



ENCYCLOPEDIA OF SOCIETY AND CULTURE

IN THE MEDIEVAL WORLD

PAM J. CRABTREE, Editor in Chief



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 **Facts On File**
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Encyclopedia of Society and Culture in the Medieval World

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Preface

Welcome to the *Encyclopedia of Society and Culture in the Medieval World*, a four-volume set that provides comprehensive coverage of the medieval world from the fall of Rome in 476 to the start of the Renaissance in approximately 1500. For coverage before the fall of Rome, readers are urged to consult our companion set, the *Encyclopedia of Society and Culture in the Ancient World*.

SCOPE AND ARRANGEMENT OF THE SET

The *Encyclopedia of Society and Culture in the Medieval World* contains 71 separate entries, each devoted to a specific cultural or societal topic. Of these 71 entries, 14 cover “major” topics with longer, more in-depth coverage than the standard entries. The entries are arranged in alphabetical order by topic; readers may consult the Contents page for a listing of these topics.

Each entry includes a discussion of the topic from the perspective of the following centers of civilization:

- Africa
- The Americas
- Asia and the Pacific
- Europe
- The Islamic World

Readers will note that there is some overlap in this list because of the inclusion of the Islamic world as a separate center of civilization. During the medieval era, Islamic rule extended not only throughout the region of the modern Middle East but also across most of northern Africa and into southern Europe, especially the Iberian Peninsula. Because the Islamic world is so often studied as a separate

entity, we decided to treat it as such in this encyclopedia. Entries devoted to Europe and Africa will thus not discuss Islamic-ruled regions.

ENTRY DETAILS

Each entry begins with an introductory essay that outlines the major developments on a given topic in the medieval world. Following that introduction are separate essays on the topic from the perspective of the named centers of civilization. At the end of the main text of each entry is a list of “see also” references to related entries, followed by a further reading list of books, articles, and Web sites on the topic.

OTHER ELEMENTS

In addition to the main text, the encyclopedia incorporates sidebars on topics that do not fit neatly into the central discussion as well as key primary source excerpts scattered throughout the set. These primary source documents appear at the end of each entry. Our goal in identifying and including these primary sources is to facilitate additional comparative study between cultures on a given topic. Readers may consult the List of Primary Source Documents in the front matter for a guide to the individual sources found in the encyclopedia. The set also features more than 240 maps and illustrations. The front matter lists these maps and illustrations.

Aside from detailing the maps, illustrations, and primary source documents, the front matter includes a section about the set’s advisers and contributors and a general introduction to the medieval world by Dr. Pam J. Crabtree of New York University, who served as the editor in chief of the encyclopedia. At the back of the set readers will find a glossary of key

terms, a general bibliography, a chronology by region, and a general subject index.

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—NEIL SCHLAGER AND MARCIA MERRYMAN MEANS,
PROJECT MANAGERS

Introduction

The medieval period, or Middle Ages, is, as its name suggests, a period of time that falls between the ancient and modern worlds. The Middle Ages began with the decline and fall of the Western Roman Empire in the fifth century C.E. and ended with the voyages of discovery, including Columbus's discovery of the Americas, about 1,000 years later. While 17th- and 18th-century scholars saw the medieval period as a "dark age," modern research has shown that the medieval era was a dynamic period of social, political, and economic changes that laid the foundation for the modern world.

The decline and fall of the Western Roman Empire took place over more than a century. In the early fourth century the Roman Empire was split into the Eastern Roman Empire, with its capital in Constantinople, and the Western Roman Empire, with its capital in Rome. By the early fifth century barbarian tribes from outside the Roman world began to cross the Rhine-Danube frontier and attack portions of the Western Roman Empire, sacking Rome itself in 410 C.E. At about the same time the Roman legions abandoned the province of Britannia (Britain), never to return. In 476 C.E. the last of the Western Roman emperors, Romulus Augustus, was deposed by the Germanic leader Odoacer. This date marks the end of the Western Roman Empire. Beginning in the fifth century Germanic tribes, including the Franks, Visigoths, Ostrogoths, Angles, and Saxons, established smaller kingdoms within the former Western Roman Empire. The Eastern Roman Empire, on the other hand, continued as the Byzantine Empire until the very end of the Middle Ages. It was overthrown by the Ottoman Empire in 1453.

The European voyages of discovery in the late 15th and early 16th centuries mark the end of the Middle Ages. Columbus's discovery of the Americas led to a period of intensive contact between the Eastern Hemisphere and Western Hemisphere. New World crops such as the potato revolutionized agriculture in the Old World, and American tobacco spread

rapidly throughout the Eastern Hemisphere. European colonists introduced diseases such as measles to the Americas. Because the Native American populations had no immunity to these new diseases, many North and South American peoples were decimated by them. The discovery of the Americas also led to an intensive period of colonization of the New World by Europeans beginning in the early 16th century with the Spanish colonization of Mexico. Thus the end of the Middle Ages is conventionally dated at 1500.

SOURCES OF INFORMATION FOR THE MEDIEVAL PERIOD

Scholars have used a variety of sources of information to study the Middle Ages. Traditional medieval studies have been based on historic texts, including documents, literature, and inscriptions. However, not all medieval societies produced written records. As a result, archaeologists, scholars who study material remains from past societies, are playing an increasingly important role in medieval studies. Other important sources of information on medieval societies include art and architecture.

DOCUMENTARY RECORDS

Written records, ranging from parish registers and land grants to histories, geographies, inscriptions, and accounts of saints' lives, have always provided information on life in the Middle Ages. However, the quantity and quality of written records vary greatly by time and place. In the Americas the Mayan peoples of Mesoamerica kept extensive written records. The decipherment of these Mayan glyphs has provided valuable information on the political history of Mayan cities. However, most other regions of the Americas did not keep written records at all. In southeastern Europe, Byzantine

historical sources provide a continuous record from the end of the Roman world through the Middle Ages. China, India, and the Middle East also have extensive historical records for most or all of the Middle Ages, whereas historical records for medieval Africa are quite limited. For western and northern Europe the historical picture is also incomplete.

For the former Western Roman Empire written sources for the fifth and sixth centuries are very limited indeed. The number of written records is so limited that the term “dark age” can be used appropriately in describing western Europe at this time. In regions of northeastern Europe, such as Scandinavia and Poland, which were outside the Roman Empire, Christianity and literacy were not introduced until about 1000. In these regions the first half of the Middle Ages is essentially prehistoric. Written records are limited to accounts written by outsiders, such as Ahmad ibn Fadlan’s Arabic account of the Viking fur traders he encountered along the Volga in 922. As a result, archaeology has come to play an increasingly important role in the study of medieval societies, especially in Europe.

ARCHAEOLOGICAL EVIDENCE

Archaeologists use material remains, such as tools, buildings, and burials, to study how people lived in the past. These remains include artifacts, features, and “ecofacts.” Artifacts are portable objects that were either made or modified by humans. Artifacts can range from complex objects such as Viking swords to simpler materials such as cooking pots. Features can be defined as nonportable artifacts. Buildings, such as houses, castles, and mosques, are features, but so are simpler structures, such as trash pits and boundary ditches. Some archaeologists use the term *ecofacts* to describe materials that are not made or modified by people but that can provide information on medieval environment or subsistence. For example, animal bones and seeds recovered from archaeological sites can tell much about medieval diets, while pollen can cast light on the medieval climate. Since written records are so limited for early medieval Europe, archaeology is a primary source of knowledge concerning early medieval life.

Even in regions where written historical sources are plentiful, such as the Byzantine Empire, China, and India, archaeology can play a role in our understanding of medieval society. During the Middle Ages most people were illiterate. Knowledge of reading and writing was limited to the political and religious elites. For this reason, written documents tell us about the lives of kings and saints but very little about the day-to-day lives of farmers and serfs. Written documents speak about political history, giving the names of kings and the dates and locations of battles, but they impart much less detail about clothing, houses, and diet. Thus, archaeology is playing an increasingly important role in the study of all medieval societies throughout the world.

Medieval archaeology is a field of study that has developed in the past 50 years. In Europe and many other parts of the world modern cities are situated atop the remains of medieval towns and cities. The medieval remains lie under modern buildings and are usually inaccessible to archaeologists. In Europe the devastation caused by World War II made many of the medieval cities, such as medieval London, accessible to archaeologists for the first time. Today, in many parts of the world, archaeologists explore medieval remains in urban centers in advance of urban reconstruction. While medieval archaeology was born in postwar Europe, it has spread to many other regions on the world during the past 50 years. Today medieval archaeologists explore ancient cities in India, towns in medieval sub-Saharan Africa, and sites associated with the Crusades in the Middle East.

ART AND ARCHITECTURAL HISTORY

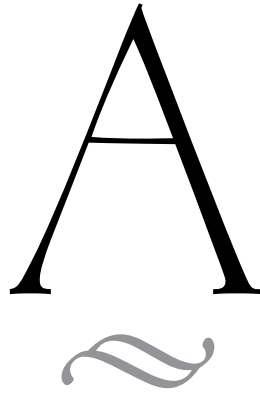
Art and architectural historians have always played an important role in the study of medieval societies around the world. The modern landscape features many buildings, including castles, temples, and houses, that were built in the Middle Ages. Some survive as ruins, while others have been in continuous use since the medieval period. Detailed studies of these buildings can tell us a great deal about medieval technology and the ways that it changed through time. In addition, the study of religious buildings, such as temples, mosques, cathedrals, and monasteries, can help us understand medieval religious practices. Many of these religious buildings house priceless examples of medieval art, including paintings, sculpture, and smaller objects like reliquaries (decorated containers for sacred relics). Studies of these sacred objects can tell us about the nature of the crafts that were practiced in the medieval world.

BEYOND THE “DARK AGES”

When we think of the Middle Ages, we conjure up images of the Black Death, or bubonic plague; Viking raids; and bloody battles. Many people also imagine that the medieval period was an era of stagnation in science and technology. It is no wonder that the medieval period is sometimes erroneously referred to as the Dark Ages. While Viking raids and infectious diseases were certainly a reality of medieval life, the medieval period cannot be seen as an era of technological stagnation. Sophisticated shipbuilding techniques allowed the Vikings to settle Iceland and Greenland and to explore the Atlantic coast of Canada. Medieval inventions such as the cannon and plate armor transformed the nature of warfare. New architectural techniques allowed medieval architects to construct castles and cathedrals. These important developments in shipbuilding, pyrotechnology, metalworking, and architecture laid the foundations for the modern world.

—PAM J. CRABTREE, PH.D.

Entries A to C



► adornment

INTRODUCTION

Throughout history, people have used adornment to make themselves beautiful, express religious or political sentiments, or identify themselves as members of particular groups. Medieval people used jewelry, cosmetics, and hairstyles to adorn themselves.

In the Islamic world adornment filled the dual roles of decoration and coverage. The Koran dictated that men and women should dress modestly in public, covering their bodies and heads. The veil became a symbol of class status; high-class women covered their hair and often their faces, while servant women left their hair uncovered. Islamic women used many different types of veils and full-body coverings. Some left openings for eyes, while others masked the wearer's eyes completely with mesh. Islamic men wore turbans.

Although they were covered in public, at home Muslims shed their concealing garments and revealed the makeup and jewelry that they had carefully selected. Women used cosmetics to keep their skin white, their eyebrows dark, and their cheeks and lips red. Men were allowed to wear perfume at home and in public. Women could wear perfume only at home. Women wore a large amount of gold jewelry set with jewels. Men, however, were not allowed to wear gold, but they could wear silver rings.

In Africa people wore jewelry made of shells, beads, fabric, and other items. Beads could be made of metal, coral,

glass or stones such as jasper and cornelian. Many of these items came to Africa from the Indian Ocean region. People made these beads into necklaces, collars, bracelets, anklets, and chest panels. Decorations could signify rank or status; for example, among many peoples, chiefs and their families wore much more elaborate jewelry than common folk. In West Africa cowrie shells were particularly valued in jewelry and were used in rings, necklaces, belts, and headdresses. Ivory and metals such as gold and copper were used in ornaments worn by the rich and powerful.

African people also used their own bodies as artistic canvases. People across the continent arranged their hair in elaborate styles, sometimes decorating their hair with shells or other objects. They painted their bodies with designs that held symbolic meanings. Many Africans cut designs into their skin to leave decorative raised scars that showed they had come of age, reached particular milestones in life, belonged to certain groups, or conformed to the local ideal of attractiveness.

Throughout Asia people wore jewelry as decoration and as a mark of wealth and status. In China people wore elaborate jewelry made of gold, silver, and stones such as turquoise and opals. Metalsmiths used casting, beating, and granular techniques to make hairpins, decorative combs and hair ornaments, bracelets, earrings, necklaces, and other items. Floral motifs were very common in medieval Chinese jewelry. Gold and gemstone jewelry was also popular in India, and Indian jewelry fashions spread through much of Southeast Asia. In

Thailand people liked to wear jewelry made with glass or ceramic beads, cornelian, agate, amethyst, diamonds, and other stones. The wealthier the individual, the more expensive the jewelry he or she could wear.

People in India drew designs on their skins with henna to mark special occasions such as weddings. Many Asian and Pacific peoples tattooed themselves to make themselves more beautiful or to show status or membership in groups, though tattooing was a mark of shame in China and Japan. In China and Japan women used white makeup to lighten the skin on their faces. A pure white face with deep red lips was considered the ideal for aristocratic women at the imperial court in Kyoto.

People in the Americas made jewelry out of feathers, shells, jade, and other items. The Maya and other Mesoamerican peoples were highly skilled at working metal, creating necklaces, bracelets, and other more exotic items such as lipspools, earspools, and nose rings that they wore in large holes in their faces to make themselves look attractive or fearsome or to express spiritual connection to the gods. American peoples also painted their faces and bodies with designs for ceremonies or battle.

Medieval Europeans devoted a fair amount of time, energy, and money to adornment. They thought smooth white skin was beautiful, so women in particular used skin creams and avoided the sun if they could. Both sexes used pigments to enhance their lips, cheeks, and eyes. Women wore their hair long and arranged into fashionable hairstyles. Some women bleached their hair to make it blonde. Men might curl or braid their hair. Many men in northern Europe wore mustaches and beards, which they sometimes arranged in interesting shapes.

Jewelry was a popular form of adornment. At the Byzantine court both men and women wore gold jewelry set with stones or decorated with mosaics. Many people wore reliquaries, cross-shaped boxes that held holy relics. In western Europe the most common types of jewelry were rings and brooches. Celtic metalsmiths produced jewelry formed in elaborate patterns, such as interwoven knots, animals, and ships. People who had gone on pilgrimages to the Holy Land would advertise this fact by wearing metal badges on their clothing or affixing scallop shells to their hats. A gentleman might also add a weapon or piece of armor to his ensemble to show everyone his military prowess.

AFRICA

BY CARYN E. NEUMANN

Adornment is a personal statement to others. By dressing the body in jewelry or perfumes or modifying the body with

AFRICAN BODY ART

African people of the medieval era practiced a range of body art. According to the norms of the culture, men and women would color or scar their skin. In common with other African adornments, scars designated status. In common with some clothes, tattoos provided protection.

Medieval Africans may have blackened the area around the eyes and lips to follow their society's idea of beauty. Both men and women of the Fulani of West Africa painted themselves white, red, and yellow. Unlike skin painting, which is used with jewelry and clothing to enhance beauty, tattoos among the Fulani appear to have been strictly protective. Triangles tattooed at the corners of the mouth were thought to protect against the feared "evil eye" of malevolent humans.

Scarification is a form of art that requires an expert hand. The technique of scarification has changed little over time. A man or woman makes a small cut with a razor or thorns and uses a foreign substance, often charcoal, to irrigate the wound. The wound is then allowed to heal. During healing, raised scars become visible.

Scars showed tribal identity as well as personal achievements. The Mursi of East Africa was one group that engaged in scarification. The scars on the arms and bodies of Mursi men were a record of feats of bravery in battle or outstanding skill at hunting. The marks, arranged in typically African geometric patterns, enhanced the social prestige of the wearer. The Bumi men of the Omo Valley in East Africa adorned their faces with scar patterns, presumably to indicate personal achievement. For women scars symbolized fertility. They showed that she bore children or had the strength to withstand the pain of childbearing. The arrangement of teardrop-shaped scars around a central point was typical. The absence of skin decoration is telling. With expert practitioners beyond the financial means of many Africans, scars showed social status.

piercing, scarification, tattoos, or hairstyles, an individual communicates important information. Social status, familial position, financial standing, and group identity are just some of the personal information that medieval Africans communicated through adornment. Much of this information

became lost when it was translated through European eyes. Medieval travelers and adventurers lacked the social awareness to understand African adornment as more than just body decoration.

In medieval African adornment an object or design did not stand alone. It was meant to be viewed in the context of clothing, hats, hairstyles, and other adornments. Africans specialized in assembling elements of power and display. Creating a totally adorned body, magnified by layers of beads and fabrics and visually enriched by the juxtaposition of ornate geometric motifs sometimes combined with similar patterns in torso scarification and elaborate hairstyles, expressed wealth and status among medieval Africans. Display elements, reflecting a family's wealth, included beads and cowrie shells as well as belts, fibers, and reflective surfaces. Power elements, often acquired over long periods, included horns, claws, skulls, and hair and created surfaces charged with special powers.

Evidence indicates that beads made from metal, stone such as jasper or carnelian, or glass were traded across the Indian Ocean to Southern Africa starting before 1000 C.E. The beads were then exchanged throughout Africa, adding to their value as items of wealth and status. However, beads were known to Africans who did not engage in transoceanic trade. The earliest examples of African medieval adornment are tin and stone beads from the Nok culture of central Nigeria around 300 C.E. Excavations at Igbo Ukwu in eastern Nigeria, dated to about the ninth or 10th century, have found not only crowns, breastplates, pendants, ornaments, anklets, wristlet, and chains but also tens of thousands of beads once worked into elaborate necklaces. These glass beads were not manufactured locally but obviously were acquired through trade, perhaps for slaves, ivory, or spices.



Hip ornament; Nigeria, as early as the 15th century (National Museum of African Art, Smithsonian Institution, photograph by Franko Khoury)

Several stone figures discovered in the sacred city of Ife, Nigeria, depict human figures that date from 800 to 1000 C.E. The best known of these objects shows a bare-chested Yoruba man sporting a heavy collar of beads and bracelets that suggest he held high rank. Other figures, presumably sculptures of rulers, show dignitaries wearing coronation insignia. These items include large collars of beads, tumbling strands of bead necklaces, an abundance of bead bracelets and anklets, and toe rings. In some cultures, such as the Yoruba, the accumulation and distribution of beads was the prerogative of the ruler. In kingdoms such as the Owo, histories of chiefs begin with recounting how many strands of beads were given by the king to a man granted a title. Beads on the ankles and arms and around the neck, along with sashes of jasper or coral beads, allude to the rank of chief in the social hierarchy.

For centuries beadwork formed the primary type of personal adornment and the apex of artistic expression in Africa. Beads were given high aesthetic value because they were thought to unite four qualities: hardness, brilliance, geometric patterns, and color. Glass beads were most popular in the southern Africa, while the people of Central and East Africa preferred ivory beads. Beaded objects indicated information about the wearer in societies like the Kete people. Colored glass beads were combined with cowrie shells to cover sashes and belts, creating a dazzling visual display. A West African woman acquired beaded-fringe panel necklaces, beaded collars, long multicolored strands of beads, and beaded leather pouches throughout her lifetime. Thus the items functioned as insignia of her social status and her connection to her family and ancestors. They also communicated information about her personality and marital status. Richly beaded capes in abstract patterns characteristic of Africa were worn by the married women of the Ngwane of South Africa.

Cowries also were used as adornment. These white shells of the *Cypraea moneta* came to Africa from the coasts of Bengal and the Maldives, islands in the Indian Ocean. They were used as both currency and decoration. No other material equaled the popularity of cowries in West Africa. The value of the shells was derived from their shape, which suggests the female sexual organ and, by extension, the aesthetic and social value of the woman herself. The structure and color of cowrie shells also suggest the human skeleton, thereby equating the shell with the most beautiful of earth's creations. The shape of cowries makes them ideal for ornamental artifacts and for very intricate geometric patterns. They were attached with wax to hard supports such as wood or metal as well as sewn onto leather or fabrics. The shells were also threaded to make jewelry and used in headdresses, rings, belts, and necklaces as well as to form sparkling overlays for masks.



Blown-glass perfume sprinkler; Egypt or Syria, 14th century (Los Angeles County Museum of Art, the Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA)

Medieval Africans believed that ivory objects of adornment imparted the powerful life force of the elephant. Ivory's light color, luminous warm patina, and surface irregularities or patterns (natural or induced and heightened by soil, wear, or color) made it enormously popular in central Africa. Items made of ivory acted as vivid punctuation points against dark skin tones or abundant dark hair.

Like ivory, metal objects of bronze, copper, iron, gold, or silver symbolized prosperity. The luster of the metal added a glow to an assemblage. The weight of metal adornments altered the gestures of the wearer while augmenting the body's contours. Metal adornments created a geometry that could be echoed by the patterns incised in the wearer's skin. Although metal was used all over the African continent, copper appears to have been more highly valued than any other precious metal among the Dogon and Bambara of West Africa because of its ability to change color. Humidity in the air turns copper from red to green, while heating it to red hot in the presence of oxygen turns the metal black.

Political status was indicated in the medieval era by a profusion of gold and copper ornaments and regalia. Akan chiefs,

queen mothers, and their attendants also wore much metal jewelry. Gold pectoral disks, known as *akrafokonmu* ("soul people's neckwear" or "soul washer's badges") were created from cast, repoussé (patterning formed in relief), or gold-leaf-over-wood techniques. The disks were worn by favorite slaves and commoners who had distinguished themselves. The wearers would be sacrificed at the king's grave on his death.

Adornment that extended the shape of the head, in the form of hairstyles or head shaping, pervaded medieval African society. The Nok wore elaborate hairstyles with intricate buns, tresses, and locks along with a seeming excess of beads around their necks, torsos, and waists. The body adornment appears to have indicated rank. Head shaping took place throughout Africa as a part of spiritual beliefs or to enhance the beauty of an individual. Some groups saw people with elongated heads as possessing more wisdom than those with naturally shaped heads. The process of head shaping in the medieval era has been lost. However, it is likely that it has some similarities with modern head shaping. A newborn's skull is malleable enough to be molded. A soft wrapping, perhaps made from tree bark, was placed around an infant's head within a few weeks after birth. A tighter wrapping of a rope or a basket was placed over this wrapping. This process was continued for about six months until the shape of the skull was permanently altered.

Medieval Africans also changed the color of their bodies. The Akan, a West African forest people, viewed gold and copper as possessing both aesthetic and spiritual value. An Akan copper cosmetic box has been found that once contained pomade made of shea butter mixed with gold dust that was rubbed on the skin. Medieval African cosmetology did not permit a gradual change from one color to another. Accordingly, cosmetic adornments showed sharp contrasts between the black color of the body, red, and white. Other colors were apparently rarely used. Black showed the energy of life, while white represented birth, and red indicated the time between birth and death. Body designs, in common with bead designs, were typically geometric.

THE AMERICAS

BY JULIA MARTA CLAPP

There are several ways to learn about adornment practices in the period before European contact. First, we may study the artifacts that archaeologists have unearthed. Second, we may study the ancient art of a particular region and look at the adornment of the figures depicted. Third, we can learn from the objects that were buried with the dead. Any of these approaches used on their own will not offer a complete picture, so they are best considered together.

A quick survey of art from the Maya civilization in the Classic Era (ca. 200–ca. 900 C.E.) reveals a Mayan taste for abundance of personal ornamentation. For example, stela 31 from the city of Tikal depicts a warrior draped in lustrous jewelry and ceremonial garb. He wears an elaborate feathered headdress (or helmet) that covers his chin. Around his neck are circular discs that are likely shell gorgets. A figure in stela 4 from Machaquilá, Guatemala, depicts a figure in similar garb, wearing wrist and ankle ornaments as well.

Necklaces were common in the art of the Maya, and nearly every depiction of a figure includes a large, multistranded necklace. Headdresses were also depicted frequently; ornate headdresses are one of the most recognizable aspects of Maya art. The Maya wore plugs (also known as spools or flares) in their ears and lips. Plugs are large discs that are worn in the lip or ear and stretch the skin. Earspools and lipspools were probably the most common articles of adornment worn in the Americas during this era.

Jade and shell were popular materials for articles of personal adornment. One Maya artifact, a shell pendant from Jaina (ca. 600–ca. 800 C.E.), is only about 3 inches high, but it clearly depicts a figure sitting with a fish that is covered in hieroglyphic text. At one time this pendant was inlaid with jade, although the jade has since been lost.

Teotihuacán is now especially known for the masks archaeologists have found there. Although we don't have a great deal of knowledge about the citizens of Teotihuacán, we can gather some clues from the masks. For example, a censer mask (ca. 500–ca. 650 C.E.) depicts an abstracted face with earspools and a nose bar, an ornament traditionally worn by elites or by deities.

Metalworking was a large part of artistic production in Mesoamerica during the Classic Period, and ancient pre-Columbian people put this skill to great use for luxury goods. At the time of the Spanish conquest European invaders destroyed much Aztec art, but some jewelry and other objects of personal adornment have survived. The Aztec were masterly in their ability to create intricate, detailed design from gold. One Aztec lipspool in the shape of a serpent's head includes a protruding forked tongue. In addition to earspools and lipspools the Aztec also wore nose ornaments. One 16th-century gold piece, in particular, is flat and pressed into a U-shape, which art historians have identified as an abstracted butterfly. Archaeologists also have found a string of gold and silver round beads of varying sizes that may have been made as early as the 14th century. Other beads were made in the shapes of particular animals, such as snails.

In addition, archaeologists have found intricate rings. A gold ring from the Postclassic Period (ca. 900–1521 C.E.)

represents the god Xipe Totec. The ring is ornately carved with the god's face, and he wears his own nose and ear ornaments and headdress with bells attached. Aztec wore not only round spools in their ears but also earrings that dangled in a manner similar to that of earrings worn today. One pair from the 15th century depicts a bird's face (possibly an eagle) protruding from a circular band. From the bird's beak hang several rows of dangling bells. Aztec wore adornments made from materials besides gold. Like other pre-Columbian Mesoamericans, Aztec also made use of jade and turquoise to beautiful effect. In addition to earspools, lipspools, rings, and nose ornaments, archaeologists have also found bracelets, pendants, and pectorals.

There are far fewer representations of human beings in art from this period in Native American history than there are from other parts of the Americas, so information about jewelry and adornment is dependent on archaeological excavation. The Mississippian culture (ca. 750–ca. 1500 C.E.), which inhabited the eastern, midwestern, and southeastern United States, made gorgets out of shell with incised images. Warriors would have worn them. In one, a warrior in an active pose with arms and legs extended holds a club and the decapitated head of an enemy. Gorgets were also found in burial mounds from the era. From the Mississippian burials gorgets are plentiful and the most common type of adornment that archaeologists have found. Historically, Native Americans from the eastern part of the current United States built mounds over burial tombs and filled them with rich offerings, especially articles of adornment.

During the Mississippian Period copper and marine-shell items were considered to be the most valuable materials. Although it was primarily the elite who owned objects made from them, ornaments of shell and copper were also popular in trade. These were primarily made into beads, pendants, and gorgets.

The use of earspools, lipspools, and headdresses of varying styles had widespread use throughout the Americas prior to the Spanish conquest and were equally common in North America. Sculptures of high-status citizens of the Mississippian civilization confirm this: One of a crouching figure (ca. 1200–1350 C.E.) shows a man wearing earspools and a necklace, and he has his hair tied in a topknot on the crown of his head. Another sculpture depicts a man in ceremonial costume wearing a headdress, shirt, and sash, with marks around his eyes. In later centuries, after sustained contact with Europeans, Native Americans were widely known to have practiced tattooing or body painting. Historians and archaeologists believe that it is likely that this was carried out during the Mississippian Period as well, which pigmented art objects such as the costumed figure suggests.



Jadeite earspool; Maya culture, Guatemala, ca. 550-ca. 850
(Los Angeles County Museum of Art, the Phil Berg Collection, Photograph
© 2006 Museum Associates/LACMA)

Before Spanish colonization in South America, natives worked adeptly with gold. Interestingly, gold was not an especially valuable material for native South Americans, though it was for the invading Spaniards in the 16th century. The value of a given object instead would have been located in its symbolic meaning and the quality of its craftsmanship.

One of the most astonishing and rich discoveries of the 20th century was the tomb of an ancient ruler from Sipán. The excavation revealed treasures of the Moche civilization, which inhabited the coastal plains of Peru from the first to the eighth centuries. Like many such discoveries, the excavation of Sipán was initially jeopardized by widespread looting, though many of the stolen goods have since been recovered. In the tomb archaeologists found many varieties of hollow beads that were made by soldering (joining with heat) two pieces of metal together. The beads were produced in a variety of shapes and sizes. One of the most impressive is nearly 5 inches in diameter and depicts a human head, its eyes made of lapis lazuli (a blue stone that the Moche acquired from Chile) and silver. The face has wide eyes; a broad nose; large, round ears; and carving that represents hair hanging over its forehead.

A pair of earplugs from Sipán is a typical example of the tomb's riches and is similar in shape to modern-day cuff links. A flat, oval gold base is inlaid with turquoise and shell. The inlay is created of many very small pieces, which—like a mosaic—form the image of a zoomorphic figure with a bird's

head, running and holding an object. Similar ear ornaments depict people, ducks, deer, and other figures.

Other objects found at Sipán were earrings; nose ornaments (for a pierced septum); a crown; masks; a headdress; bracelets; a painstakingly beaded pectoral made of white, pink, and green shell beads; a hammered, fitted gold plate that covered the wearer's entire face below his nose (probably designed as a burial ornament only and not worn in life); bells; and other astonishingly beautiful objects. It is important to remember that the treasures found at Sipán were meant for the wealthy and elite only; such a discovery gives us little understanding of everyday adornments worn by the nonelite.

Much later artisans from the Chimú Period (ca. 11th–13th centuries) made gold earspools similar to those found at Sipán. These are round like coins and were created by hammering flat sheets of the metal. The spools depict a figure with upraised arms, which is also bedecked in jewelry and a headdress as well as separate, dangling pieces that are attached on small rings. Metalworkers from this period were skilled at creating such designs that had separate parts and that were made of a gold alloy; gold was mixed with other metals to increase its strength. Since the Moche Period, South Americans had been mixing gold, silver, and copper, but they were skilled at making these alloys appear to be pure gold.

Most of the artifacts that have survived from the Caribbean islands are objects of ceremony or ritual, rather than articles of adornment. However, from the Dominican Republic (on the island of Hispaniola) archaeologists have found a beaded necklace made of semiprecious stones. The beads are still strung together, and they are fairly uniform and smooth. The amulet represents a mythical, anthropomorphic creature. Such ornament was added to daggers, scepters, or amulets carved of stone, shell, or jadeite. In Taino societies in the Greater Antilles and the Bahamas only the cacique, or ruler (and his wife or wives), wore jewelry.

Pre-Columbian Taino societies also adorned their skin with body paint, especially for religious ceremonies and battle. They painted their bodies with ink made from plants and clay. In addition, paint could be applied with a stamp. From the Dominican Republic is such a ceramic stamp in the shape of a bearlike animal adorned with a geometric pattern. Although stone, shell, and wood were the most popular materials used for much Taino craftsmanship, they were also skilled in beadwork. A belt (ca. 1530 C.E.) from the Greater Antilles is constructed from cotton, red and white snail shells, black seeds, pearls, glass, and obsidian. The beadwork is geometric and precise. In the center of the belt is a figure, which mostly consists of a simplified head with open mouth and teeth and wide eyes, flanked by earspools and hands.

ASIA AND THE PACIFIC

BY CARYN E. NEUMANN

The history of Asian art gives little emphasis to the so-called minor arts associated with adornment. Textiles, jewelry, and body art have undergone little study from either the technical or historical standpoints. Few pieces of jewelry are dated, leaving considerable chronological gaps in the narrative. Nonetheless, certain patterns based on style, design, and technique do emerge that can be viewed in the context of political developments. As is evident from excavations and records, the applied and decorative arts played an important part in everyday Asian life of the medieval era.

Ornamentation with jewelry was probably the most popular type of adornment in Southeast Asia of the Middle Ages. Extant images from the region reflect Indian influences and an excess of riches. The bas-relief figures on famous monuments are sumptuously adorned with an abundance of jewelry worn in direct contact with the skin, fastening draped costumes, and adorning intricate hairstyles. Bracelets, chest pendants, head ornaments, belts with buckles, rings, and necklaces cover these images. Like Indian jewelry, most of the jewelry from Southeast Asia was gold. Pieces were molded, forged cold in the form of stamped or embossed sheets, or constructed from a clay or bronze core wrapped in a sheet of gold. The jewelry helped signify rank. Semiprecious stones enhanced the simplest as well as the most intricate shapes of rings and buckles.

Gold has never been abundant in Thailand. However, a few small mines in scattered locations produced enough of the precious metal to explain the wealth of gold artifacts discovered from the medieval period. Most gold came to Thailand through trade. As a valuable commodity, gold was generally used only for religious or royal objects. Many Thai artisans used niello (a black-colored alloy). The process of creating niello is thought to have come to Thailand from India in the 12th century. The object decorated with the amalgam had to have a silver content of at least 95 percent for proper adhesion. Artisans used chisels to etch designs.

The niello amalgam was made of lead, copper, and silver, which were heated to form a compound. Sulfur was added, and the mixture was allowed to cool and harden. The compound was crushed to a powder and mixed with soldering flux pressed into etched areas on the object. The object was then smoothed with sand and polished by rubbing it with soft charcoal. Gold could also be wiped on to silver areas to make gold flowers on silver vines.

In Thailand bead necklaces and beaded ornaments were in fashion from the ancient period up to the 11th century. The Thais used beads made from cornelian, agate, garnet, and

amethyst as well as colored glass and glazed ceramic. Gold and silver ornaments appeared in Southeast Asia during the period of Indian-influenced civilization from the first to the fifth centuries. Following the Indian style, Thai jewelers favored nine gems: diamonds, rubies, emeralds, topaz, garnet, sapphires, moonstone, zircon, and cat's eyes. The Indian tradition was followed in Thailand by the Mon culture from the sixth to the 11th centuries. Gold ornaments of the period included rings, earrings, necklaces, and pendants. The common motif of Mon jewelry was a dot design. Semiprecious stones were applied to some pieces. The royal fascination with gold continued with the rise of the Sukhothai kingdom in the 13th century and through the modern period.

In China the Tang Dynasty (618–907) experienced a flourishing of metalworking. Once used principally as inlay and decoration on bronze objects, gold and silver began to be used in all the innovative shapes and beautiful designs that had been exclusive to bronze. Elaborate eighth-century gold hairpins have been discovered in Guangzhou at the Huangdigang archaeological site. A tomb dating to 760 at the Hansenzhai site in Xi'an disclosed gold filigree and beaded hairpins set with turquoise and opal and in the form of birds with outspread wings. Other hairpins with openwork ornaments were recovered from a tomb at the Huijiacun site in Xi'an and dated 848. Chinese metalwork from this period was either cast or beaten. Granular work was used sparingly and, for the most part, only on jewelry. By the mid-eighth



Bronze mirror; China, Tang Dynasty, eighth century (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)

century granular work became favored for hairpins and other hair ornaments. Other jewelry pieces were worked in filigree and set with semiprecious stones. Floral patterns, either as a blossom or a spray, confined to a circular or oval center were one of the most common design elements.

Japan has a long history of fascination with the painted face. The fashion for white makeup came from China in the seventh century. When Japanese culture blossomed in the Heian Period, stereotyped white face makeup had already become an attribute of beauty for aristocratic women at the imperial court in Kyoto. It would remain so for the rest of the medieval era. A white face with red lips stylized the appearance, eliminating any individualism and elevating the wearer above the ordinary. The Chinese supplied the women of the imperial court with white lead-based makeup that proved extremely damaging to the skin. The red for the lips, obtained from the flowers of the safflower plant, apparently came from China in about 610 B.C.E.

The Ainu women of Japan practiced tattooing. The significance of the decorations was closely linked to the Ainu religion and to their social structure. A full tattoo was a status symbol for a married woman. Female specialists performed the tattooing process in several stages over a period of years. Powdered charcoal was rubbed into cuts made in the skin with small sharp knives. The result was a blue-black tattoo tapering at the sides of the mouth that made the lips appear double in size. The areas around the eyebrows were also decorated with wavy lines, and the hands and forearms were adorned with various patterns.

While body art in other regions became associated with high status, tattooing in medieval Japan was linked with low social status. From the sixth century onward tattooing was used as a form of punishment. As in China, marks were made on the foreheads or forearms of criminals to set them apart from the rest of society. In some regions a criminal was tattooed with the character of a dog or a stripe. In some eras the lowest class of grave diggers and menial laborers were also distinguished from the rest of society by a tattooed caste mark called an *eta*.

Southeast Asia used gold in ornament before the Chinese did so and continued this practice through the medieval era. In Java the facial orifices of the dead were covered with rings and tiny sheets of gold until the seventh century, while Filipinos continued this practice until the 14th century. At the same time the use of rings and ear ornaments (broken rings with or without a bulge near the cleft with wire coiled in a double spiral) was widespread at all levels of society throughout the region. Javanese and Balinese people, according to surviving monuments, wore an abundance of jewelry in direct contact with the skin, to fasten draped

costumes, and to adorn elaborate hairstyles. Bracelets, chest pendants, head ornaments, belts with buckles, rings, and necklaces made of gold and precious stones helped signify rank in the Pacific islands.

EUROPE

BY AMY HACKNEY BLACKWELL

The efforts medieval Europeans made to adorn themselves were determined by time, place, and social status. For most Europeans adornment was a simple matter. The poor did not have ready access to warm water or jewelry, so for them adornment might consist of a quick splash of water and brushing the crumbs off their clothes. For the wealthy, however, adornment was a serious business. At the Byzantine court and in other royal environments, people would cover themselves with gold and jewels in all the latest styles.

Bathing habits varied tremendously in medieval Europe. Although the peasantry generally did not bathe very often, many Europeans did wash themselves regularly. Some Irish people during the early medieval period appear to have bathed and combed their hair daily. The Anglo-Saxon people of Britain did not bathe their whole bodies frequently, but they did wash their faces, hands, and feet daily, and many people owned their own wash basins. In the 13th and 14th centuries wealthy people typically bathed once a week. Europeans of all ranks used lotions and unguents to keep their skin soft and prevent chapping. Olive oil, lanolin, and butter made good lotions and sometimes were mixed with herbs to make them smell nice. Many people oiled their hair as well. Europeans kept their teeth clean by rubbing them with twigs or chalk. Some Viking men apparently carved decorative grooves into their teeth and filled them in with red or black pigments.

Throughout medieval Europe people prized smooth white skin. The most common means of maintaining a white complexion was staying out of the sun, an option that was unavailable to peasants, who typically labored under a hot sun and thus had darker skin than members of the aristocracy, who generally avoided both labor and the sun. Women (and some men) used various colored substances to enhance their appearances. In Ireland, for example, berries from the alder tree made a good red pigment for cheeks and lips. Other natural pigments were used to darken eyebrows or as eye shadow. Many people used soot or kohl, a substance made from the heavy metal antimony, as an eyeliner or mascara. Honey was said to make lips firmer. Most refined Europeans valued smooth hands and neat fingernails. In Ireland women sometimes dyed their fingernails red.

Medieval women wore their hair long. Irish poets sing the praises of women with hair long enough to touch the grass. In

much of Europe golden hair was considered the most beautiful, and women were known to bleach their hair to achieve the fashionable light color. Ingredients in hair color recipes included saffron, eggs, chamomile, henna, and calf liver. People used combs made of ivory, wood, or bone to keep their hair tangle free. Hairstyles varied from place to place but often involved braids, which kept hair in order and lent themselves to various arrangements. Some women let their braids hang over their shoulders, and others wound their braids around their heads. A popular arrangement was the ram's horn, in which the braids were twisted into circles on the sides of the head. Another style was achieved by gathering the braids into a mass held at the back of the head in gold netting called a *crispine*. Women could add false hair to their own to make their braids longer. They sometimes braided ribbons or gold thread in their hair. On top of their hair women sometimes wore veils, flower wreaths, or circlets of gold. Starting in the 13th century wealthy women in western Europe continued to wear elaborate hairstyles, but they often hid this work entirely under pieces of cloth that covered their heads and necks.

Men's hair and beards were also the focus of much attention. Men in western Europe typically wore their hair long. They might let it fall loose over their shoulders or arrange it in braids. Depictions of men in the Book of Kells and other illustrations show elaborately curled and arranged hairstyles that must have been executed by skilled hairdressers. Viking men usually wore their hair long in various styles, often designed to fit under the conical helmets they wore in battle. Western European facial hair fashions varied throughout the medieval period. Beards and mustaches were very common, especially in Britain, Ireland, and Scandinavia. Some men wore mustaches without beards. Irish men sometimes wore their beards forked into two points.

At the Byzantine court and among wealthy Byzantine households, jewelry and adornment were ubiquitous and complicated. Both sexes wore jewelry made of gold, often set with precious stones. Sapphires and emeralds were the most commonly used gemstones, though rubies and diamonds were also popular. These stones were polished smooth but uncut because jewelers of that time did not know how to cut facets into gems. Pearls were extremely popular, and women who could afford them wore strands of pearls around their necks or wrists. Women liked to wear large earrings of gold and gems and gold bracelets. Most people used pins to secure their cloaks around their necks and shoulders, and these pins could be very rich and ornate. Some jewelry was decorated with mosaics, designs formed by piecing together tiny fragments of colored stones into patterns. Many people wore reliquaries as jewelry, usually as pendants on chains. Reliquaries were small crosses decorated with gold wire or set with gems; they were designed as



Saxon brooch; Britain, seventh to ninth centuries (© Museum of London)

hollow boxes intended to contain holy relics, such as splinters from Christ's cross or the finger bones of saints.

The famous empress Theodora was known for her elaborately jeweled headdresses, which were made of gold and liberally encrusted with pearls and gemstones, with several strands of pearls dangling down to her shoulders. In one portrait she wears a heavy gold collar on top of her cloak. The collar is set with numerous emeralds and pearls, with large tear-drop-shaped pearls hanging from the bottom edge.

Byzantine women wore elaborate hairstyles, similar to those worn during the late Roman Empire. They would wear braids entwined with pearls, affixing the arrangement with pins decorated with carved heads. Some women wrapped their heads in turbans decorated with tiny pearls or gems. Byzantine men wore their hair short and shaved their faces until about 900, when beards became fashionable.

A Byzantine emperor would often wear a cloak extravagantly decorated with jewels, gold, and elaborately embroidered designs. The most lavish part of this cloak was a rectangular or square panel called a *tablion*, which was covered with embroidery depicting a significant image, such

as the face of Christ. Only the emperor could wear a purple cloak. People with money would invest in “jewelry” for their garments. Clothing could be decorated with tiny pearls and gems, or with sheets of gold hammered flat and sewn to the cloth. A nobleman wore a long oblong scarf across his chest and around his waist. The scarf, called a *lorum*, was encrusted with pearls, gems, and embroidery in silk, wool, and gold thread.

Even the soldiers of Byzantium decorated themselves. Members of the imperial Varangian Guard wore metal helmets with bull’s horns on either side, like the helmets worn by Vikings. They attached ornamented metal brooches to their mail shirts and carried swords and spears decorated with gold and silver inlays.

In western Europe the girdle, or belt, was an important piece of adornment for both men and women starting in the early medieval period. Women wore clothes that showed off their waists, and on top of their dresses they wore loose girdles that showed off their status. A wealthy woman’s girdle was woven of gold or silver thread and studded with metal ornaments, enamel, and jewels. Many medieval stories feature ladies awarding their girdles as prizes to brave knights. The girdle was also useful for carrying important items. Women often tied their purses to their belts, and the lady of a house was identifiable by the bunch of keys she wore on her girdle. Garters were an important form of decoration as well. Noble-men sometimes wore garters made of gold as a way of showing off their rank.

In the early medieval period western Europeans did not wear a great deal of jewelry. From the sixth through the 12th and 13th centuries the most popular forms of jewelry were brooches and rings, which could be made of gold, silver, and gems. People covered their arms and necks with clothing, so necklaces and bracelets were impractical. Brooches, however, were important because they could be used to fasten cloaks and garments, and some were extremely elaborate. Celtic metalsmiths, in particular, were known for their ornate knot designs. One of the best sources of information on early medieval jewelry comes from the Sutton Hoo burial ship, the grave of King Raedwald of East Anglia, who died around 625. Artifacts found within the grave include brooches and buckles made of silver and bronze, silver dress pins, fragments of embroidered cloth, shoulder clasps made of gold and decorated with garnets, a sword with cloisonné decorations on the hilt, and a bronze full-face helmet. Many of the metal pieces were decorated with intricately intertwined lines and images of animals, including birds of prey and wolves. The metal-work and textile decorations all suggest that the people of Sutton Hoo had contact with traders from other lands, from Scandinavia to Byzantium and even Syria.

Viking metalsmiths from around the year 1000 also made intricate jewelry. Pendants depicting Thor’s hammer were a popular decoration; one good example is a hammer found on the island of Bornholm, Denmark, now in the Danish National Museum in Copenhagen. Viking smiths made gold rings with woven or braided patterns or decorated with pearls. People closed their cloaks with brooches decorated with ships, horses, dragons, panthers, and other images.

As pilgrimages to holy sites and the Holy Land became popular in the 12th century, people adopted a fashion that let them show everyone where they had been. A person who had visited the Holy Land would place a scallop shell in his hat. Shrines sold badges that were associated with their particular saints. These badges were made of metals such as brass or pewter. They were either pinned or sewn onto clothing.

During the 1300s and 1400s accessories and cosmetics became more elaborate. Most men of the time chose to shave their faces completely, although some continued to wear beards and mustaches. They began to wear their hair chin length and parted in the middle. In France men oiled their hair to make it smooth and rolled the ends around pieces of fabric. Women plucked the hair to make their foreheads appear taller. They also plucked their eyebrows, either into thin lines or completely off so that they could paint new eyebrows higher, thus furthering the effect of an elongated face.

Men and women continued to wear rings and brooches. Gloves were very fashionable, and sometimes people cut holes in the fingers of their gloves to let their rings show. People of this time loved perfumes, and they often carried scents with them in pomanders—hollow metal balls that held sponges soaked in scent. They might also carry a roasted orange studded with cloves, which would help keep away of-fensive odors. Fashionable men carried heavily ornamented daggers. Gentlemen would often wear pieces of their armor along with their ordinary clothing as a way of showing off their military prowess.

THE ISLAMIC WORLD

BY ROSE ASLAN

According to the Koran, both Muslim men and women are commanded by God to be modest in their behavior and dress. It was common practice for Jewish and Christian women in the pre-Islamic era to wear head coverings, so it was not radical for Islam to make wearing a head scarf compulsory for women. A verse in the Koran defines how Muslim women should behave and dress in public: They “should lower their glances, guard their private parts, and not display their charms beyond what [it is acceptable] to reveal; they should let their head scarves fall to cover their necklines.”

One of the reasons that Islam encouraged modesty was that some polytheist women in the Arabian Peninsula would wear clothes that revealed their chests. Women were required to wear modest clothes for their own protection and to avoid harassment. In the medieval period throughout the Islamic world women, both Muslim and non-Muslim, overwhelmingly dressed in clothes that covered most, if not all, of their bodies; thus, adornments were mainly displayed at the home and at private celebrations with other women. As is true in modern times, men were forbidden from wearing adornments such as gold and silk, but women were permitted to wear them.

Islamic art from the medieval period, especially murals in places such as bathhouses, tapestries, and illuminations in manuscripts, depict women wearing a variety of adornments. Most often slave women and courtesans are seen wearing luxurious ornaments, sometimes without a head covering, while married women are seen covered in long veils, which sometimes swathe their faces. While lower-class women and slaves often would not cover or only partially cover their hair, it was the rule for middle- and upper-class women to always cover their hair. The veil was essentially a class symbol that gave honor and status to the woman who wore it; in fact, it was considered shameful for women to reveal their faces in public except under special circumstances, such as during mourning rituals.

There are many names in the Arabic language for veils, all of which denote a slightly different style. Women wore many different types of veils, such as a *niqab* or the burqa (also spelled burka), both of which completely covered the face except for the eyes and came in a variety of colors, including blue, black, pearl, gray, white, and light colors. The *niqabs* would often have decorations, such as silk embroidery or colored borders. Another type of face veil was made of a black mesh or net; yet another consisted of a dark cloth that would cover the face below the eyes as well as a goat-wool or horsehair net that hung from the top of the head to just below the eyes.

Another style of women's headdress was a narrow, pointed cap from which hung a veil, which was popular in Turkey during the Ottoman Empire (beginning in 1281), though it is not clear if this was worn only by women at the court or by common women as well. Various other caps of different shapes with attached veils were worn by women.

Men in the Arab world always wore a turban in public, which was popular even before the advent of Islam. Little is known about how the turban looked during the time of the Prophet Muhammad (ca. 570–632), but scholars believe that it comprised a very long piece of fabric that was wrapped around the head and that white was a common color while

black was worn by the Prophet and men of high religious standing in the community.

As green was the favorite color of the Prophet, green turbans soon became popular in the Islamic world and were spread further by Ottoman rule. With each ruler and dynasty the popular style and color of turbans would change, though each region and social class had its own style. Crowns were not worn in the Islamic world; thus, in the court the king would wear a very large silk turban decorated with jewels, while others would wear less ornate turbans of different sizes according to their rank and office. In Muslim Spain, on the other hand, only scholars would wear turbans, and most men went bareheaded or wore simple wool caps. In regions such as Persia and elsewhere in the Middle East wool caps of various sizes, with dome, cone, or cylinder shapes, were often worn instead of turbans, or else turbans were wrapped around small caps.

Court women and women of the upper class of Ottoman Turkey and in other regions were very concerned about their looks. They would pluck and shape their eyebrows according to the fashion, and they would use rouge, often made of cinabar, a red mineral, to redden their lips. At times, unibrows were the fashion; if women did not have one, they would stain their eyebrows with kohl to make them meet over the nose. Kohl or antimony was effective in preventing prevalent eye diseases as well as being fashionable, and it was applied as eyeliner by men, women, and children.

Throughout the Islamic world women would dye their nails in various colors and paint intricate designs on their hands and feet with henna, which was usually reddish but could be made brown, black, or dark blue by adding a dye such as indigo. As part of wedding celebrations, women would get together and have festivities where they would decorate the bride and guests with henna. In addition, in regions such as Persia, women would paint beauty marks and moles on their faces and necks.

Black hair was seen as the standard for beauty, and women would color their hair black with dyes such as walnut and indigo; men would dye their beards black in imitation of the Prophet Muhammad. Women would use natural oils, such as sesame and olive oil, to give their hair luster and strength. People with white hair would often dye it with henna, giving it a reddish-orange tint.

The ideal for women was to have smooth, white skin, and they would use various creams and ointments to lighten their skin color. A cream made of ingredients such as honey, beeswax, sesame oil, sandalwood, and saffron was used to moisturize and soften the skin and act as suntan lotion. Throughout the region it was the custom for women to remove much of their body hair; they would use a sticky substance made of



Gold armlet or anklet; Syria, 11th century (Freer Gallery of Art, Smithsonian Institution, purchase)

melted sugar or honey and sometimes lemon to peel off the hair. Also, natural rocks called *shabba* (alum) were moistened with water and were used as a deodorant.

Largely influenced by Sassanian (pre-Islamic Persian) and Greco-Roman styles, jewelry designs were modified according to the preferences of Muslims. Women would hang jewels and gold and silver chains on their face and ears and also would wear jeweled bracelets and armlets. In addition, they would wear fancy necklaces, earrings, rings, and pendants of gold, pearls, and gems. Paintings depicting court women show them decked in elegant styles of jewelry that changed through the years.

During the Mamluk Period (1250–1617) women wore intricate filigreed gold jewelry, some of which were set with precious jewels; this type of jewelry became popular throughout the Islamic world and could be found in places as far as Russia, Syria, Muslim Spain, and India. Jewelry had a variety of designs, with Arabic calligraphy, geometric patterns, and vegetable motifs being the most popular. Although men were forbidden from wearing gold jewelry, they were permitted to wear silver rings like the Prophet Muhammad.

It is recorded in traditions that the Prophet Muhammad used to wear perfume on Fridays and on holidays, to promote Islamic standards of cleanliness. Only men were allowed to wear perfume in public, as a well-known Islamic tradition states: “When a woman puts on perfume and goes among people so that its scent reaches them, she is an adulteress, and any eye which is attracted to her is that of an adulterer.” Because of this standard, women were allowed to wear perfume only at home.

Owing to the emphasis in Islam on personal hygiene, Muslims brought the art of producing perfumes to perfection. Although many of the essential ingredients came from

countries such as China, India, and Africa—transported by sea or overland on the Silk Road—the knowledge of perfume making was centered in the Islamic world and subsequently spread to Europe and other parts of the world. Fabricating perfumes and scented oils was a fine art that was practiced by specialists called attars, the most famous of whom was Farid od-Din Mohammad ibn Ebrahim Attar (ca. 1142–ca. 1220), who, apart from being a perfumer and herbalist, was also a famous mystic poet. Abu Bakr Muhammad ibn Zakariya ar-Razi, also known as Rhazes (ca. 865–between 923 and 935), was a Persian physician and philosopher who wrote a medical encyclopedia called *al-Hawi* that contains a section on cosmetics. Muslims believed that certain scents had medicinal and healing properties, and they were sold alongside medicine by attars; some perfumes were believed to have medicinal qualities, and they were used as medicine and in cooking. People would wear perfume on their wrists and hands, hair, and even clothes.

Umar I (r. ca. 634–44), a caliph and a companion of the Prophet Muhammad, said, “Whoever spends a third of his wealth on perfume is not being extravagant.” Such was the popularity of perfume that it was often used by poets to symbolize beautiful things, such as Paradise and love. Some of the most valuable perfumes at the time were musk, ambergris, and camphor, which were used mainly by the wealthy. Musk was especially treasured because tradition holds that it was the favorite scent of the Prophet Muhammad. More reasonable perfumes were used by common people and were derivatives of easily obtainable flower essences. Perfumes were based on vegetable oils and animal fats, unlike today’s alcohol-based perfumes. Different types and qualities of perfumes were used according to social standing and wealth. Intricate containers for holding perfumes were crafted for the wealthy, and some containers were even encrusted with jewels or made of delicate colored glass.

See also ART; CHILDREN; CLOTHING AND FOOTWEAR; CRAFTS; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; FAMILY; FESTIVALS; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; HOUSEHOLD GOODS; METALLURGY; RELIGION AND COSMOLOGY; SACRED SITES; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WEAPONRY AND ARMOR.

FURTHER READING

- Marie-Therese Brincard, ed., *Beauty by Design: The Aesthetics of African Adornment* (New York: African American Institute, 1984).
- Chira Chongkol, “Jewellery and Other Decorative Arts in Thailand,” *Arts of Asia* (November–December 1982): 82–91.

- Elizabeth Coatsworth and Michael Pinder, *The Art of the Anglo-Saxon Goldsmith* (Woodbridge, U.K.: Boydell Press, 2002).
- Susan Cooksey, *Sense, Style, Presence: African Arts of Personal Adornment* (Gainesville, Fla.: Samuel P. Harn Museum of Art, 2004).
- George A. Corbin, *Native Arts of North America, Africa, and the South Pacific: An Introduction* (New York: Harper and Row, 1988).
- Karen DeWitt, "All the Perfumes of Arabia." Available online. URL: <http://www.saudiaramcoworld.com/issue/197405/all.the.perfumes.of.arabia.htm>. Downloaded on October 20, 2006.
- Geoff Egan and Frances Pritchard, *Dress Accessories c. 1150–c. 1450* (Woodbridge, Suffolk, U.K.: Boydell Press, 2004).
- Timothy F. Garrard, *Gold of Africa* (Munich, Germany: Barbier-Mueller Museum, 1989).
- Maud Girard-Geslan, ed., *Art of Southeast Asia* (New York: Abrams, 1994).
- Karl Gröning, *Decorated Skin: A World Survey of Body Art* (London: Thames and Hudson, 1997).
- Rachel Hasson, *Early Islamic Jewellery* (Jerusalem: L.A. Mayer Memorial Institute for Islamic Art, 1987).
- Clarence W. Kelley, *Chinese Gold and Silver in American Collections* (Dayton, Ohio: Dayton Art Institute, 1984).
- Mary Ellen Miller, *The Art of Mesoamerica: From Olmec to Aztec* (London: Thames and Hudson, 2001).
- "Muslim Contributions to Cosmetics." Available online. URL: <http://www.muslim-heritage.com/topics/default.cfm?TaxonomyTypeID=11&TaxonomySubTypeID=56&TaxonomyThirdLevelID=-1&ArticleID=364>. Downloaded on October 20, 2006.
- "Muslim and Middle Eastern Clothing, Jewelry, Make-Up." Available online. URL: http://www.sfusd.k12.ca.us/schwww/sch618/Clothing/Islam_Clothing,_Jewelry_Ma.html. Downloaded on October 20, 2006.
- Esther Pasztory, *Pre-Columbian Art* (New York: Cambridge University Press, 1999).
- Michael Ryan, *Metal Craftsmanship in Early Ireland* (Dublin: Country House, 1993).
- Steve Van Beek and Luca Invernizzi Tettoni, *An Introduction to the Arts of Thailand* (Hong Kong: Travel, 1985).
- Susan Youngs, *The Work of Angels: Masterpieces of Celtic Metalwork, 6th–9th Centuries A.D.* (Austin: University of Texas Press, 1990).

► agriculture

INTRODUCTION

By the beginning of the medieval period most people across the globe depended on agriculture for at least part of their sustenance. Although some people continued to live by hunting and gathering, especially in more remote areas of the Americas, Africa, and the Asia-Pacific region, in most areas populations were too large to support by this method, and agriculture was essential. New technologies and crops appeared throughout the medieval period, allowing farmers to feed increasing numbers of people.

Agricultural methods varied by region, population size, and technological knowledge. Primitive peoples commonly used slash-and-burn agriculture, the practice of cutting down vegetation and burning it to create fields. This technique was used by people who typically moved their fields and perhaps their dwellings from place to place every year or so. Slash-and-burn fields lose their fertility quickly. After a field had been used for crops, the farmers would abandon it and allow natural vegetation to grow over it again while they moved on to new fields. After a few years they could return to an old field and reuse it by the same technique. In the Caribbean people such as the Arawak used slash-and-burn agriculture to grow manioc and other root crops. Throughout Asia people used this method to create their initial fields.

As populations grew, however, creating new fields annually became impractical, and people were forced to farm the same land year after year. This compelled them to solve the problem of the reduction in soil fertility that naturally resulted from growing crops. Crop rotation and fertilizers were the main correctives to this problem. In Europe farmers developed the three-field system, in which two crops were rotated among three fields, one of which was always left to lie fallow and recover its fertility. Medieval Islamic farmers adopted new, more efficient methods of crop rotation and employed fertilizers that eliminated the need to allow fields to lie fallow. Asian farmers used manure to restore fertility to their soil. They also learned to create terraces on hillsides, which permitted rice cultivation in formerly unusable areas.

Although the details varied by culture, farming was typically a family affair, requiring work from each family member. In Europe the men performed such heavy work such as plowing, women tended kitchen gardens, and children scared away birds that would eat the grain. In many communities in the Americas each family group would be allocated its own plot of land to produce food for their own consumption. Many American peoples divided agricultural work by sex. Among the Taino of the Caribbean islands women tended fields, carried water, and raised animals for eggs and meat, while men did the heavy work of clearing fields and planting crops.

Most people farmed, but not everyone owned their own land. In Europe most land was owned by lords and farmed by peasants, who cultivated crops for both themselves and their landlords. In contrast to Europe, most people in the Islamic world had the right to own property, and thus individual families could own and operate farms. In Africa and the Americas clans divided farmland among their members, allocating each man or woman a plot of land to farm for personal consumption.

Medieval farmers grew a large assortment of crops, many of them the result of careful breeding or international trade. Islamic farmers grew many crops imported from Asia and Africa. Durum wheat, sorghum, rice, fava beans, lentils, chickpeas, pomegranates, lemons, limes, apricots, artichokes, and eggplant were all typical foods in the Islamic world. Common European crops included wheat, barley, oats, peas, beans, and various types of vegetables. In Asia rice continued to be a principal crop, and much of the population of China, India, and Southeast Asia derived most of their calories from it. In the drier or colder parts of Asia, such as northern China, wheat and millet were more common crops. In the Andes people used slash-and-burn fields to grow coca leaves, manioc, peanuts, and sweet potatoes. Throughout much of the Americas people depended on a trio of crops, corn, beans, and squash, which grew well together and provided most of the necessities of a balanced diet. They also grew cotton, which they used for clothing.

African farmers developed numerous varieties of grains, fruits, and vegetables, selecting the species that thrived in their local climates. In West Africa, for example, farmers bred a variety of rice that grew at the same speed as the annual floods. Trade routes that developed in medieval Africa allowed the transfer of crops and agricultural techniques from place to place. Africa had three major environmental zones, each of which lent itself to a different type of agriculture. In the deserts of northern Africa people could not raise crops and restricted themselves to herding livestock. In savanna areas people planted such grains as sorghum and millet, timing their crops to coincide with the annual rainy season. They also raised cattle, though the tsetse fly limited livestock to dry areas. In the forests of central Africa people grew a range of crops, including tubers such as yams, legumes, vegetables, and bananas.

Getting water to crops was a perpetual problem for farmers throughout the world. People came up with a variety of irrigation techniques to get water to their fields. In the Andes people tapped into underground water tables and built aqueducts to move water around. They also constructed raised fields separated by canals and small lakes that both provided water to the crops and controlled temperatures by absorbing and releasing solar radiation. People of Mesoamerica and the southwestern United States built irrigation ditches. In the Rift Valley of Africa farmers used the local rocky landscape to create irrigation canals that used gravity to water fields. In Asia people dug elaborate networks of canals to ensure that water could be distributed over the rice fields at the appropriate times. Throughout the Islamic world people used machines to help them move and lift water. People dug deep wells and underground tunnels to reach and channel ground-

water. They also dammed rivers to collect water and release it as needed. A Persian device called a *qanat* collected water on a hilltop and released it into fields below through a series of underground channels.

Throughout the medieval period, farmers invented devices to make their work easier. New technology such as the moldboard plow (an import from China), wheeled plows, and the horse collar made European farming easier than it had been. By 1500 farming was much more efficient than it had been in 500.

AFRICA

BY KATHRYN DE LUNA

For the last several millennia up to the present day Africa can be characterized as agricultural because most people have made a living by planting crops, herding livestock, or a combination of the two. The range of environments both today and in the past encouraged an inventive farming tradition in which Africans carefully combined diverse agricultural activities with other modes of food procurement, such as hunting, gathering wild foods, and fishing. Not surprisingly, some of these other strategies were integral to farming in the first place; hunting was necessary to protect crops from wild animals searching for food, and foraging was one of the ways in which Africans became familiar with new food plants, many of which were slowly adopted in the repertoire of cultivated plants and gradually transformed into domesticated species.

Generally, we can identify three environmental zones in Africa, with each corresponding to a different mode of agriculture. Agriculture in the deserts and steppes was limited to the herding of livestock, often in a nomadic or seasonally nomadic pattern. In the wooded and grassland savannas an annual rainy season provided moderate water to support grains—such as fonio, sorghums, and millets—and some livestock. The spread of iron technology in the first millennium C.E. was vital to the settlement of the eastern and southern savannas, because iron tools allowed people to break up the hard, packed savanna soils to plant in time for the rains. Dense vegetation supporting tsetse fly and other livestock disease transmitters created a natural limit to cattle keeping, which was most successful in the drier savanna zones or in areas where Africans burned the bush to manage vegetation patterns.

In the moist, densely vegetated African forests located close to the equator, where the rains occur twice a year, Africans grew tuber crops, such as yams, by planting root or stem cuttings with digging sticks long before the spread of iron tools. In both the grain fields of the savannas and tuber gardens of the forests, a range of legumes, wild fruits and veg-

etables, fish, and disease-resistant smaller livestock like goats and sheep supplemented the primary carbohydrates. By the final centuries of the last millennium B.C.E. foreign foods like Southeast Asian starchy and sweet bananas were cultivated in the forests of eastern and central Africa. Animals also moved along these early routes; chickens and at least two types of cattle spread from Asia throughout Africa well before the medieval era.

In Africa a focus on innovation and experimentation with diverse species created a different kind of agricultural tradition than those found in Eurasia, where adjustments to the landscape were vital to improving productivity. Terracing and irrigation systems did occur in ancient and medieval Africa; the terraces in the hills of Ethiopia, Cameroon, the Darfur region of Sudan, and the Nyanga (formerly Inyanga) area of Zimbabwe serve as primary examples. Likewise, the gravity-fed irrigation canals of the Great Rift Valley in eastern Africa and Engaruka in Tanzania attest to the engineering skills of African farmers. However, most agricultural systems in Africa up to the advent of commercial agriculture in the last century focused on the transformation of plants rather than the landscape. Africans developed hundreds of varieties of rice, bananas, and other plants selected over the centuries to produce specialized varieties for particular environments, drought patterns, taste and texture preferences, pest resistance, flood tolerance, and particular uses, such as beer brewing. West Africans even bred a variety of the indigenous African rice *Oryza glaberrima* to grow at the same rate as the floods, to ensure that the seed head continues to form even as the waters rise around it.

In Africa, as elsewhere, agriculture was intimately tied to social and political life. Unlike the agricultural histories of Europe or the fertile Mesopotamian valleys, low population densities and plentiful land in most of Africa meant that contestations over farmland were rare. Indeed, leaders struggled to attract people to work the land. Nonetheless, as in other parts of the world, control over food surpluses, access to labor to farm the land, and concerns over the fertility of the soil provided the means by which individuals, especially chiefs and groups, usually lineages, acquired power and status in Africa. In fact, farmers recognized the powers of indigenous peoples living on the lands into which they had slowly spread. Struggles to control the power of these “owners of the land” over local spirits and the ancestor spirits of “first comers” who first permanently settled such lands took place to ensure the fertility of the community and its agriculture. Such struggles have influenced changes in the character of social and political life over the last several millennia, creating numerous configurations of power between chiefs, lineages, and spirit mediums.

By the beginning of the middle of the first millennium of the Common Era farming had already spread across the continent, and communities who adopted this new technology had, through gradual experimentation, successfully integrated it into their economies. As the next thousand years unfolded over much of Africa, regional concentration on certain foods combined with specialization in hunting, fishing, foraging, salt making, and iron production drove internal trade and created opportunities for social and political change.

EASTERN AND SOUTHERN AFRICA

Research on the agricultural history of Africa has largely focused on the spread of farming across eastern and southern Africa. Interest in the agricultural history of this region was initiated by attempts to explain a particular phenomenon in African history: the process by which related Bantu languages and cultures came to spread over most of eastern and southern Africa. Early scholarship on the Bantu expansions attributed superior technologies of iron production, farming, and pottery making to the Bantu people to explain how they spread across such a vast region, often at the expense of communities of non-Bantu hunter-gatherers and pastoralists. Although we now know that this package of farming, iron, and ceramic technologies did not always spread together or necessarily in connection with the spread of Bantu languages, peoples, and cultures, it is clear that both iron and ceramic technologies were intimately tied to the successful adoption of farming by a variety of communities in eastern and southern Africa, particularly in the dry, hard soils of the savannas.

In eastern and southern Africa this spread of cultivation is characteristic of the Early Iron Age, which, contrary to agricultural histories of Eurasia, was preceded by the spread of pastoralism. By the fall of the Roman Empire in Europe in 476 C.E. farming, iron, and ceramic technologies had largely spread across most of Africa for the different environmental zones. As the Early Iron Age was coming to a close in eastern and southern Africa, farmers were living and interacting with herders and hunter-gatherers; their dynamic relationships enabled the flow of people and knowledge across the fluid boundaries of their communities. Farmers had grown confident in their knowledge about cultivation in familiar environments, such as rich floodplains and moist forests, and were beginning to experiment with plants and animals in drier areas. Although Early Iron Age farmers were practicing mixed agriculture, their focus was on crops rather than livestock. In the savannas farmers made use of abundant land by practicing shifting agriculture: using iron axes to clear new fields, burning the cut vegetation to enrich the soil's phosphate levels, moving on to new fields every two or three years, and allowing old fields to lie fallow and rejuvenate.

nate for 10 or even 20 years. Thus, by the second half of the first millennium C.E., at the close of the Early Iron Age, the small population movements characteristic of shifting agriculture, experimentation with new crops, and the adoption of these technologies by indigenous peoples had resulted in the gradual spread of agriculture across eastern and southern Africa.

In the last centuries of the first millennium C.E. farming societies in eastern and southern Africa experienced a series of economic, social, and cultural transformations that characterize the transition to the Late Iron Age. Transformations associated with the Late Iron Age usually were local developments and elaborations on existing knowledge rather than the result of the spread of peoples, languages, and knowledge, as was the case in the Early Iron Age. The Late Iron Age in eastern and southern Africa was characterized by the development of new Bantu languages and the creation of new pottery styles and local variants on regional styles. However, the most important agricultural transformation was the extension of farming economies into drier environments with the widespread adoption of cattle keeping and new cultural ideas about the economic and social value of cattle.

As a form of wealth that could reproduce itself, cattle provided various opportunities to control other social processes, such as the attraction of dependents through the distribution of cattle or the transition into adulthood through the convention of marriage. The institution of bride-wealth, whereby the groom's family compensated the bride's lineage for her reproductive powers with cattle and other gifts, probably dates in some areas to the Late Iron Age. Bride-wealth became an important means by which adult men in the lineage controlled the timing and partners of their sons', nephews', and grandsons' marriages. Older men who had accumulated great herds could demonstrate and augment their wealth and status by using cattle from the herds to marry second and third wives and beget more children rather than using the cattle to fund the marriages of their younger male relatives. Children of a man who had multiple wives provided additional sources of agricultural labor to increase household productivity; when they eventually married, daughters brought in more cattle in the form of bride-wealth.

Archaeological and linguistic evidence for the emergence of cattle keeping provides numerous examples of how this agricultural transformation affected other aspects of life in eastern and southern Africa. A particularly stunning example of the productive powers of cattle and associated social and political developments began on the hard velds of Botswana east of the Kalahari Desert around 900 C.E. Farmers living on the grassy plains had begun to experiment with

cattle several centuries earlier, but the turn of the first millennium marked the establishment of a new demographic and social pattern in which densely settled towns with large cattle kraals were surrounded by mid-sized cattle-herding villages and smaller outposts inhabited by stone-tool-using hunter-gatherer communities with very limited access to cattle. The largest of these capitals gave its name to this emergent culture, Toutswe. In the Toutswe state elites in the towns controlled large herds and could demand valuable bulls in the prime of their reproductive years for consumption from the smaller herding villages. The Toutswe culture illustrates how savvy leaders forged a new, stratified social system based on control of cattle and the appreciation of agricultural activities over those of indigenous, stone-tool-using hunter-gatherers.

Command of cattle was not a foolproof path to power, however. By about 1300 C.E. overgrazing, a series of dry years, and the increasing demand for gold in Indian Ocean trade all contributed to the fall of the Toutswe state and the emergence of Zimbabwean states to the east. Even as Indian Ocean trade allowed leaders of the Zimbabwean states to develop new configurations of power based on control of trade in gold to the coast and beads, cloth, and other prestige items from the coast, cattle herding remained an integral aspect of the elite economy and cattle consumption an important demonstration of status.

In the Great Lakes region of eastern Africa similar processes characterized the Late Iron Age. Farmers focused on cattle keeping and established settlements in drier, savanna environments. Specialized modes of farming in the different environmental zones of the Great Lakes region—intensive banana farming near the lakeshore and river valleys, grain farming in the savannas, and cattle keeping in the driest areas—promoted both internal trade and, eventually, the development of kingdoms. In addition to specialized agricultural surpluses, control of the production of salt and iron and ritual powers ensuring the health of communities, their fields, and their animals, were other important building blocks of authority.

On the East African coast the emerging Swahili culture participated extensively in Indian Ocean trade, eventually developing complex plantation systems in the last centuries of the second millennium C.E. to supply demands for sisal (a fibrous plant used in rope making), cloves, and other cash crops. Even earlier agriculture was an important part of the coastal economy, not only for producing food for the inhabitants of coastal cities but also as a means of demonstrating status. Asian rice, *Oryza sativa*, had become an important prestige food as early as 1000 C.E. in cosmopolitan coastal Swahili communities.

In some areas the centralization of political power could not be accomplished through the control of cattle herds. Some time after the 14th century C.E. on the southern fringes of the equatorial forest in the Upemba basin located near the southern border of modern-day Democratic Republic of the Congo, leaders of the emerging Luba state system initially established their authority by controlling both farming and fishing surplus. Over the coming centuries leaders extended their control to trade, especially in copper, and developed a complex institution of divine kingship, which spread widely throughout the southern savanna; claims to origins in the Luba royal lineage legitimized subsequent states, such as the Lunda kingdom and chieftaincies in eastern and central Zambia.

THE EQUATORIAL FORESTS

There has been little research on the agriculture history of the equatorial forest for this time period. Among a number of reasons for this neglect is the fact that plant remains and even iron and ceramics are not well preserved in the moist forest soils, so there are few data for archaeologists to uncover. Studies based on linguistic evidence have focused on the spread of Bantu languages and agriculture into the equatorial forests and then traced their subsequent spread from the forests into eastern and southern Africa. Thus, the history of the farmers living in the equatorial forests after the introduction of farming is largely unknown.

The early adoption of agriculture to forest environments was probably tied to interactions between hunter-gatherers and early savanna inhabitants practicing mixed farming on the equatorial and western African forest fringes in the early second millennium B.C.E. In the equatorial forests the transition to farming was a gradual process, and farming, iron, and ceramic technologies spread through the forest independently rather than as a Neolithic technological package. By the middle of the first millennium C.E. farmers in the forests of western and equatorial Africa had integrated a rich repertoire of tubers, legumes, and oil palms into their detailed knowledge about forest fruits, vegetables, medicines, meats, and fish. Archaeological and linguistic evidence demonstrates the interdependence of forest hunter-gatherers and farmers, whose relations with each other varied over time; eventually, with the integration of forest peoples into the wider Atlantic trade economy in the 16th century, this relationship took the shape of the more unequal association common today, whereby hunter-gatherers are the clients, or dependents, of farmers. Farmers in the forests were quick to adopt new foods, such as bananas and chickens from Asia via the East African coast and, after the fifteenth century, taro, cassava, and legumes from the New World via the Atlantic coasts of western and central Africa. The extensive system of

waterways in the equatorial forest served as a travel network, facilitating the spread of people, ideas, languages, and new agricultural practices.

The Africanist scholar Kairn Klieman elaborates on the agricultural history of the equatorial forest region by exploring how Bantu people moving into the forest interacted with indigenous Batwa hunter-gatherers. By about 500 B.C.E. Bantu peoples gradually adopted a sedentary agricultural lifestyle as a result of the spread of iron technology and banana cultivation, and, in reaction to this increasingly sedentary lifestyle, some Batwa broke off from mixed communities they had shared with their Bantu neighbors to specialize in procuring forest products for trade with farmers. This specialization remained viable throughout the next 2,000 years, until the integration of equatorial forest societies into the Atlantic Ocean trade system in the 16th century. The economically based identities of “farmer” and “hunter-gatherer” limited the ways in which leaders of newly sedentary Bantu farming communities were able to acquire power, but they were hardly rigid categories; members of farming communities became forest specialists and vice versa when it was advantageous to do so.

Bantu people had long believed the indigenous Batwa hunter-gatherers of the forests had powerful connections with local nature spirits, deserving of a special politico-religious status within early Bantu communities. However, as Bantu farmers adopted a sedentary lifestyle based on banana farming, they centralized political power in chiefdoms. During the second half of the first millennium C.E. Bantu chiefs reconfigured the older ideology of the primacy of the indigenous Batwa’s powers as “first comers” to the world by asserting the importance of their own Bantu ancestors as first comers either closely allied with or descended from the Batwa. As Bantu chiefs emphasized the importance of their own ancestors, they unseated the Batwa from their previous powerful political and religious roles, celebrating the Batwa as the civilizers of the Bantu even as they recast the Batwa’s role to be more symbolic than powerful.

Later, in upheavals associated with the incorporation of equatorial forest societies into the Atlantic community from the 16th to 20th centuries, power derived from the control of trade and accumulation of personal wealth would come to undermine those older patterns of authority that were based on first-comer status and the intercession between communities, their ancestors, and nature spirits. From Klieman’s research, however, it is clear that the development of social identities and the cosmologies that shaped how societies were organized, how they interacted with each other, and how leaders acquired power were intimately entwined with developments in the agricultural history of the equatorial forest between the 6th and 16th centuries.

ON THE FRINGES OF THE SAHARA: NORTHERN AND WESTERN AFRICA

The agricultural history of northern and western Africa does not follow the same chronology as that of the equatorial forest or eastern and southern Africa. The spread of iron technology, for example, did not occur in conjunction with the development of new farming practices but was adopted into early cultivation practices as an extension of an existing agricultural system. Furthermore, nomadic pastoralism flourished along the dry fringes of the Sahara; interactions between savanna farmers and nomadic pastoralists of the desert fringes characterized social life and political organization for millennia. On the northern coasts farming shared the characteristics and history of other Mediterranean agricultural systems in which farmers grew wheat, grapes, olives, and sometimes barley.

Like farmers in eastern and southern Africa, those in northern and western Africa grew sorghums, millets, and other grains in the savannas to the south and north of the desert, often using a system of shifting cultivation. However, Africans living in the western region could also cultivate an indigenous rice, *Oryza glaberrima*, using one of three systems: In Guinea, for example, farmers planted rice on hillsides so that rainfall would irrigate the plants; along the Atlantic coast, farmers planted rice in mangrove swamps to ensure adequate moisture; rice planted in floodplains of the Senegal and Niger rivers was watered by floods and the moisture retained in the clay soils. The hundreds of varieties of rice developed by West African farmers was an important factor in the development of early permanent farming settlements and in adaptation to the particular threats associated with each of the three rice cultivation systems.

Changes in relations between sedentary farmers and nomadic pastoralists characterize the period corresponding to the European Middle Ages. By the fourth century C.E. several important technologies had spread into northern and western Africa and transformed the mobility of nomadic pastoralists: cavalry, camels, and chariots. With these new technologies, nomadic pastoralists were able to reconfigure earlier economic transactions in which farmers traded surplus grains, cloth, tools, and other products of sedentary life for pastoralists' surplus meat and milk. In earlier times farmers had controlled relations because pastoralists, as specialist producers had more need of farmers' products than vice versa. With the advent of technologies improving the mobility of pastoralists, relations became more balanced and developed into a pattern of alternating pastoralist and sedentary dominance over marginal lands between the steppe and the cultivated savanna. As early as the 14th century the famous Tunisian historian

Ibn Khaldun (1332–1406) interpreted the history of the ninth through the 14th centuries as the alternation of power between sedentary farmers and nomadic pastoralists, with the latter often raiding and conquering the former. Nomadic dynasties ruling over sedentary farmers were, of course, prey to raiding and conquest by other nomadic pastoralists on the savanna fringes. This pattern continued long past the 14th century and is a common theme tying western and northern African history to historical patterns in Eurasia and beyond.

Among the most important historical themes in precolonial West African history is the development of a series of states on the southern edge of the Sahara. The first of these states appeared at the turn of the first millennium C.E., and they continued to emerge, one succeeding the next, into the middle of the second millennium C.E. Generally, the development of the West African states of Ghana, Mali, Kanem, Borno, and the Songhai Empire was tied to control of trans-Saharan trade, particularly the supply of gold from the south to the trade networks spanning the desert. However, the agricultural productivity of these trade empires was central to their survival. Although loss of trade monopolies meant loss of regional predominance, droughts and other agricultural catastrophes could mean the collapse of the state. This was the case with the state of Ghana, which was located between the middle Senegal River and Niger River bend. At the height of its power in the early 11th century, Ghana dominated the trans-Saharan gold trade. By the middle of the 11th century, however, traders had found ways to access gold outside Ghana's networks. This shift marked the end of Ghana's trade power but not its demise as a state. It was only in the 13th and 14th centuries, when major climatic shifts threatened the farming lifestyle of its citizens and forced the dispersal of Soninke farmers from their homeland throughout western Africa, that the state of Ghana collapsed completely.

A similar pattern unfolded with the fall of the Axum state in Ethiopia, where trade was the heart of power but the breakdown of agriculture contributed to state disintegration in the eighth century. These examples, coupled with those described for eastern and southern Africa, demonstrate the central role of agricultural activities in the history of state building in Africa and illustrate parallels with similar processes in Europe, the Middle East, and Asia.

LOOKING FORWARD

Agricultural history in the period spanning the mid-first millennium C.E. to the mid-second millennium C.E. was characterized by elaborations on farming technologies that had spread during the ancient periods of African history. Agricultural history in both the ancient and medieval periods in Africa reveals a slow series of developments in cultivation

practices, crop varieties, tools, and those social organizations that both supported and controlled farming activities. With modifications spanning millennia, Africans bred new species suited to diverse environments. Older knowledge about the bush and wild sources of food were always at hand for times of poor harvests, while times of plenty provided surpluses to strengthen social relationships through marriage and clientship.

By the middle of the second millennium C.E. as the Renaissance emerged in western Europe, some Africans in areas like the Great Lakes region and southeastern and western Africa were in the process of developing more centralized societies in which power derived from control of trade and agricultural surpluses. However, decentralized agricultural societies continued to exist as the norm in other areas so that the emergence of centralized political institutions in the form of chiefdoms and states was certainly not the inevitable result of a transition to farming. Regardless of how farming activities were woven into political institutions, most African societies in the coming centuries would be affected by the development of a complex slave trading network that supplied labor to plantations within Africa and in the New World; the adoption of new foreign crops like cassava, taro, and maize from the Americas; and the restructuring of agricultural practices and access to land during colonialism and later under the control of newly independent governments and international organizations. As African farmers faced these new challenges, they were equipped with a rich body of knowledge about domesticated species, diverse environments, and the social and political value of the crops and animals they nurtured; the enduring legacy of African agricultural history is the persistent relevance of that body of knowledge in the daily lives of most Africans up to the present day.

THE AMERICAS

BY ELIZABETH MORÁN

Agriculture in the Americas was as varied and diverse as its geography. Methods used to develop agricultural lands progressed from the slash-and-burn technique to methods that would intensify crop production to meet the needs of a growing population. Slash and burn, or the clearing of an area by cutting and burning to create agricultural fields, is a technique that has been used throughout history in almost every part of the world.

CARIBBEAN

In the Caribbean the first farmers, perhaps Arawak Indians (500 or 400 B.C.E.), cultivated roots and tubers such as manioc (also called cassava) by using a restricted form of slash and

burn. These farmers migrated to the islands from the Venezuelan mainland and brought this technique with them, finding it useful in large rain forest areas but wasteful on the smaller islands. Once on the islands, the Arawak needed to adapt to the unique terrain and used only a restricted form of slash and burn. Eventually they did less farming and more marine gathering, fishing, and hunting.

The Taíno (600–1500 C.E.) in the Caribbean (Cuba, the Bahamas, Puerto Rico, Hispaniola, and Jamaica) developed in a pattern similar to the Arawak but with some variations among certain groups. Some societies focused exclusively on activities like fishing, as is evident at the Unión site in Hispaniola, or on gathering. Women did most of the daily work, tending fields until harvest, preparing food, fetching water, and caring for domestic animals such as dogs, pigeons, turtle-doves, and other small birds. Men prepared the fields by clearing, burning, and planting. They also fished and hunted.

NORTH AMERICA AND THE SOUTHWEST

For native North American groups such as the Agawams and Norwottucks of the middle Connecticut River valley, the calendar year began in late spring, after the lands thawed. Like that of many other native groups in the Americas, their seasonal calendar corresponded to the agricultural cycle. Late spring was the time to clear the fields and plant the staple crops—usually corn, beans, and squash. Horticulture was women's work. Women used hoes made from long sticks with either a freshwater shell or shell-shaped bone at the end to push a few inches of dirt around the base of each plant. The men generally planted and took care of the tobacco fields. Tobacco was smoked for both pleasure and as part of ceremonies. The Iroquois of the eastern Woodlands used slash-and-burn agriculture. Again, women were the farmers; they planted and tended to the crops while men hunted. This pattern of agriculture and gender-specific division of work seems to have been typical for most northern Native American groups.

In the Southwest, Pueblo communities along the Rio Grande used the river to irrigate their fields. In its simplest form irrigation is merely the application of water to the soil in which crops are being cultivated. The process can, however, take many forms. The primary irrigation method began with the construction of canals, but dams and aqueducts were also used to irrigate land for suitable crop harvesting. Other Pueblo communities established their towns and villages on oases, where they built dams and small reservoirs to take maximum advantage of the available water. The southwestern landscape is one of many contrasts: high mesas, deep canyons, and deserts. The climate is characterized by extremes of droughts and floods, sandstorms, and blizzards. Native communities flourished by pursuing various ways of life that

suited the particular ecosystem. For example, in the flood plains of desert areas, groups farmed by taking advantage of seasonal floods to water and fertilize their fields.

In the Americas agriculture was a part of both everyday existence and sacred practices. The native people of the American Southwest celebrated the Green Corn Ceremony late in the summer when the corn was becoming ripe enough to eat. The ceremony, which lasted several days, symbolized the beginning of a new year, the renewal of the community, and a time of cleansing. In preparation for the ceremony, public buildings and areas were cleaned and repaired. The ceremony also included fasting and the use of plant infusions in an effort to “cleanse” the body.

SOUTH AMERICA

In Costa Rica and many other places in South America slash-and-burn agriculture was typical. In general each family group was allotted a parcel of land to work, and the allocations shifted when fertility dropped off. Men cleared and burned the vegetation while women planted and harvested the crops. Communal agricultural labor, which is still practiced among some modern indigenous groups, usually involved men assembling at the residence of the landowner and working in a group to accomplish a particular goal.

The natural environment dictates how people grow crops. The central Andes of western South America is a diverse geographical landscape that demands that its inhabitants develop various techniques to grow food. On the Andean coast people originally settled along the shoreline, but by 1800 B.C.E. they began moving inland, constructing irrigation canals to help them grow food. By 1200 C.E. irrigation networks on the far northern coast connected as many as five river valleys. The Nazca people tapped into the water table using a system that they developed around 500 C.E. and which is still largely in use today. They constructed underground aqueducts or filtration galleries that minimized evaporation and terminated in reservoirs and irrigation canals. Among the crops they planted were cotton, squash, gourds, and beans. Andean groups in the highlands developed trading relationships to gather whatever they could from coastal people: dried fish, marine salt, seaweed, and coastal crops. Because a real market system did not exist in the Andes, marketplaces were very rare. Groups established special political ties among themselves, and societies spurred the exchange of most commodities. One useful method exploited by highlanders, in particular, was establishing enclaves in various ecosystems, thus allowing for a more even distribution of resources.

Different social groups in the Andes developed their agricultural lands in different ways. In the tropical forest areas slash-and-burn technique produced coca leaves; medicinal

plants; and foods like manioc, peanuts, and sweet potatoes. Andean farmers used the *chakitakylla*, or foot plow, to tend their fields. Other places required intense agricultural techniques. The city of Tiwanaku (ca. 100–ca. 1000) was a prosperous urban center where some houses had wells and drainage systems. The key to its prosperity and longevity was its rural hinterland, devoted to growing crops in raised fields, herding llamas and alpacas, and exploiting the fish and birds living along the shores of Lake Titicaca. Andean pastoralists may have domesticated the llama in this area as early as 3500 B.C.E. Llamas were a source of meat and served as beasts of burden. Alpacas were also domesticated to provide wool for weaving into cloth. Contemporary native groups still use these animals in much the same ways.

Andean farmers devised raised-field systems called *waru waru* that made wetlands productive and somewhat protected from damage. The water in the canals between the cultivated ridges acted like a series of miniature lakes, absorbing the solar radiation during the day and releasing the conserved heat at night, thus decreasing frost damage. *Waru waru* systems increased harvests and ensured a dependable food source in a region beset by droughts, hail, frost, torrential rains, and strong winds. Tiwanaku also established agricultural “estates”—areas used specifically for intense agriculture. This particular model was followed by many other Andean peoples, including the Inca.

By the mid-1400s the Inca had established themselves as the most powerful group in the Andes, and their ability to exploit their natural resources largely contributed to their success. They used the technique of terracing to dramatically increase the amount of arable land they had available. Terraces are essentially huge window boxes that convert mountainsides into stepped fields. The Inca built retaining walls of fieldstone, scooped out the packed earth, laid a layer of stones at the bottom for water drainage, and loosely repacked the earth. With canals supplying water, these terraces could withstand frost and drought and produce several crops each growing season. The Inca developed the most extensive network of terraces that the highlands have ever known. Agricultural terraces such as that at Pisac, near the Urubamba River northeast of Cuzco, were extensive. Other terraces seem to have been primarily decorative; for instance, at Ollantaytambo, also near Cuzco, terraces displayed flowers. The Inca also did terracing in places without apparent water sources, suggesting that the technique was also seen as an important aesthetic form.

MESOAMERICA

As populations grew the Maya opened new lands to cultivation and developed new methods to increase crop yields.

Hydraulic modifications were among the tactics intended to intensify food production. The Maya dug extensive networks of ditches to irrigate crops and to drain excess water from saturated soils, thereby improving plant growth. The Edzna hydraulic system in Campeche, Mexico, most likely constructed between 300 and 50 B.C.E. and used several centuries thereafter, has an extensive canal and reservoir system capable of irrigating at least 180 acres of cultivated land. Archaeological evidence suggests that the Maya used some lowland areas for large-scale food production, leading to the conclusion that they transported their harvests to major cities for distribution. Remains of raised fields have been found in low-lying areas. These fields provided fertile and well-drained growing conditions for various crops, including maize, cotton, and cacao. Raised fields were built by digging narrow drainage canals in water-saturated soils and heaping the earth to both sides, forming raised plots for growing crops. By periodically dredging the mulch from the drainage channels, farmers replenished the raised plots with fresh soils and organic debris, allowing continuous cultivation. The canals may also have been used to raise aquatic life such as fish and mollusks.

As in the Andes, the irrigation canals and drained fields throughout Mesoamerica were part of a larger pattern of agricultural intensification. Growing populations and the need to support them prompted extending cultivation into agriculturally marginal areas. This extension in turn prompted the development of innovations like terracing and irrigation that turned some marginal areas into very productive farmlands, which in turn permitted even greater population growth.

The Maya and many other Mesoamerican peoples used intercropping—growing several complementary species together, such as maize and beans—to intensify food production and ward off pests. Archaeological evidence and ethnohistorical accounts reveal that tree crops were once important to the Maya. Tree crops require little labor, and the fruit or nuts of some species may be collected from the ground as they fall. By mingling various food tree species, the Maya would have discouraged pests or diseases that thrive on a single species. Household gardens were vital to the daily life of people. In Cerén, El Salvador, archaeologists found portions of preserved household gardens buried by volcanic ash from a sudden eruption. The ash preserved the casts of several crops, some grown right next to the remains of houses. Carefully tilled rows of cotton and food plants like maize and manioc were separated by furrows that facilitated drainage. The volcanic ash also preserved fences built of sticks to protect fields from pests and facilities built to store the harvested food.

The 16th-century Aztec of central Mexico organized and performed agricultural rituals throughout the year. These



Painted ceramic mask of Tlaloc, god of rain and fertility; Aztec culture, Mexico, ca. 1325–21 (Courtesy National Museum of the American Indian, Smithsonian Institution)

rituals were connected to the planting and harvesting of basic staples: maize, squash, and beans. While these foods were eaten on a daily basis, they also were used in highly sacred rituals that sometimes even included human sacrifice. In addition, basic staples were associated with deities and the origins of the world.

Ironically, agricultural work was neither the primary occupation nor the major source of subsistence in the Aztec capital of Tenochtitlán. The Aztec employed various agricultural methods on the lakeshore and beyond to provide some form of sustenance for the general population. Among these were *chinampa* agriculture, terracing, and multicropping. *Chinampas* are artificial planting areas built up from mud scooped from the bottom of a lake or freshwater swamp, held in place by posts and roots, and separated by canals. The narrow size of the plots allows the soil to receive enough moisture to provide a continuous, stable, and intensive agriculture. Household gardens were also important to agricultural production in the city. Small *chinampa* plots formed household gardens in which Aztec families grew vegetables. Larger *chinampa* plots yield crops that sustained several families.

Although *chinampa* agriculture was fundamental to the Aztec way of life, it certainly did not provide for all the food needs of Tenochtitlán. The Aztec did, however, develop *chinampa* technology to its fullest potential, expanding the existing system to cover more than 75 square miles that supported as many as 100,000 people. Although the southern district of the Mexico Basin was heavily used for artificial planting areas, most of the foodstuffs consumed came into the city through trade and tribute. The Codex Mendoza, a

16th-century painted manuscript, illustrates vast amounts of food coming in as tribute. Raw foods included squash, honey, cacao, and chilies. In addition, the Aztec received many types of foods already prepared, including many meat dishes. The Aztec tribute system was a useful method of supplementing not only the food needs of Tenochtitlán but also its labor needs. A tribute workforce could be redistributed to better serve the needs of the urban population and ruling elite. Men and women supplied the labor for cooking and other food preparation as well as labor in the marketplace. Labor redistribution was intricately organized by the Aztec state.

ASIA AND THE PACIFIC

BY KENNETH HALL

Early Asia and Pacific agricultural productivity ranged from annual cycles of shifting cultivation among hunting-and-gathering populations in the highland, frontier, and remote island regions to the sophisticated wet-rice agriculture that could produce up to three crops a year in southern, eastern and southeastern Asia's densely populated river plains. Asia and Pacific island farmers produced a variety of grains, fruits, vegetables, and marketable specialty produce, such as cotton, hemp, tea, and spices. Most Asians cultivated and gathered root crop starches as well as rice by choice over other grains, such as wheat, millet, and sorghum. Taro and tapioca were the principal starches in Pacific island diets, but they were supplemental crops in Asia's grain-cultivation areas. Cultivated or gathered yams and sago palms were the other source of dietary starches on the islands of southeastern Asia.

The staple grain crops in India were wheat and barley in the cooler north and elsewhere as winter crops; rice in the irrigated plains and south, and millet in the dry regions of the Deccan plateau. Sugarcane was widely grown, as were leaf vegetables and gourds, plants of the *Sesamun* genus (valued for its edible oil and including sesame), peas, beans, and lentils. The Kerala coast region of southern India was the source of pepper, cardamom, ginger, and cinnamon; the Himalayan foothills produced valuable saffron; and cotton production was concentrated in the Gujarat and Tamil regions of the northwestern and southeastern coasts. Fruits included mangos, small Indian bananas known as plantains, and the sour fruit of the tamarind that is used to flavor curry. Coconut palms were imported from Southeast Asia in the Middle Ages, but palmyra and talipot palms, which provided the traditional Indian writing materials and were the source of alcoholic drinks known today as toddy and arrack, were products of coastal India. Date palms grew in the dryer regions of western India.

In addition to rice, which was their dietary grain staple throughout most of the region, Southeast Asians cultivated limited numbers of vegetables (cucumbers, onions, ginger, beans, and various gourds and, later, soybeans, introduced into the region by Chinese settlers in the fifteenth century) but instead favored fruits and spices. Fruits included coconuts, bananas, durian, mango, mongosteen, jackfruit, rambutan, and citrus fruits such as limes. Southeast Asian spices included cloves, nutmeg, and mace from the eastern Indonesian archipelago Spice Islands; widely grown varieties of Southeast Asian peppers (with the exception of black pepper, which was a product of India), tamarind, turmeric, ginger, cubeb, and calamus were used for food flavorings as well as medicines throughout Asia. Turmeric was notable for producing the "hottest" flavoring for foods.

Sugarcane was native to Southeast Asia, where it grew wild and was cultivated in the well-watered regions. It was sold as a confectionery or was chewed. Brown sugar, derived from boiling the sap of the sugar palm, was more popular as the source of liquid sugar. Honey was less in demand but was widely available and used especially as a medicine. Betel, a byproduct of the nut of the areca palm grown in southern and southeastern Asia, mixed with lime from crushed clam shells (to produce a chemical reaction) and wrapped in a betel vine leaf to form *tambula* was a chewable narcotic. It produced red saliva, which chewers spit out, and was widely popular in India, South China, and Southeast Asia.

ANIMAL HUSBANDRY IN ASIA

Chickens, both domestic and wild, were common in all the settled and hunting-and-gathering regions of Asia. Chickens were allowed to run wild in vegetable gardens, orchards, and grasslands because "wild" chickens were culturally valued over domesticated chickens. Pigs were not indigenous to southern Asia but were common in Southeast Asia and in eastern Asia as sources of meat and fertilizer. Pig sows were especially prized, since they produced annual litters of piglets. Pigs were efficiently raised as a meat source because they needed only a small, marginal space to scavenge for their diet, eating almost anything that resembled food. Pigs ate and processed human feces; subsequently, their excrement was used as garden fertilizer.

By the late medieval era people newly converted to the Islamic religion in island Southeast Asia faced the dilemma posed by Islam's outright prohibition on the eating of pig. Local populations resolved this dilemma by eating pig meat that had been raised and slaughtered by non-Muslims. Dogs were initially domesticated as a food source (along with pigs) but in time became hunting companions and tended

livestock. The early peoples of eastern Asia and Southeast Asia used pack-hunting dogs and later bred dogs as house pets. Soldiers normally received dogs as emergency food rations; similarly, in times of famine dog meat became valuable among the people of eastern Asia and Southeast Asia. Ducks were domesticated in the wet-rice producing regions of Southeast Asia and eastern Asia both as a source of food and because of their importance as a fertilizer in the wet-rice growing cycle.

Among the seminomadic populations who inhabited the steppes and plateaus of central and southern Asia, sheep were especially important as a source of wool and skins for clothing, blankets, and shelter and also as the dietary staple of boiled mutton. Dried sheep dung was used as a fuel for heating and cooking. Goats provided meat, milk, and cheese but were not environmentally efficient, since they consumed grass from the root and thus overgrazed grasslands. Yaks supplied meat and milk and, with oxen, pulled carts. Where grasslands or grain surpluses were available, cows were the source of meat, hides, and milk, which was frequently converted into yogurt. Oxen (dry zones) and water buffalo (wet zones) were the major source of animal labor in Asia's settled agricultural regions.

Horses were raised on the Mongolian steppes and in Sind and northwestern India, where they were used for transportation and herding and as a source of mare's milk, which produced a favorite fermented alcoholic drink called *airag* (also called koumiss). Unlike other animals, horses were unable to breed in Asia's tropical zones and had to be imported; there they had ceremonial and military use rather than practical productive use. Asia's Bactrian camels, with two humps, were valuable in the desert regions owing to their ability to live on limited pasturage and their capacity to consume and store large quantities of water, which allowed them to travel long distances between water sources. In addition to their transport value, camels were a source of wool, milk, cheese, and meat.

Cattle were widely used in southern and eastern Asia for plowing, transport, and food; despite Hindu and Buddhist prohibitions, numerous Asians ate beef. In India there was normally a village cowherd who drove the cattle, branded them with their owner's marks, took their waste to the plowed fields every morning, and returned them to the village at dusk. Cow's milk, curds, and ghee, made from melted butter skimmed from milk fat, which would keep indefinitely in the hot climate, were dietary staples. Water buffaloes were of greater value in the regions of southern, southeastern, and eastern Asia that practiced wet-rice agriculture, where they were valued for their plowing rather than as a source of food. In Java wild cattle were hunted and domesticated for plowing

in the dry agricultural zones, and in the mainland Southeast Asia regions adjacent to southern Asia in Myanmar (Burma), Thailand, and Cambodia, which had access to India's white cattle stock, cattle were widely used for plowing in regions of dry cultivation. In these mainland regions of Southeast Asian and India, Indian elephants were prized for their use in transport, military ventures, and court rituals and in fulfilling heavy labor such as the clearance of jungles (toppling trees) and carrying heavy loads (stones and logs) associated with major construction projects.

HUNTING AND GATHERING AGRICULTURE IN THE PACIFIC ISLANDS

Medieval era Australia, New Zealand, and the Pacific islands were notable for their isolation from developments in the neighboring regions of Asia, but at the same time these areas were subject to important migrations of populations among the Pacific islands that would have an impact on regional agricultural systems. Except for the sweet potato, which is thought to have had a South American origin and been transported to Asia across the Pacific Ocean by sojourning Polynesians, all the crops and domesticated animals of the Pacific islands (toro, bananas, yams, breadfruit, sugarcane, pigs, dogs, and chickens) originated in Asia. These foods were purposefully introduced by voyagers intending to settle, rather than by happenstance. Medieval era Pacific island populations normally lived in villages on the lower slopes of mountains on the edge of coastal plains, where they could plant taro, the tuber vegetable that was their principal starch crop, which they supplemented with harvests of the products of the sea, native animals (notably sea snails and tropical birds). They also picked breadfruit and coconuts from trees, which, with other local plants, provided them with the fibers they needed for their clothing.

In contrast to other Pacific island societies, the Aborigine populations of Australia were seminomads who had settled the Australian continent in prehistoric times and in the medieval era followed seasonal sources of food over a fairly defined territory in the Australian interior. None practiced settled agriculture or had significant settlements on the Australian coastline. In New Zealand the initial Maori Polynesian settlers landed on the South Island around 750, where they followed the normal patterns of Pacific island hunting and gathering. A new group of voyaging Maori populations from Polynesia arrived in the 12th century, settled on the North Island's west coast, and moved inland, where they introduced food crops that they had brought with them, notably, taro, yams, gourds, and *kumara*, a variety of sweet potato and the only tropical plant to flourish in New Zealand's cool climate. As the new crops took hold, Maori societies developed an

efficient underground storage system that allowed them to harvest the fragile *kumara* tubers before the first frost so that they could ripen during the cold winter months. The stored crops fed the local population in the winter, and the surplus was replanted in the spring.

SHIFTING, BROADCAST, AND TRANSPLANTING CULTIVATION IN SOUTHERN, SOUTHEASTERN, AND EASTERN ASIA

The earliest settled agriculture in Asia consisted of clearing woods, planting grain, weeding, harvesting, and raising chickens, pigs, and dogs. Millet, sorghum (grain-producing grasses), and other dry-zone grains (wheat, barley, and rye) were highly adaptable and predate Asian wet rice as the staple grain in the early densely settled plains of the Indus and Ganges rivers of northern India and the Yellow and Yangtze rivers of northern and central China. Millet (dry rice) and

wet-rice (*sawah*) cultivation were incompatible; as wet-rice production spread, it displaced millet production in regions that had sufficient water and favorable climate. Initially millet was produced in the uplands by means of what is commonly called slash-and-burn, shifting, or swidden cultivation.

Shifting cultivation of dry rice, grains, and sorghum was ideal for the marginally populated frontier regions of Asia and the Pacific and the sloping highland areas with adequate drainage. Shifting cultivation required little labor and was able to produce a substantial surplus relative to the size of the workforce. A new patch of forest was cleared and burned each year. Planting normally consisted of using pointed sticks to make holes, into which two or three grains were placed. Nutrients added to the soil in the initial burn-off were washed away by rain within two seasons, thus necessitating a shifting cultivation cycle. Owing to spoil depletion, highland village communities moved at least once every 10 years. Fields, rivers, and lake production centers might be some distance apart rather than coincident. Local migration cycles, together with the relatively low yield per acre, limited highland population density to between 20 and 30 persons per square mile and made it difficult to pool significant surpluses.

The transition from upland shifting cultivation to lowland dry-grain cultivation had taken place in India's and China's northern river basins between 3000 and 2000 B.C.E. and in Sri Lanka, Korea, and Japan from roughly 300 B.C.E. In contrast, this transformation accelerated in southern India, Southeast Asia, and southern China in the medieval era. While this medieval-era transition might have resulted from population pressure, it was more likely due to the supportive physical environments or new technologies that allowed the cultivation of lands that were previously useless swampland or subject to heavy annual monsoon season flooding. Terracing was another innovation, which permitted wet-rice production on hills or mountains.

Wet-rice cultivation, initially developed on mainland Southeast Asia, spread to neighboring regions of Asia that were subject to seasonal monsoons in the early first millennium of the Common Era. In some regions, as in Cambodia, seed was more often broadcast in the muddy puddles of a raised-earth plowed floodplain, since it grew quickly and needed little work. In most areas of Asia, however, a transplanting method was preferred, which gave higher yields per unit of land used though not the highest per labor input. By either the broadcast or seedling method a productive wet-rice farmer could normally expect an annual output of 20 to 25 bushels of grain per acre. In early times one rice crop proved adequate to supply local needs, though a second could be harvested if weather and irrigation facilities permitted and there were incentives to produce a surplus for external consumption.



Porcelain model of a granary; China, 13th century (Freer Gallery of Art, Smithsonian Institution, Purchase-Lois S. Raphling and the Hassan Family Foundation in memory of Dr. David L. Raphling)

In the regions of southern, southeastern, and eastern Asia using the transplanted seedling method, seed was sown annually in small flooded seedling beds at the approach of the rainy season. While seedlings took root, farmers and family prepared nearby fields; they weeded and broke up soil with wooden, stone, or metal-tipped hoes until the monsoon rains soaked the earth. Then seedlings were transplanted by hand with enough space between for each plant to grow. As the crops matured, farmers repaired the local irrigation system and regulated the flow of water as rains reached their peak. When water receded and fields drained, the sun ripened the grain. At harvest the entire community worked side by side. During the subsequent dry season, fields were cleared, tools were repaired, and feasts, festivals, and marriages were celebrated.

Commonly both wet-rice cultivation systems depended on the retention of dissolved matter that was brought into the fields by seasonal floods or irrigated water, which enriched already fertile layers of soil and to which fertilizer (such as water buffalo, pig, and duck excrement) was added. Water buffaloes plowed the irrigated fields to make the land suitable for the reception of seeds and seedlings. At first, wooden and, later, metal-tipped plows turned under the mulch from the previous year and transformed the flooded soil into a creamy mud 12 to 20 inches deep, which minimized the filtration loss of the irrigated water. Domesticated ducks were important in providing fertilization but also to control potentially harmful algae. There was a wide range of traditional rice varieties, from those with an 80-day growing period, first developed in Vietnam for drought-susceptible fields, to varieties with a growing period as long as 270 days for lands that were moist over a lengthy portion of the year.

Water manipulation was the key to success. The canal networks ensured that wet seasonal floodwater was equitably distributed over local fields. Temporary channels and waterwheels diverted water for gravity-fed irrigation. Large ponds, often initially associated with temples that took responsibility for their construction and maintenance, retained rainy-season water for domestic use during the dry season. In a few areas, as in southern and central China, Java, Cambodia, Vietnam, and Sri Lanka, complex regional canal networks built during the medieval era are still used today. Terracing, which involved the elaborate construction of level raised-earth fields on mountainsides, was another innovation that allowed productive wet-rice cultivation of otherwise marginal hills and mountains in the densely populated regions of China, Sri Lanka, Java, Bali, Korea, and Japan during the medieval era and also permitted rainy-season water to be channeled from highlands to lowlands by networks of dams and canals.

Wet-rice agriculture could support a high population density owing to big yields from small areas—a field of 2½ acres could easily support a household. But large population centers in the early wet-rice regions were the exception. Small housing clusters (one house and one field or several houses and nearby fields) were more practical for flooding and draining of the fields. Too much water flow would damage the dikes, while too little would result in algae growth. Rights to occupy and use land were characterized by long-term commitment to a soil plot. Leaving their fields uncontrolled was not an option among wet-rice cultivators, except just after harvest, and developing new lands for cultivation might take several seasons.

To prevent reversion to the wild, a grassland periphery was commonly maintained around cultivated fields, which served as a border against the forest as well as a buffer against enemies. Here domesticated animals grazed, and wild animals were hunted to supplement and protect cultivation. There was also controlled use of fire, which helped maintain the border. Old, taller wild grasses were replaced by shorter hybrid varieties that provided better nutrition to livestock. Villages on the periphery were charged with the task of preventing reversion and were justly rewarded for their efforts. Early state records in China both praise and compensate those who cleared forests and extended wet-rice cultivation. War captives, debt bondsmen, criminals, and retired military were resettled in these peripheral zones to support the opening of and then maintenance of newly productive territory.

AGRICULTURAL AND TOOL INNOVATION

By the medieval era iron tools were common among Chinese, Indian, and Southeast Asian farmers; their efficiency supported a substantial increase in local agricultural productivity, which in turn supported, if not caused, significant population increases. China's population dramatically doubled from roughly 50 million people in the ninth century to 100 million by the 13th century as the result of extensive rice cultivation in central and southern China coupled with rural farmers' holding more abundant yields of food that they could easily provide the growing market.

The Chinese were the leaders in the development of metallurgy in the seventh and eighth centuries, and the technology spread to the other Asian regions. This production involved a leather bellows system that was powered by humans. The bellows increased the temperature of an iron furnace to produce a higher-quality iron for plows, which were less likely to break under stress when plowing fields. Triangular iron plowshares, which had a U-shaped moldboard fixed to the rear of the plow, were highly effective in turning over

and crushing the earth. Further medieval era innovations included the curved-shaft plow, which was more efficient in cutting the soil, and new iron tools that further improved cultivation, including the machete. Paired with the breast harness, which had been developed around 200 B.C.E., the new plow allowed draft animals to breathe easily while pulling heavier loads. The plow, which both crushed and plowed the soil, could turn left and right and even turn around. Another new metal tool was the wheelbarrow, which could carry both people and cargo. Large, self-powered bucket waterwheels and other water-pumping devices allowed for the lifting of water over riverbanks into adjacent irrigation canals. In China and elsewhere, woodblock-printed books made the new agricultural technology widely available.

The construction and extension of water-control projects in the Yangtze River basin of China and Sri Lanka and throughout mainland Southeast Asia and Java and the development of tank agriculture in southern India to retain the seasonal monsoon rains for dry-season agriculture supported the introduction of crop production into previously marginal lands. By the 10th century farmers in many of the wet-rice-producing regions cultivated new strains of early-ripening rice, which was initially developed in the Cham regions of central Vietnam. With the new industrial technology and the widespread use of fertilizer (animal manure and composted organic matter), wet-rice farmers could easily produce two rice crops annually. This freed land for the growth of vegetables and fruits for the marketplace in the cooler winter months or coincident with rice production, as vegetables were planted on the mounded earth that separated the rice fields.

Road and canal constructions supported the transport of rice surpluses to other regions. In China some areas chose to import rice and devoted their labor to cultivating lychees, oranges, and other cash crops for the marketplace; the same was true in the eastern Indonesian archipelago's Spice Islands, where local workers exclusively farmed and gathered spices and depended on rice imports from Java as their source of dietary staple. By the end of the 15th century sweet potato tubers, which entered southern China ports from the Pacific island basin, were grown in every region of China as a common winter dietary staple. Sweet potatoes were roasted and sold as a street food in Beijing, Xi'an, Chengdu, and Shanghai, among other Chinese cities. Farmers of the Song era (960–1279) supplied China's markets with other new commercial crops, most notably cotton and tea, the latter of which was previously used as a medicine and in Buddhist rituals. Silk was another local cash crop, but it required considerable human labor. A farmer had to raise 700,000 silkworms to produce 150 pounds of silk.

LAND TENURE AND POLITICAL ECONOMIES

Permanent use of land, through planting, the creation of irrigated fields, or the utilization of fruit-bearing trees and palms, was subject to a variety of local arrangements through the Asian agricultural regions. Among these land distributions were 1) lands regarded as the common property of the community, even though portions of the common land were known to belong to specific community members; 2) lands under individual and familial inherited control; 3) landed estates that were inhabited by mixtures of assigned laborers, war captives, and slaves and were managed by a temple-based staff; and 4) tenant farming arrangements that were subject to the authority of resident and absentee landed aristocrats, including rulers who sent dependents into the forest to clear and cultivate new lands under the control of royal retainers and kinsmen. Except for China, during the medieval era Asian labor shortages resulted in competition for labor rather than land, with resulting patterns of labor dependency and bondage that resulted from conquests rather than the development of tenant farming arrangements.

In the Khmer realm of Angkor Cambodia, Java, Myanmar (Bagan), and the Tamil regions of southern India, the elite with existing claims over land minimized the intervention of an emerging state elite in their demands for taxes and labor services by concentrating their family economic resources under a Hindu or Buddhist temple's administration. In many cases these arrangements were a front by which members of the donor family, rather than the temple staff, managed the family land assigned to a temple, the temple receiving only a designated share of the income. What was transferred by the donors was not "ownership" of land but the right to income from the land. As noted, in medieval era Asia landholding meant rights to the production and labor service of the property inhabitants rather than absolute possession. Income rights could be transferred; while inhabitants of the land continued to farm the land, their production was subject to a series of income claims, including those of the state, the temple, and the donating family, which retained guarded rights to the property, most notably the administrative and political rights over its inhabitants.

In China, owing to inheritance distributions to male children at a father's death, warlord seizures in the eras of transition, and movements of the old gentry to cities to become metropolitan elite, aristocratic and temple estates declined under the Tang (618–907) and Song dynasties. In previous times agricultural lands were "owned" by hereditary gentry and temple estates. The decay of these old estates paired with new Song tax policies allowed for land ownership among commoners. Besides working their family's assigned estate lands,

from which annual production was divided between the gentry and their dependent farming family, Chinese farmers had been subject to heavy labor taxes, which they performed on an aristocrat's lands and state public works projects. Instead of collecting labor taxes and mandatory surplus grain payments, the Song tax system converted to regularized cash collections. Paid laborers and professional soldiers replaced conscriptions of locals for state labor and military services. The Song tax collection system did not employ local gentry; instead, government officials accountable to a regional magistrate collected local taxes from village elders, who had considerable management autonomy as long as their villages paid taxes and behaved in an orderly manner.

In part to justify their collections of agricultural surplus, the Tang and Song imperial regimes implemented "ever-normal granaries," which stored surplus grain assessments collected in productive years to guard against starvation in years of drought, disease, or other societal crisis. The imperial bureaucracy also controlled local market access to salt and iron, in theory to ensure their availability to the public but in reality to guarantee their access to the imperial army in times of war.

AGRICULTURAL MANAGEMENT AND POLITICAL POWER

Control of access to water was an important issue in the dry areas of Asia, but in regions where rainfall was plentiful or where there were multiple water sources useful for irrigation, the would-be elite found it difficult to dominate a water system, and local autonomy prevailed. However, where rulers rather than locals initiated hydraulic networks and continued to manage and control water, this reinforced their authority over local producers. Some historians highlight the critical role of powerful individuals or externally linked institutions—either religious or political—as the initiators of Asia's wet-rice agriculture, which was the vital source of wealth that supported the emergence of powerful, centralized states in China, Korea, Japan, mainland Southeast Asia (Myanmar/Burma, Cambodia, and Vietnam), Java, southern India, and Sri Lanka during medieval times.

Scholars debate whether terraced agriculture had to be supported by well-organized and hierarchical societies and how this may have contributed to the development of early centralized political systems. The natural order of terraced farming is hierarchical from top to bottom. Members of society politically and ritually submitted to rulers, local nobles, and temples that had the most to do with building and maintaining the water-management system, the terraces, the water canals, and the storage tanks. In such a society the needs of the individual had to be secondary to the welfare of the group.

Cultivation cycles paired with the local geography and the available labor supply to create an orderly production schedule. These rice cycles shaped the calendar of human events. The annual pulse, it is said, reinforced the community's mutual commitment to human service and charity as well as its willing submission to a central cultural authority. Asia's terraced farming societies have been thought most likely to emphasize teamwork and continuity over change.

State administrators in the noted Asian regions were especially known to promote social conformity, as reinforced by the logic of China's Confucianism and Hindu and Buddhist traditions that had their origin in southern Asia but were widely accepted as a logical foundation for the establishment of universal standards of societal conduct, as this supported greater productive efficiency. Settled wet-rice farmers were especially bound to the soil, practically if not legally, and were in theory less likely to risk rebellion against the state. To reinforce their political and economic objectives, officials encouraged transition from early matriarchies to empowered males in a patriarchal society as a way to increase the role of men in agricultural production, which had traditionally been dominated by women. Earlier hunting and fishing beyond the village, which was the previous domain of male economic activity, produced no taxable surplus. In contrast, settled agriculture was a predictable source of tax revenues that could be collected as the state's share of each year's harvest. Taxes were also assessed on the expectation of annual yields based on the records of past productivity.

EUROPE

BY TOM STREISSGUTH

The continent of Europe is one of the most diverse regions on earth, with widely varied land formations, soils, climates, and growing conditions. Coupled with the isolation of peasants living in small, scattered villages and resisting change and outside influences, this diversity gave rise to a complex mix of farming practices during the Middle Ages. Historians and archaeologists have only recently made medieval agriculture a subject of intense scientific study and have found that the ways and means of medieval peasants were nearly as varied and numerous as the villages in which they lived.

RISE OF THE MANOR

The fall of the western Roman Empire in the fifth century disrupted traditional patterns of land use and farming in the areas settled by the Romans, including Britain, Spain, Italy, and Gaul (modern-day France). The waves of migrants from the north left poor and isolated communities in their wake. Many regions continued to suffer generations of warfare,

sieges, pillaging, and highway robbery. As central authority broke down, local nobles and warlords began exercising absolute control within the boundaries of their private domains.

After the fall of the empire, farming was carried out by small, isolated, and self-sufficient communities. Trade was minimal, and most rural families—the vast majority of the population—subsisted on what they could raise or grow on the land surrounding their homes and villages. Out of this society arose the manorial system. Whereas Roman settlers managed large estates worked by slaves, manor lords parceled out plots for cultivation among the peasants living in the areas surrounding the lords' private estates, or *demesnes*. The peasants worked farmland on the manor as part of their obligatory service. These manors gradually increased in size and number as new lands, including forests, marshes, and coastal areas, were reclaimed throughout Europe for productive use. Tools were developed to hasten the clearing of land and to increase the efficiency of labor. For example, heavy axes helped to speed the job of clearing dense forests, the jointed flail was superior to a simple wooden stick for beating grain, and the long scythe simplified mowing hay.

To manage his estate, the lord employed a steward or bailiff, who oversaw the labor of the peasants and sat in judgment in the court of the manor to decide disputes over rights and duties. In England the reeve was appointed to look after the lord's interests, such as the use of his *demesne* lands (the shire reeve, or the reeve of an entire community, was the origin of the modern sheriff). Important duties were also held by the hayward, or guardian of the fields and hedges, who was responsible for preventing damage to the properties from the herds and corraling any stray animals.

On some estates, slaves were used for field labor and as domestic servants. The slave population largely comprised captives from the frontier wars with pagan barbarians such as the Visigoths, Saxons, and Alamanni. As Christianity spread, slavery declined in medieval Europe (the Church held slavery of its members to be against Christian doctrine). Certain legal punishments, however, reduced men and their families to serfdom, and impoverished peasants who could no longer provide for themselves and their families were consigned to voluntary servitude to work in return for sustenance. To release himself from bondage, a serf had to give a money payment or hope for a reward for his bravery in protecting and defending the lord's estate. To successfully flee a *demesne* was a formidable task, because serfs could hope for no outside assistance and the lord had his own knights and bailiffs as well as any local authorities to carry out a search. On the other hand, a lord could not normally displace serfs from his lands without good cause, because the vital production of his lands and herds depended on the labor of his bonded men.

THE AGE OF REBELLION

The heavy taxes and obligations of the manorial system kept serfs tied to the land, working their crops and managing herds with very little hope of betterment in their lives. Toward the end of the Middle Ages this onerous agricultural system came under pressure from social and economic changes. The Black Death, the Hundred Years' War, and other events caused social turmoil, price inflation, and a shortage of peasant labor. In England and on the Continent the result was violent rebellion among the peasantry, beginning in the middle of the 14th century.

Rebellions flared in France, Germany, eastern Europe, and Scandinavia. The *Jacquerie*, a peasant revolt in northern France, took place between 1356 and 1358. Mobs of peasants stormed through villages and the homes of the nobles, burning, raping, pillaging, torturing, and murdering their victims. They were eventually suppressed, with bands of nobles and mercenaries carrying out massacres of the rural population. Since this event the term *Jacquerie* has come to mean any violent mob rising.

The most significant of these events took place in England. Wat Tyler's Rebellion erupted in 1381, in the village of Brentwood, England, when a royal tax collector was driven away by a well-armed mob. Tyler led the unruly crowd into the city of London, where they attacked homes, prisons, palaces, and the Tower of London. To stem the riot, King Richard II agreed to meet with the rebels and promised to abolish the traditional obligations of serfdom. But after Tyler was killed in a street fight with London's mayor, the king immediately reneged on his promises.

The wave of rural violence ebbed in the 15th century. The rise of town economies, the establishment of industries and an artisan class, and the breakup of large estates spelled the end of the old manorial system. Like many social changes in history, the transformation was accompanied by violence, as those with privilege fought to protect their rights and the lower classes defied authority and used sheer terror to achieve their goals.

In the domains of the Eastern Roman Empire, or the Byzantine Empire, the majority of farmers in the early Middle Ages were independent smallholders who owed taxes to the state rather than labor to landowning nobles. This system

resulted from the invasions and migrations from the north and east, which had broken up large estates, permanently scattered the landowning Roman aristocracy, and had ended the system of rural slavery. The staple crops in the region were wheat, olives, and wine grapes, with the addition of beans that added protein to a peasant's meager diet. Stock farming of cattle, pigs, sheep, and goats was important in the interior of the Balkan Peninsula and Asia Minor. Byzantine farmers used a variety of iron tools and broke the land with a small plow known as the ard. Through the first centuries of the empire, as the rural population expanded, new land was cleared for planting in the forests of the Balkans, and irrigation works brought water to dry regions of Asia Minor and the Levant.

VILLAGE LIFE AND WORK

Medieval peasants lived within small villages, which in northern Europe were surrounded by unfenced land divided into narrow strips. This open-field system of scattered strips of land separated by furrows or boundary fences dates to the time of Charlemagne. Strip farming made plowing with a large team of animals easier, because fewer turns were necessary to work a single parcel of land. The heavy moldboard plow used in northern Europe dug deep furrows, allowing excess rainfall to drain more easily. By the 10th century wheeled plows were coming into use in northern Europe. These heavy instruments were pulled by teams of oxen, in teams of two or four. (Heavier, rocky soil required even larger teams.)

Horses had been less common than oxen because they were more expensive to buy and feed. But the use of horses as farm animals increased with the arrival of the horse collar, which was invented in China and came to Europe around the eighth or ninth century with the caravans of traders crossing from eastern Asia along the Silk Road. The padded collar fit around the animal's neck but did not cut off its breathing, as did earlier harnesses. By distributing the weight of the load, the horse collar enabled the horse to plow heavy soil and haul heavy carts at a faster pace than could an ox.

Each farmer worked several narrow 1-acre plots within a larger field. Farmers owned plows and heavy equipment in common and shared the labor of plowing, planting, and harvesting their crops. The plots that were the property of a single peasant were an endless subject of dispute over rights and inheritance within the household. As families multiplied, the plots were parceled out among the heirs, leading to a patchwork quilt of tenancy rights that did little to enhance the efficiency of food production.

Every year the farmer paid out a portion of his harvest to the lord as a form of rent. The peasants also relied on a house garden to provide them with cabbages, leeks, onions, and garlic as well as dye plants, medicinal herbs, and cash crops



Man with pruning hook climbing palm tree; detail of a manuscript page, Spain, 1220 (Courtesy the Morgan Library and Museum)

such as flax and hemp. Pastures were owned communally, with stock animals looked after by the village herdsman. Also held in common were forested areas, useful for cutting wood, hunting small game, and collecting wild food such as nuts, berries, and mushrooms. The forest floors also were used for *pannage*, or pasturing for domesticated pigs, which fed on ground nuts and fallen acorns.

The homes of the peasants were constructed of wattle and daub, or mud plastered over a frame of sawn wood or heavy branches. Tightly bound straw or reeds were used as roofing material. For the peasants living in these small and dark homes, disease and hunger were familiar, travel was dangerous, and life was full of perils. Their diet consisted of bread and ale, vegetables from their private gardens, and occasional meat: beef, pork, chicken, or other fowl such as geese and wild game or birds.

In southern Europe and the Mediterranean region the demands of a different climate gave rise to different methods of working and dividing productive land. Less rainfall and drier summers made it necessary to retain moisture in the soil. Thus, shallow and less frequent plowing was done with the iron ard, a smaller and lighter version of the moldboard plow that broke up the soil without digging a furrow. Many fields in the south were enclosed, with farmers working a small number of larger plots as well as orchards. Communal farming was rare, in contrast to northern Europe, and most plots of land were owned and worked by individual families.

Throughout southern Europe vines and olives were important crops, along with wine grapes, which in medieval times ranged over a larger region of Europe than in modern times. In Spain, which was conquered and settled by the Islamic Moors from the eighth century, new crops imported from North Africa and the Middle East included rice, cotton, and citrus fruits. The introduction of Merino sheep made Spanish wool among the finest in Europe. One legacy of sheep raising in Spain was a powerful union of shepherds known as the Mesta, which was in frequent conflict with farmers over use of land, migratory routes, and grazing rights.

In areas where the manorial system was in force, peasants owed a percentage of their harvest (often half) to the local noble and exchanged their labor for the use of the land and the lord's protection against sieges, assaults, and highway thieves. Many villages also paid a tithe of one-tenth of their harvest to the church. The bailiff collected the rents and supervised the work and lives of the peasants. (Some lords held the right to prevent their laborers from moving to a residence or marrying a spouse outside the village.) The peasants worked a set number of days (often three every week) on land held directly by the lord and supplied labor when canals, ditches, or wells had to be dug or roads or mills built. The manorial system endured for centuries with little change. The local nobles provided the only authority and security known to most rural peasants, who rarely left their isolated villages and for whom moving any distance in search of better conditions or work was unthinkable. Without urban markets for crops, production remained low; the peasants subsisted on what they could grow and had no motivation to produce a surplus or plant new crops. In addition, a scarcity of coin forced many rural communities to operate on a barter system for tools, household goods, and food.

In the later medieval period, as a network of roads and new long-distance trading routes developed, production increased and city squares provided new marketplaces for the sale of produce and farm goods. Such weekly markets in the central square have survived in many European towns. An increase in production allowed some peasants to buy or bar-

ter for additional lands and thus accumulate a store of money and property. These relatively wealthy peasants could lease fertile land and pasture to tenants. Those without means could hire themselves out as laborers or servants or take up crafts like smithing, toolmaking, or carpentry.

SPRING PLOWING AND PLANTING

Medieval farming communities were the scene of frequent negotiation over duties, particularly over the share of labor to be borne in the seasons of plowing, planting, and harvesting. For rural peasants the year began in the spring with the return of fair weather and the greening of fields and forests after the last winter frosts. The planting season began when the soil thawed and could be turned easily by the plow. A plowman directed the big teams of oxen, which were replaced in later times by horses. The moldboard positioned behind the plowshare turned the soil over after it was broken.

Spring crops included barley, oats, legumes, peas, and vetches (plants grown for forage or as animal feed). Winter crops, such as wheat, were already growing where they had been planted the previous fall. Seed was scattered by hand, and sometimes various crops were mixed together in a single field. Peas and beans were planted carefully in shallow holes, dug by a narrow stick. Each kind of seed was planted in an ideal density, which would prevent the field from being choked by weeds or by too many plants of the crop being planted.

After seed was planted, it was harrowed (covered with soil). The harrow, made of bundles of sticks or built from a wooden frame, was dragged over the field; the peasants used hammers or mallets to break up large clods of soil. The young crop then had to be defended. It was a common task of peasant children to chase crows and other predators from the fields (taking care not to harm any of the lord's private game or doves).

The days between plowing and harvest were not idle. Rural peasants had to repair hedges and fences, dig ditches and wells, tend to their homes and gardens, maintain tools, care for stock animals, and provide the lord with obligatory service. Women were responsible for home care, sewing clothes, storage of dried crops and herbs, tending kitchen gardens, preserving meat, milking cows and goats, churning butter, making cheese, and slaughtering chickens and pigs for meals.

SUMMER LABORS

The hot summer months were reserved for making hay in the communal pastures. Hay was used as animal feed, and a good hay crop meant a steady supply of meat and milk through the winter months. Medieval haymakers used long wooden scythes to mow, with women following to move and turn the hay to make sure it dried evenly. The hay was bundled

into stacks and then brought to storage barns. Peasants who mowed the meadows belonging to the lord were entitled to a portion, in some traditions as much as they could carry off the field with the points of their scythes.

Care of the herds of sheep, goats, and cattle was also an important summer occupation. Lambs were sheared in late spring and their fleeces spun into wool. Cattle and sheep were pastured on fields intended for later crops to fertilize the soil. In some cases plowing for the fall crop began in early summer. The plowman dug as deep as possible to expose weeds, which then had to be laboriously cut at the root and pulled from the ground. Common weeds were thistles, nettles, cockles, cornflower, and marigolds.

In the summer households harvested the flax and hemp that matured in their gardens. The plants were pulled by hand and then dried in the sun and put into running water to rot away the waste parts and clean the plants. Flax and hemp fibers were beaten and separated and then hung up to dry. Hemp was wound and used to make rope, and flax was spun into yarn used for matting and other household goods.

In late summer as food stores dwindled, medieval peasants had to forage for food from the surrounding forests and take any game they could from communal lands or, illegally, from the lord's preserves. By the end of August the summer grain harvest began. This crucial harvest of winter wheat and rye and spring barley and oats depended on a steady rainfall in the spring months as well as several fair days, allowing harvesters to bring a dry crop into storage. The reapers cut the wheat with short sickles and the other grains with long scythes. Binders followed behind to gather the sheaves into bundles. In some places a tithe to the church of one of every 10 sheaves was collected, and the rest was carried to storage. Gleaners were allowed to collect any cut wheat that remained in the field. Damp grain could be dried in special ovens, if any were available. The stubble remaining was left to hens, ducks, and geese, who were turned loose to clear the fields and fatten themselves up for winter feasts.

AUTUMN PROCESSING

Harvested grain had to be processed, which required the labor of men, women, and animals. The work was done immediately after the harvest, when the days began growing short and the nights cold. Wheat and other grains were threshed (beaten) with long-handled beaters to separate grains from the ears and stalks. The grains were winnowed by being thrown up into the air and allowing the wind to carry away the chaff, which was then used as animal feed. Seeds were removed by passing the grain over a sieve. The processed grain was collected and stored, ready to be milled into flour and then baked into bread. If a running stream was available,

grain mills were powered by water wheels. In some places draft animals were used to drag millstones over the grain and pound it into flour. Rodents and other vermin posed a constant threat to processed grain, which could be kept for a long period unless affected by damp.

After the harvest the peasant settled his yearly debts and rent with the lord of the manor. Livestock that was no longer useful to breed or to work was slaughtered at this time, and the meat was stored and preserved by salting or by hanging in a smokehouse. The skins of cattle and pigs were saved for tanning into leather for clothes and shoes. Winter crops of wheat and rye were planted and harrowed after the fall plowing. The fall was also the time for collecting wild fruit and for herds of pigs to scavenge nuts and mushrooms in the forest, a right that peasants might gain through negotiations with the lord.

In years of good harvests peasants had good stores of grain, nuts, dried fruits, and meat to last between the fall and spring. They collected wood from the forest floor (because cutting live trees was usually prohibited) and reeds for use as thatching material to repair or build homes. Household chores for women included making or repairing clothes, preserving food, preparing meals, and caring for children. Men worked at repairing their homes and tools, at crafts such as ironworking and woodworking, at milling grain, and attending markets.

IMPROVEMENTS IN AGRICULTURE

The two-field system of planted and fallow plots was eventually replaced by a three-field system: one field was left fallow while the other two were used alternately for spring and fall crops. Three-field rotation greatly increased harvests, as did the development of new technologies starting in the 11th century. The heavy-wheeled plow fitted with a moldboard was better adapted to the heavy soils of northern Europe. A padded collar fitted to a horse enabled the peasant to replace oxen with the faster animal for plowing fields and hauling goods longer distances. Water mills made use of the power of local streams for milling grain more efficiently and for making textiles. Marl, or high-calcium earth, was used to extend animal dung as a fertilizer over large areas.

Throughout the 12th and 13th centuries European farm production and population increased. National monarchies were establishing control over larger areas, although local power still rested in the hands of regional leaders: earls, dukes, counts, viscounts, and landowning nobles. At the same time, arable land was extended to fields that were previously used as pasture and forage land. In about the 13th century manorial lords began exerting closer control over common land. These changes reduced the herds of cattle, sheep, and

goats grazing on fertile pastures—and producing the fertilizer vitally needed for crops—setting the stage for the many troubles of the 14th century.

Cash transactions became more common in marketplaces and between peasants and landowners. With the demand for hard money increasing and with the use of silver coins for paying rents, taxes, and fees, the European farmer was forced to grow and market a wider array of surplus crops. The subsistence farming of the early Middle Ages gave way to a more complex market economy in which supply and demand determined prices and the farmer began selling his harvest to raise money, which in turn allowed him to purchase food for his own table. The growth of large cities provided another impetus to agriculture; cities became vast cash markets, home to large commercial networks for buying, transporting, and selling food. Kings and their ministers paid close attention to conditions in the countryside, because successful harvests meant lower prices and helped rulers keep the peace among the naturally restive urban populations. Labor in the countryside became increasingly specialized, and as transportation improved, moving goods to market became easier and faster. This was especially true of livestock produce, such as wool, butter, cheese, meat, milk, and hides, which could be brought to market along roads and byways, avoiding the hazards of river and sea transportation.

RURAL CRISIS

The urbanization of medieval Europe was a spur to improvements in farming technology. In the early 1300s, however, an agricultural crisis took hold in England and western Europe. Heavy rains in 1315 ruined England's harvest, driving up the price of grain to six times its average. Over the winter of 1315 to 1316 a famine struck England and western Europe. A few years later animal herds were devastated by murrain, a disease outbreak that robbed many peasants of meat and milk and the means to plow their fields. The series of bad harvests and droughts caused widespread starvation so desperate in some places that people resorted to cannibalism. Village peasants were now bearing the burden of supplying food to an increasing urban population, which produced no food of its own and was utterly dependent on good harvests for daily sustenance.

Desperate to sustain themselves, peasants flooded into the cities, causing overcrowding, crime, and unsanitary conditions. Epidemics of typhus, plague, and other diseases became more common, until the Black Death of 1347 to 1349 killed about one-third of the population of Europe. In France the Hundred Years' War struck another blow to peasant farmers who suffered the pillaging and theft of

crops and animals by the hungry roving armies of English, French, and Burgundians. The war continued until the middle of the 15th century, leaving entire regions of northern France denuded of crops and inhabitants. Just as the war came to an end, a general shift in climate occurred; a little ice age began, with colder temperatures and shorter growing seasons.

Gradually, Europe recovered from the frequent plagues, social chaos, and war, but the crisis had left a permanent mark on agriculture. With their labor in high demand in the cities, many farmers left the countryside to become artisans in the cities. The return of a cash economy enabled farmers who remained in the rural areas to begin buying land of their own. One of the areas to recover quickly was the Netherlands, where the industrious Dutch had been raising great swaths of new country from the sea floor for several centuries. Farmers raised berms, or mounds of earth, to canalize the water and built terps, small areas of raised land on which houses and barns could be built. They repaired dikes and polders, large and level areas of cultivable reclaimed from the sea. Dutch farmers began raising new crops of legumes and root vegetable crops as well.

In England a transformation took place as the open fields were enclosed for raising sheep for wool, a commodity in high demand on the continent. To survive in this land-use environment, English farmers had to consolidate their scattered strips of land and enclose them with fences or hedges. This incited an enclosure controversy that continued for some two centuries; eventually the profitable trade in English wool overwhelmed the efforts of English farmers to hold to their traditional system of open-field farming. In the meantime, on the European continent the system of manorial lords and serfs gradually gave way to an independent landowning peasantry, subject more to the whims of the marketplace than to feudal obligations to landowners.

In the Byzantine realm serfdom became more common in the late Middle Ages. Many villages became the property of wealthy landowners or were absorbed by monasteries. The rise of the Seljuk and then Ottoman Turks in Asia Minor posed a constant threat to the empire and its farmers. By the 14th century the rural population was in decline throughout the Byzantine Empire, affected by war, plagues, and a weak and corrupt government. With the fall of Constantinople in 1453 the Turks destroyed the last remnant of the Roman Empire and imposed a new administration and tax system in the countryside. The former Byzantine lands were further isolated from western Europe and adopted a new form of rural feudalism, in which Ottoman *hospodars* (governors) imposed heavy taxes and put strict limits on the movement of the rural population.

THE ISLAMIC WORLD

BY TOM STREISSGUTH

The conquest of the Middle East, Persia (now Iran), and North Africa by Islam in the seventh and eight centuries brought a transformation in the economy and society of those regions. The remnants of the Roman imperial government were swept away, and a new faith and culture were adopted by the population. Rural estates were seized and distributed to the members of the victorious armies and their leaders. New land came under cultivation, and eventually an entirely new system of agriculture was put into place. This “green revolution,” in the phrase of some historians, had far-reaching effects both on the countries adopting Islam and on societies in Europe and Africa that did not adopt the Islamic religion.

Eventually the Islamic *umma*, or community, reached from India and central Asia in the east to the western coasts of North Africa, the island of Sicily, and the Iberian Peninsula (modern-day Portugal and Spain) in the west. The climate, soil, and agriculture of these regions varied. Generally, where settled agriculture was possible large cities and powerful states arose, and their governments collected harvests and built granaries to keep the population fed. In more arid regions, where growing crops was difficult, people tended to be migratory and more autonomous, and large clans were the basic unit of social organization.

The original home of Islam, the Arabian Peninsula, was a vast, poorly watered land of desert and mountains, crisscrossed by caravan trails and the site of a few permanent towns. The people of this region relied on trade, animal husbandry, and the growing of food crops in a few small oases. Herders kept sheep, goats, and camels, guiding them north in summer and returning in winter for grazing in sparse mountain pastures.

To the north the Fertile Crescent, an area of well-watered land, surrounded the valleys of the Tigris and Euphrates rivers. In Mesopotamia (a name that means “the land between the rivers”) settled agriculture had been practiced for millennia. Annual snowmelt in Anatolia, where the rivers had their source, brought a spring flood that caused the streams and tributaries to overflow their banks and then retreat, leaving a thin layer of silt that enriched the soil for the cultivation of grains, legumes, and vegetables. Date palms, which required little rainfall, also flourished in the region.

To the west lay Syria and the coastal plains of the Levant, the region bordering the eastern shores of the Mediterranean Sea. As in Mesopotamia, irrigation systems had been in place since long before the Islamic conquest. In level areas river water was diverted with a series of dams and canals to farming plots. In the mountains farmers terraced the hillsides to se-

cure the soil and create level ground for cultivation. Surplus farming allowed large cities, such as Damascus, Aleppo, and Baghdad, to grow some distance from the coast and the main trade routes of the Mediterranean.

Before the Islamic conquest North Africa had been known as the granary of Rome. The Nile River valley was the productive heart of the ancient kingdom of Egypt. The valley surrounded the immense Nile, the world’s longest river, which had its source in the highlands of eastern Africa. The Nile flooded its banks annually with spring runoff that originated in these mountains. The flood renewed the land and refilled the network of ponds, canals, and ditches that served to irrigate crops. The soil of the Nile Valley was so fertile that farmers could raise two crops every year.

Stretching west from Egypt was the Maghreb, a region that includes the northern provinces of what are now Libya, Tunisia, Algeria, and Morocco. Lowlands along the coast rose to steep interior mountains, where the high-altitude plains were used for crops and pastures. The farmers of the Maghreb raised grain, olives, vegetables, and citrus fruits. The region enjoyed sparse but steady rainfall, lessening the need for artificial irrigation. To the south the Sahara supported a few natural wells and oases, but it was largely a harsh and infertile region that saw minimal settlement of any kind.

In the eighth century an Islamic force pushed across the Mediterranean into the Iberia Peninsula, establishing the realm of al-Andalus atop the remnants of former Roman and Visigothic states. The Iberian Peninsula itself consisted of a large and arid central plateau surrounded by mountain ranges that ran down to the coast. There were many variations in rainfall and soil, giving rise to a great variety of crops and farming techniques. In the high elevations forests of oak and cork trees produced valuable raw materials, while in the plateaus a mixed agriculture was practiced. The conquering Moors (North African Muslims) introduced rice, sugarcane, eggplant, cotton, bananas, and citrus fruits as well as many new and sophisticated methods of agriculture.

AGRICULTURAL PRACTICES

Muslim farmers restored dams, canals, irrigation ditches, and other infrastructure that had fallen into decay in the centuries before the rise of Islam. They dug new reservoirs and aqueducts to store and carry water. Water power was harnessed by mills, which allowed the efficient grinding of grain, olives, sugarcane, and flowers (for aromatic oils). Generally in mountainous or desert regions and in areas with little or no rainfall and infertile soil, agriculture was limited to pastoralism—the raising of animals by nomadic herders who moved seasonally from one place to another in search of good pasture. Where a minimum of about 10 inches of rain fell annually, sedentary

farming dominated. Each way of life brought about distinctive living and social conditions.

In the centuries following the Islamic conquest sedentary farming expanded at the expense of pastoralism. Available grazing land was reduced as irrigation claimed former pastures for permanent crop fields. Sugarcane, rice, and coconut palms, for example, tolerated the saline soil that was common in desert oases, which had formerly been the exclusive domain of nomadic herders. Competition over useful land generally favored the settled farmer, who could rely on the help of authorities who needed a reliable supply of food for an expanding urban population and reliable tax revenues from people tied to their land and estates.

Land ownership in the Islamic world stood in stark contrast to the manorial system of Europe, where a small layer of society had the means and legal right to own land and the vast majority of those who worked the fields had few legal rights and were often yoked to their homes as transferable property. Ordinary citizens of the Islamic world had the right to buy, sell, and mortgage productive land, and economic relationships were formalized not by oaths of loyalty but by written contracts. Cultivators who worked in the service of a landowner had the right to a significant portion of the harvest, generally at least half. Full ownership was granted to those who cultivated previously unused land. Around the major cities of the Islamic world small market gardens, many owned by single families, provided a variety of crops to the bazaars within the walls.

Under Islamic rule busy trading routes linking the Middle East, Africa, Europe, and India became the avenue for the propagation of many new species of food crops. From India came rice, artichokes, eggplants, coconut, and citrus fruits. Central Asia was the source of spinach. Africa produced sorghum, which replaced millet as a staple grain. From the Middle East spread durum wheat, a hardier variety than the wheat grown in Roman times. Durum wheat was the source of semolina flour and foods such as couscous and spaghetti, which was introduced to Italy through Islamic Sicily.

A wide variety of legumes, including fava beans, lentils, and chickpeas, were easy to store, transport, and prepare. Their cultivation also restored fertility to exhausted soils. Muslim farmers planted new orchards of lemons, oranges, pomegranates, limes, apricots, figs, and grapefruit. Banana trees came from Southeast Asia and watermelon from India. Adopting tough, drought-resistant summer crops, such as sorghum, watermelon, eggplant, and cotton, also allowed farmers to cultivate marketable produce throughout the year.

Sugarcane, also from India, had already arrived in the Sassanid realm of Iran by the sixth century. After the Islamic conquest it spread to Syria, North Africa, and al-Andalus,

where it was grown in abundance. Refined sugar eventually entered Christian Europe, where it was considered a luxury food and was in high demand in houses of nobles and royalty, who saw it as a worthy replacement for the common honey produced by feudal peasants.

New crops from tropical regions, where annual summer monsoons provided plentiful rainfall, demanded new techniques of farming. The Islamic world adopted new methods of crop rotation to replace the traditional method of rotating crops between two fields and leaving one of the fields fallow (unplanted) each year to renew its fertility. They frequently used an ard, a type of plow common in the Mediterranean region, which broke up the soil and improved its ability to hold moisture. The wider variety of crops and irrigation kept plots of land productive for longer periods.

The use of fertilizers and pesticides increased harvests and helped keep crops free of pests. To this end farmers used blood, powdered bone and horn, vegetation, chalk, lime,



Page from an herbal manuscript; Iraq or Syria, 13th century (Los Angeles County Museum of Art, the Nasli M. Heeramanek Collection, gift of Joan Palevsky, Photograph © 2006 Museum Associates/LACMA)

ashes, and manure. They frequently plowed, hoed, and harrowed the soil. Land that was marginal, or largely infertile, was put to use for crops that could tolerate sandy soil, such as watermelon, durum wheat, and sorghum. They also developed the science of grafting and crossbreeding plants to create more productive and hardier agricultural species.

Middle Easterners were expert breeders of horses and sheep, and they tamed the camel into a useful and extremely tough desert nomad, able to carry heavy burdens long distances and survive on minimal food and water. Sheep's wool and cattle hides were produced for the use of textile and leather industries in the cities, which exported their goods to distant markets in Europe, Africa, and Asia. Eventually, however, overgrazing and erosion destroyed marginal lands and green mountain pastures throughout the Levant, the Arabian Peninsula, and Mesopotamia, a phenomenon that had lasting effects on the society and economy of the Middle East.

The raising of crops and animals was limited by lifestyle and strict restrictions on diet. Pork was forbidden to Muslims, as were meat-eating animals. Nomadic peoples survived on a diet of flat bread, dates, and vegetables, and they relied on their herds of sheep, camels, and goats for meat and milk. The diet was supplemented by dried fruits, nuts, olives, and dates. The Middle Eastern Arabs favored coffee, which was imported from highland areas of eastern Africa. Food was flavored by spices, the most expensive of which was saffron, which came from India and was commonly used to flavor rice. Although they were not native to Islamic lands in the medieval era, cinnamon, nutmeg, and pepper were imported by Muslim traders from eastern Asia.

Progress in agriculture, indicated by increased harvests and a wider range of crops, was the foundation of a flourishing urban civilization in which large cities depended on their surrounding hinterlands for a steady and abundant supply of food. In addition, cotton, indigo, silk, and other cash crops were introduced that provided valuable goods for long-distance trading and created a luxury-clothing industry. In turn, these crops were introduced to Europe through Islamic Spain and Sicily.

The design of gardens for the growing of useful and ornamental plants reached a pinnacle of development in the Islamic world. The notion of Paradise in Islamic scriptures is a well-watered garden where trees and plants flourish beside pools, fountains, and ever-abundant springs. Gardens decorated the courtyards of the nobility, the grounds of royal palaces, and public squares and parks, prime examples being the gardens in and around the palace of Alhambra in the city of Granada, Spain. The skilled cultivation of a garden developed in tandem with improvements in farming techniques outside the walls of Islamic cities. In al-Andalus gardens were used to

acclimate new crops to their environment under the supervision of expert botanists.

AGRICULTURAL SCHOLARSHIP

Agriculture was the subject of a wide range of scholarly books and treatises in the Islamic world. Botany was a science widely studied and respected for its practical application to farming. The new techniques of farming spread widely through Arabic books, which circulated to the cities and to nobles, landowners, and cultivators. Ancient Greek texts were translated into Arabic at Baghdad's academic center Bait al-Hikma (House of Wisdom), and, with new knowledge added, they survived to modern times. Among the most important of these books were *De plantis* (On Plants) a text by the Greek historian Nicholas of Damascus (first century B.C.E.), and *De materia medica* (Concerning Medical Matters), a book by the Greek physician Dioscorides (ca. 40–ca. 90 C.E.). The *Georgika*, a work by the sixth-century Greek writer Kassianos Scholasticos, in Arabic became the *al-Filaha al-rumiya*. An even more respected ancient text, known as the *Nabatean Agriculture* (translated by Ibn Wahshiyya in 904), gave a detailed system of classification, instructions on how to plant, raise, and harvest a wide variety of food crops, and advice about grafting, treating the soil, and other topics of crop management.

These writings inspired further study and works by Muslim scholars, including *Kitab al-shifa* (Canon of Medicine), by the scientist Ibn Sina (980–1037; known in Europe as Avicenna), which treated the medicinal function of the different parts of plants. Ibn al-Awwan, a 12th-century Moorish agriculturalist, consolidated all of this ancient knowledge into the *Kitab al-filahah* (The Book of Agriculture), an encyclopedia of 35 chapters that became a standard reference book throughout the medieval Islamic world. Knowledge was spread further in specialized books about agriculture, such as the almanacs and volumes of practical advice that originated with the Persian astronomer and botanist ad-Dinawari (ca. 815–ca. 895 or 902) and the scientist Ibn Miskawayh (ca. 930–1030), both of whom lived in what is now Iraq. The almanacs advised the farmer on the best time to plow his fields, plant and fertilize his crops, graft trees in his orchard, and carry out the harvest. Almanacs also were useful in identifying the latitudes of the Islamic world, where the passing of the seasons often did not bring about dramatic changes in weather or growing conditions. In addition, farmers could produce crops to meet seasonal demand by relying on advice about the best time of year to harvest and consume certain kinds of food.

One of the most famous of these almanacs was written by al-Malik al-Mashraf, a sultan of Yemen who reigned in the 13th century. He advised his readers on the properties of soils, weather signs, and the different properties of plants

through their growing seasons. Scholars in botany and agriculture traveled widely throughout the Islamic world to teach in mosques, schools, and public marketplaces for the edification of farmers.

Developments in astronomical knowledge also contributed, among other things, to the spread of new agriculture. Astronomers tracked the progress of the sun through the signs of the zodiac, a skill inherited from ancient Babylon and the best method known in the medieval world to keep track of time's passage. A more precise measurement of time, the seasons, and the passing of the year helped farmers plant and harvest their crops at the optimal time.

WATER MANAGEMENT

Under Islamic rule the knowledge of irrigation and other techniques spread west from Iran, Babylon, and other realms that had long mastered food cultivation under difficult conditions. The sponsorship and maintenance of irrigation works were a primary function of strong centralizing governments in the medieval Islamic world, as in ancient Mesopotamia and Egypt. By the 10th century summer irrigation and crop rotation allowed farmers in some places to grow three crops a year instead of just one. Where rivers were scarce or nonexistent, water management was the key to successful farming. Under Islamic rule a system of deep wells, tunnels, and weirs (dams) known as the *qanat*, which originated in ancient Iran, spread to the Middle East, North Africa, and Iberia. The *qanat* was dug into a high point of land or mountainside, and water ran downhill through an underground network of artificial channels. The *qanat* was built and maintained by a local association of farmers who were responsible for its upkeep—a practice that still prevails in parts of the Islamic world. It provided a reliable supply of water even in years of little or no precipitation and also was relatively safe from pillage or destruction by hostile armies.

In North Africa the underground network was known as a *foggara*. Having built these networks at great expense and hard labor, farmers carefully guarded them from vandalism and other mischief, because the destruction of their water network would lead to poverty and hunger. They controlled the use of water among themselves by a system of clepsydras, or water clocks; these were distribution weirs that channeled the water to a certain field for a specific length of time. Each farmer was responsible for the maintenance of the weir during the time he used it; this method made water management the responsibility of the community rather than the rulers. In Tunisia the *foggaras* were used to create new oases in the desert. In Algeria the medieval *foggara* network is still in use, running for thousands of miles underground, with some shafts as deep as several hundred feet.

An important part of water management was the use of dams, known as *sudd*, which were built to divert water, slow and control it during times of flood, and bring it to the level of crop fields and reservoirs. Some dams were built to control the runoff of streams during storms, while others were used to control water from perennial springs, a technique especially common in Iberia. At certain points along a stream farmers installed a *noria*, or Persian wheel, a device for lifting water from a stream to a higher reservoir or field. Driven by a river current, the wheel contained small weighted buckets that descended into the lower level and then rotated to a higher level, where they were emptied. In areas where streams did not move swiftly enough, the wheels were operated by humans or draft animals with a system of small wheels and gears.

In the Moorish Iberian Peninsula the underground water network was known as a *galeria*. Many of the *galerias* built during this era are still in use, notably around the city of Granada, the last seat of Islamic Spain. From Spain the system eventually spread to Mexico and other places of Spanish colonization in the Americas.

IBERIAN PENINSULA

Under Roman occupation Iberian farming had been based on two annual crops, harvested in winter and in spring. With the Moorish conquest of early eighth century, the agriculture of al-Andalus was transformed. Hard wheat was introduced for cultivation on the plains around Córdoba, Saragossa, and Toledo. In these and other regions the former “dry farming,” relying only on natural precipitation, was replaced by crops watered by artificial irrigation. Deep wells and canals were dug, reservoirs prepared, and chain lifts installed to bring water to the fields in the dry and hot summer. The Moors enhanced the fertility of their fields with manure, wood ashes, decayed vegetation, and ground bone. They instituted a system of crop rotation and produced two or three crops a year.

Terracing leveled the contours of hillsides and protected fields from erosion. From mountain springs, water was transported by pack animals and aqueducts to the fields and orchards at lower elevations. The Islamic system of *qanats* and weirs distributed water from underground sources, with the outlets built according to the soil type, climate, growing season, and type of crop grown.

With the introduction of new crops, cultivation expanded into previously unused areas. A judge of Córdoba introduced pomegranates from Syria, and the renowned theologian, jurist, and poet al-Ghazali (1058–1111) brought home a variety of fig tree after a journey to the Middle East. At the same time, the ancient Mediterranean agriculture of wheat, olives, and wine grapes survived.

Al-Andalus inherited many methods of land tenure and laws concerning ownership and farming practices brought from North Africa. In Valencia, for example, the Tribunal of the Waters met each week to judge disputes over water, a carryover from a common practice in the Maghreb. As a result of this scientific and social cross-fertilization, the agriculture of Moorish Iberia was among the most systematic and productive in history.

DESTRUCTION AND DECLINE OF AGRICULTURE

Relying on its annual river flood, Egypt remained productive, and farming also continued to prosper in Moorish Spain. After the first centuries of innovation, however, a general decline in agriculture took place in the rest of the medieval Islamic world. The constant cultivation and planting of land caused soil erosion, and irrigated land that was poorly drained became saline.

By some reckonings, the agricultural decline began around the time of the Crusades in the Levant, which were under way by the late 11th century. The invasion of Mesopotamia by Mongol armies in the 13th century brought a wholesale massacre of urban populations and the destruction of irrigation works that had been built and maintained ever since the original Islamic conquest. Invasions and civil unrest also occurred in the Maghreb, where the Banu Hilal, Almoravids, and Almohads overthrew the Islamic dynasties established during the original conquest.

The Mongols' conquest of the Abbasid Caliphate in 1258 and destruction of Baghdad virtually halted the innovative study of agriculture and other disciplines. The Mongol invasion proved to be a military and cultural disaster from which Mesopotamia never quite recovered. Trade routes from the East were closed, cutting off the introduction of new species and knowledge from India and the rest of Asia, and millions of farmers fled their homes and fields. The death blow was struck by plague epidemics, which ravaged central Asia and the Middle East in the 14th century before reaching Europe.

Large stretches of countryside that had once flourished were depopulated, and infrastructure that had supported productive farms was destroyed. Trade and the monetary economy declined, and the urban markets for farm produce shrank. Land was given over to religious communities, military leaders, and tax officials, closing it off to farming by individual farmers and ending the robust competition that had brought about innovation. Many peasants became tenant farmers with no rights of ownership and increasing obligations in the form of rents, taxes, and sharecropping. Irrigation works fell into disuse and disrepair, and fallow land returned to pasture.

By the close of the medieval period the Islamic world was weakened and vulnerable, subject to outside control and, eventually, a European colonial system. The Christian reconquest of Spain, which began in the 11th century and was consolidated in 1492 with the fall of Granada, disrupted irrigation works, forced Muslim farmers to flee the region, and discouraged innovation through the imposition of heavy taxes on those who remained behind.

See also ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CHILDREN; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; CRIME AND PUNISHMENT; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FAMILY; FESTIVALS; FOOD AND DIET; FORESTS AND FORESTRY; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; INVENTIONS; LAWS AND LEGAL CODES; LITERATURE; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MILLS AND MILLING; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SCIENCE; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

Africa

~ Ibn Battuta: Excerpt from Travels in Asia and Africa (1325–54) ~

IBN BATTUTA RETURNS TO YEMEN

From Kulwa we sailed to Dhafari [Dhofar], at the extremity of Yemen [near the border with Oman]. . . . In

the neighborhood of the town there are orchards with many banana trees. The bananas are of immense size; one which was weighed in my presence scaled twelve ounces and was pleasant to the taste and very sweet.

(continued)

(continues)

They grow also betel-trees and coco-palms, which are found only in India and the town of Dhafari. Since we have mentioned these trees, we shall describe them and their properties here.

Betel-trees are grown like vines on cane trellises or else trained up coco-palms. They have no fruit and are grown only for their leaves. The Indians have a high opinion of betel, and if a man visits a friend and the latter gives him five leaves of it, you would think he had given him the world, especially if he is a prince or notable. A gift of betel is a far greater honor than a gift of gold and silver. It is used in this way. First one takes areca-nuts, which are like nutmegs, crushes them into small bits and chews them. Then the betel leaves are taken, a little chalk is put on them, and they are chewed with the areca-nuts. They sweeten the breath and aid digestion, prevent the disagreeable effects of drinking water on an empty stomach, and stimulate the faculties.

The coco-palm is one of the strangest of trees, and looks exactly like a date-palm. The nut resembles a man's head, for it has marks like eyes and a mouth, and the contents, when it is green, are like the brain. It has fiber like hair, out of which they make ropes, which they use instead of nails to bind their ships together and also as cables. Amongst its properties are that it strengthens the body, fattens, and adds redness to the face. If it is cut open when it is green it gives a liquid deliciously sweet and fresh. After drinking this, one takes a piece

of the rind as a spoon and scoops out the pulp inside the nut. This tastes like an egg that has been broiled but not quite cooked and is nourishing. I lived on it for a year and a half when I was in the Maldivé islands.

THE MANY USES OF THE COCONUT

One of its peculiarities is that oil, milk and honey are extracted from it. The honey is made in this fashion. They cut a stalk on which the fruit grows, leaving two fingers' length, and on this they tie a small bowl, into which the sap drips. If this has been done in the morning, a servant climbs up again in the evening with two bowls, one filled with water. He pours into the other the sap that has collected, then washes the stalk, cuts off a small piece, and ties on another bowl. The same thing is repeated next morning until a good deal of the sap has been collected, when it is cooked until it thickens. It then makes an excellent honey, and the merchants of India, Yemen, and China buy it and take it to their own countries, where they manufacture sweetmeats from it. The milk is made by steeping the contents of the nut in water, which takes on the color and taste of milk and is used along with food. To make the oil, the ripe nuts are peeled and the contents dried in the sun, then cooked in cauldrons and the oil extracted. They use it for lighting and dip bread in it, and the women put it on their hair.

From: Ibn Battutah, *Travels in Asia and Africa 1325–1354*, trans. and ed. H. A. R. Gibb (London: Broadway House, 1929).

Europe

Excerpt from "The Farmer's Law" (Byzantium, seventh to eighth centuries)

The Farmer who is working his own field must be just and must not encroach on his neighbor's furrows. If a farmer persists in encroaching and docks a neighboring lot—if he did this in plowing time, he loses his plowing; if it was in sowing time that he made his encroachment, he loses his seed and his husbandry and his crop—the farmer who encroached.

If a farmer without his landowner's cognizance enters and plows or sows, let him not receive either wages for his plowing or the crop for his sowing—no, not even the seed that has been cast.

If two farmers agree with the other before two or three witnesses to exchange lands and they agree for all time,

let their determination and their exchange remain firm and secure and unassailable. . . .

If two farmers exchange lands either for a season or for all time and one plot is found deficient as compared with the other, and this was not their agreement, let him who has more give an equivalent in land to him who has less; but if this was their agreement, let them give nothing in addition. . . .

If a farmer on shares reaps without the grantor's consent and robs him of his sheaves, as a thief shall he be deprived of all his crop. . . .

If a farmer takes from some indigent farmer, his vineyard to work on a half share and does not prune it as is filling and dig it and fence it and dig it over, let him receive nothing from the produce. . . .

If a farmer takes over the farming of a vineyard or piece of land and agrees with the owner and takes earnest-money and starts and then draws back and gives it up, let him give the just value of the field and let the owner have the field.

If a farmer enters and works another farmer's woodland, for three years he shall take its profits for himself and then give the land back again to its owner. . . .

Concerning Herdsmen. If a neat herd in the morning receives an ox from a farmer and mixes it with the herd, and it happens that the ox is destroyed by a wolf, let him explain the accident to its master and he himself shall go harmless. . . .

If a herdsman receives an ox from a farmer in the morning and goes off and the ox gets separated from the mass of oxen and goes off and goes into cultivated plots or vineyards and does harm, let him not lose his wages, but let him make good the harm done.

If a herdsman in the morning receives all ox from a farmer and the ox disappears, let him swear in the Lord's name that he has not himself played foul and at he had no part in the loss of the ox and let him go harmless.

If a guardian of fruit is found stealing in the place which he guards, let him lose his wages and be well beaten.

If a hired shepherd is found milking his flock without the owner's knowledge and selling them, let him be beaten and lose his wages.

If a man is found stealing another's straw, he shall restore it twice over.

If a man takes an ox or an ass or any beast without its owner's knowledge and goes off on business, let him give its hire twice over; and if it dies on the road, he shall give two for one, whatever it may be. . . .

If a man steals all ox or an ass and is convicted, he shall be whipped and give it twice over and all its gain.

If while a man is trying to steal one ox from a herd, the herd is put to flight and eaten by wild beasts, let him be blinded.

If a man finds an ox in a wood and kills it, and takes the carcass let his hand be cut off. . . .

If a man is found in a granary stealing corn, let him receive in the first place a hundred lashes, and make good the damage to the owner; if he is convicted a second time, let him pay twofold damages for his theft; if a third time, let him be blinded. . . .

If a man delivers cattle to a slave for pasture without his master's knowledge and the slave sells them or otherwise damages them, let the slave and his master go harmless. Where a man destroys another's beast on any pretense, when he is recognized, let him indemnify its owner.

If a man harvests his lot before his neighbor's lots have been harvested and he brings in his beasts and does harm to his neighbors, let him receive thirty lashes and make good the damage to the party injured. . . .

If a man lawlessly, when he has a suit with another, cuts his vines or any other tree, let his hand be cut off. . . .

If the owners of the cultivated plots are not willing that the water go through their plots, let them be entitled to prevent it.

From: W. Ashburner, trans., "The Farmer's Law," *Journal of Hellenic Studies* 32 (1912), 87-95.

FURTHER READING

- J. Desmond Clark and Steven A. Brandt, eds., *From Hunters to Farmers: The Causes and Consequences of Food Production in Africa* (Berkeley: University of California Press, 1984).
- Georges Duby, *Rural Economy and Country Life in the Medieval West*, trans. Cynthia Postan (Columbia: University of South Carolina Press, 1968).
- Martin Hall, *Farmers, Kings, and Traders: The People of Southern Africa, 200–1860* (Chicago: University of Chicago Press, 1990).
- Jack R. Harlan, Jan M. J. de Wet, and Ann B. L. Stemler, eds., *Origins of African Plant Domestication* (The Hague, Netherlands: Mouton, 1976).
- David Ludden, *New Cambridge History of India: An Agrarian History of South Asia* (Cambridge, U.K.: Cambridge University Press, 1999).
- Evelyn Sakakida Rawski, *Agricultural Change and the Peasant Economy of South China* (Cambridge, Mass.: Harvard University Press, 1972).
- Werner Rösener, *Peasants in the Middle Ages*, trans. Alexander Stützer (Urbana: University of Illinois Press, 1992).
- Thurstan Shaw, Paul Sinclair, Bassey Andah, and Alex Okpoko, eds., *The Archaeology of Africa: Food, Metals, and Towns* (London: Routledge, 1993).
- Joseph R. Strayer, ed., *Dictionary of the Middle Ages*, Vol. 1: *Agriculture: Islam* (New York: Scribner, 1989).
- Marijke van der Veen, ed., *The Exploitation of Plant Resources in Ancient Africa* (New York: Kluwer Academic/Plenum, 1999).

► alchemy and magic

INTRODUCTION

Magic has proved to be a difficult subject for American and European scholars to study because of the history of the word itself. The word *magic* comes from an ancient Iranian word meaning “power.” (It is etymologically connected with the English word *might*.) It was the basis of the term *magus*, the name of an important tribe of priests from Media (part of modern-day Iran), who were later absorbed into the Persian Empire. In the fifth century B.C.E., when Iran was at war with Greece, Greeks borrowed the word, but from their viewpoint it naturally meant the religion of the enemy, which was viewed as false, superstitious, and harmful compared with Greek religion. Greeks began to use the terms *magus* and *magic* (magic is what a *magus* performs) to refer to any kind of ritual of which they disapproved or that was at odds with the state or religion, even if those rituals were actually Greek in origin. Conversely, others used the names *magus* and *magic* for themselves and their own practices as a way of claiming that their rituals were mysterious and powerful precisely because they stood in opposition to ordinary Greek religion.

When Christianity, which was to become the universal religion in medieval Europe, made its appearance, it was im-

mediately attacked by Greeks and Romans as magic because it was foreign and subversive of the power of the Roman state. But Christians turned this charge around and claimed that Christianity was the only true religion, whereas traditional Greek and Roman religion were to be viewed as magic.

Because the meaning of the word *magic* is constantly changing in Western languages—it is often whatever the speaker condemns as contrary to his own religion—one must be very careful in calling the practices of a non-Western culture magic. In general, human beings use ritual to address needs and dangers that cannot be managed in any other way. Collective rituals that involve the whole community are meant to ensure that no disaster occurs in an area of concern to the whole, such as the success of the harvest. On the other hand, rituals intended to harm a personal enemy are often carried out in secret, and practitioners would be punished if their actions became publicly known (although more often such rituals are suspected only if some accidental harm befalls a person, so that their existence in a culture is more imaginary than real). To use religion and magic to distinguish between those two extreme poles of ritual makes some sense. That leaves, however, a very wide middle between the extremes. Everyone might pray for the recovery of a sick king, but if an individual is sick, are the exorcisms and drugs used to cure him magic or not? This is one reason that physicians and healers in medieval Western culture had to defend themselves against charges of magic: if they can heal, cannot they also harm? Quackery, too, is magic conceived of as fraudulent.

Another concept that occupies the middle ground is an occult science such as alchemy, astrology, or herbalism. These are systematic bodies of knowledge often pursued by the leading intellectuals in a culture as part of a spiritual or philosophical quest. Their private nature makes them seem like magic while the status of their practitioners (who are often priests) relate them to religion.

Whatever magic is, it easily travels between cultures, in part because it is always viewed as foreign. Nothing illustrates this better than alchemy. This pseudoscience was invented by the Greeks in Roman Egypt and was enthusiastically adopted by the Islamic conquerors of Egypt and then transmitted to the opposite ends of the earth: Western Europe and India. When there is an actual historical link between cultures, it is much easier to compare the different developments of the various forms of magic from one nation to the next. But nothing in Chinese or Mayan culture can be truly connected to alchemy because there is no cultural contact. Their practices can be called alchemy only because that is the element in Western culture they most closely resemble.

AFRICA

BY KIRK H. BEETZ

To the medieval African, the distinction between magic and religion was tenuous. For example, the Yoruban god Shango was traditionally considered a king who became a god. Two versions of his story exist. One says that he was a cruel king who was overthrown and forced to flee into the forest, where he hanged himself. The other says that Shango was a magician as well as a king who accidentally caused lightning to kill his wives and children and that, overcome by remorse, he hanged himself in his palace. In either case he ended up becoming the god of storms and magic. Thus, a Yoruban magician might call on him for aid in casting spells. Is this religion or magic? The traditional anthropological definition is a useful resolution of the dilemma: Magic is the use of supernatural powers to control people or the forces of nature.

Another challenge in studying African alchemy and magic is the patchy nature of the information. Most medieval Africans did not leave written records of their magical practices. Thus information about African magic is found primarily in the writings of outsiders, mostly Arab explorers and traders in West Africa and East Africa and Portuguese explorers traveling Africa's coast. For some African cultures archaeologists try to determine magical practices from rock paintings and the occasional shrine. One technique anthropologists use is observing the present-day practices of an old, continuous culture, like the Yoruba, Dogon, or San, and from those observations inferring what the magic of those peoples was like hundreds of years ago. This method is not always productive, however, because Africans tended to be very pragmatic about their magic; when a spell or potion seemed to lose its power, it was abandoned for a new, more potent one, making African magic a practice that was constantly changing.

The subject of alchemy is an example of the challenge faced by historians and archaeologists when studying Africa, because the practice of alchemy in Europe and Asia was different from that in Africa. Alchemy is often associated with mixing substances to create a chemical reaction that results in the so-called philosopher's stone or in the transmutation of base metal into gold. Most Africans, however, were not interested in such endeavors. For them the purpose of creating a new substance from a mixture was to improve everyday life: healing people, making crops bountiful, or preventing misfortune. A good magician was expected to be able to concoct potions that when drunk would have magical effects.

Peoples in western and central Africa believed that alchemical concoctions could have fearsome consequences, because a magician might slip a bit of potion into someone's

drink or a bit of doctored food into someone's meal and the ingested substance would confer magical powers on its victim. Some African cultures believed that this was how magicians passed their supernatural powers to the next generation. What made this practice fearsome is that the victim could unintentionally cause havoc in the community. For instance, while victims slept, their spirits might leave their bodies and roam the village, spoiling people's food, causing people to trip and hurt themselves, giving people ghastly nightmares, or causing other suffering or calamities. If their identities were ever revealed, the perpetrators of these problems would not be punished because it was understood that they were the victims of a wicked magician and could not help creating supernatural disruptions.

The substance used for creating a magical effect, usually called a potion, tended to be a mixture of substances each considered potent already or capable of becoming supernatural when placed in the presence of other substances. Thus a potion slipped into someone's food might be composed of thread, needles, and resin. Magicians spent much time working on potions. Such mixtures were given not only to people but also to spirits in the home or at a shrine or painted on stones or other objects. Some potions had practical benefits because magicians and shamans in most regions of Africa knew about herbs and other plants that could help cure certain illnesses. When they were smeared on rocks, some potions were supposed to protect farms from thieves and disease. Magicians were constantly modifying their potions because the magic would seem to disappear. If the application of a potion caused a calamity that it was supposed to prevent, such as a crop failure, people generally responded not with anger toward the magician but with the conviction that some other magician had cast a more powerful malevolent spell to counter the potion.

When misfortune happened to a person, Africans in the medieval period took a very matter-of-fact approach to analyzing the event and understood that the cause was usually mundane. When a person suffered snakebite or when a kiln broke or a roof collapsed, Africans knew full well that it was an ordinary snake, a flaw in the kiln's construction, or a very heavy wind that was the immediate cause. Yet most Africans believed that underlying every misfortune, no matter how prosaic, was a supernatural force. An example commonly given by anthropologists is of a man who is walking along a road toward home when a snake bites him. After receiving treatment for his wound, he asks a seer why the snake was on the road at just the right time to bite him. The seer tells the man that a jealous family member paid a magician to make a snake slither on the road just when the victim was walking past or that angry spirits had sought to harm him. The vic-

tim asks the seer for magical protection against whatever had caused the snake to be on the road when he walked by.

Broken kilns and fallen roofs could be caused by angry spirits. Perhaps the victims had failed to say the spirits' names as often as the spirits would like. In West Africa, in particular, many cultures believed that ancestor spirits remained alive only if their descendants spoke their names; they would disappear if no one spoke their names. Broken crockery, spoiled food, and other everyday events could be spirits trying to communicate with their descendants. In such a case the victim would consult a shaman, who could be either a man or a woman. Shamans typically kept abreast of events in the lives of local families as well as gossip among the villagers and used that information to explain victims' misfortunes. Perhaps a man was being rude to his sister-in-law, and spirits were breaking the man's belongings until he apologized to his sister-in-law and treated her respectfully. The magical ability of a talented shaman was comforting for Africans because the shaman provided explanations for seemingly random events and offered ways for people to end their troubles.

Efforts to use magic to control people and nature were sometimes dramatic. The Igala of present-day Nigeria have a tale about a king named Agagba who had to sacrifice one of his daughters to defeat an invading army of the Jukun. In exchange for her death a magician gave Agagba charms that when scattered in water would make fish poisonous. Agagba scattered the charms in a river beside the Jukun army's camp, and the Jukun warriors died when they ate the fish.

Magic rarely required gestures as dramatic as human sacrifice, but the belief that taking a life could have magical effects appears to have been fairly common among the people of central and western Africa in medieval times. For instance, after a person died, a magician might sacrifice an animal such as a goat and compel the deceased's spirit to inhabit the animal. The sacrifice was then cooked and eaten in an effort to incorporate the spirit into another person and prevent its running loose to do harm. This practice could take a more sinister turn: Among the Ibibio a person could be killed by having his or her spirit forced into an animal that was then eaten.

Charms and fetishes had special powers. A magician had to consider the person for whom the charm was intended and create one that specifically suited that person. Magic that worked for one person would not necessarily work for anyone else. In tropical Africa some general principles seem to have underlain the making of charms. For example, bundles of feathers could protect a room from invading spirits, animal teeth could ward off physical injury from people or animals, and whistles could defend against evil magic. In sub-Saharan cultures that were not predominantly Muslim, some Muslims



Amulet; Coptic Egypt, ca. 200-ca. 800 (Los Angeles County Museum of Art, gift of Carl W. Thomas, Photograph © 2006 Museum Associates/LACMA)

were seen as having special powers because they were literate. Even if the Africans themselves were not literate, they had respect for written words. Thus in some communities Muslim magicians would sell charms consisting of an Arabic word written on paper, which was then sealed in an amulet or a pouch. Warriors often wore several such charms for protection in battle. In societies where people seldom lived to 50 years old and infant mortality was high, magicians provided charms for use in evading the evil magic that was at the source of premature deaths.

Fetishes usually were carved wooden statues. A statue of a human being could give a spirit a home where it could be consulted in mystical matters and where it would behave itself and not torment the living. When a fetish cracked from age, it ceased to be magical and had to be replaced. Statues of animals were used to help hunters.

People were ambivalent about the status of a magician in the community. Healers and seers were valued members of some communities. Their magical explanations could ease conflicts by persuading people that the turmoil was the result of magic that could be understood and sometimes countermanded. On the other hand, many communities feared magicians, especially evil ones, and deemed any socially deviant behavior to be a sign that someone might be a source of bad magic. In East Africa people suspected of practicing malevolent magic could be killed, and people in many cultures conjectured that a magician was responsible for every death. These suspicions led to witch hunts. A corpse carried high might point out its killer before burial. In some eastern communities a person suspected of practicing evil magic would

be given a poison that would cause either vomiting or dysentery. Vomiting indicated innocence, and dysentery could mean a sentence of death.

THE AMERICAS

BY ARDEN DECKER

In general, the use of alchemy and magic throughout North, Central, and South America is tied to a variety of social functions, including healing, harming, divining, and religious or ritual use. Prior to the Spanish conquest practitioners of alchemy and magic (witches, sorcerers, healers, and shamans) were not viewed with the negative connotations that are sometimes associated with those who practiced magic in Europe. It is useful to keep in mind that in these various cultures the manipulation of plant properties and the use of magic did not belong to a realm that was separate from religion or society at large. In fact, they played an important role in the reinforcement and continuation of cultural identity and religious beliefs. Most medieval American cultures believed that the entire natural world was animate and the line between human and supernatural realms was not rigidly defined. Because plants are highly perishable, there is little physical evidence of the use of alchemy, though some visual representations do exist. While much of what is known concerning the use of alchemy and magic is gathered from colonial-era chroniclers and explorers, we also have learned much about these practices through the contemporary people who continue to utilize them to this day.

Although their names and specific roles varied and often overlapped, most practitioners of alchemy and magic were believed to possess supernatural powers and knowledge that enabled them to control or manipulate situations and the natural environment. Witches were believed to be able to alter the acts and welfare of others in both positive and negative ways. Witches could be elders, leaders, curers, or sometimes even an ordinary person. The Aztec (ca. 1300–1521 C.E.) of central Mexico believed that witches and shamans had the special ability to transform into an animal alter ego called the *nagual* (also spelled *nahual*). By calling upon the *nagual*, the practitioner was able to vicariously perform acts against others. In Maya cultures (ca. 1800 B.C.E.–1530 C.E.) shamans often were called upon to capture “lost” animal spirits or the alter ego of a person. Shamans were particularly important within most American cultures because they served as leaders and intermediaries of the human and spiritual realms. More specifically, shamans possessed the ability to pass through the various supernatural levels. Both men and women could become shamans, thereby suggesting that both sexes held religious and political power. The role of curers and healers was

more specific. Some engaged in a general practice of healing sicknesses, while others were specialized in treating certain types of illnesses or conditions. Often they worked as ritual healers of ailments brought on by the gods, witches, or sorcerers.

The tradition of using plants in magical and ritual ceremony is long, and it is believed that shamans in North America engaged in such practice as early as the Paleo-Indian Period (ca. 13,000–ca. 8000 B.C.E.); it is commonly held that these traditions were brought over by Paleolithic peoples from Asia. Plants were used as remedies for medical issues; as master herbalists, shamans, curers, and healers all engaged in such use. In more extreme cases, witches, curers, healers, and shamans entered into ecstatic trances in order to perform magic. Hallucinogenic plants that were believed to help the person or the soul travel into supernatural realms often aided this process. Natural elements, such as leaves, seeds, or barks, were commonly believed to be magic or sacred owing to their unique effects. Some plant elements were used alone, while others would be combined and mixed with additional ingredients to enhance specific effects.

The sophisticated knowledge of plant properties among contemporary indigenous groups in North, Central, and South America indicates a longtime study of hallucinogenic and medicinal plants. It has been suggested that the use of magical plants often allows members of a society to find validation of their culture and history as they participate in rituals and ceremonies passed down for generations. It is necessary to mention that such plants were not used for recreation, as they were considered to be highly sacred and were employed only for ritual purposes.



Stone owl (Aztec culture, Mexico, ca. 1325–1521); owls were associated with shamans, who were thought to transform themselves into animals. (© The Trustees of the British Museum)



Pipe with bluebird (Mexico, ca. 1100–ca. 1400); tobacco and other substances were smoked to induce hallucinogenic states or illness as a way to gain supernatural empowerment. (Los Angeles County Museum of Art, gift of the Art Museum Council in honor of the museum's 25th anniversary, Photograph © 2006 Museum Associates/LACMA)

In medieval Mesoamerica the use of psychotropic mushrooms was a longstanding part of magical or ritual practice. The Huichol Indians of north-central Mexico have continued such practices since pre-Columbian times, and it is believed that such mushrooms also were used by Classic and post-Classic Maya in shamanistic ritual. There is strong evidence to support the use of the peyote cactus in southwestern North America and western Mexico, including funerary art depicting the plant. The use of morning glory seeds called oloiuqui by the Aztec was also prevalent in Mesoamerica. The colonial-era historian Bernardino de Sahagún (1499–1590) wrote about the Aztec use of oloiuqui mixed with honey in ritual practices. The seeds of the *Sophora secundiflora* plant, known as red beans or mescal, have been found at archaeological sites dating before 1000 C.E. in both Mexico and Texas, and they have the longest record of use throughout Native American cultures. It is believed that these seeds were used for divination purposes. The use of members of the *Datura* family of plants also was widespread throughout the Americas. As a psychotropic plant, it was highly valued by the Inca (ca. 1450–1532 C.E.) for its intoxicating effects and was particularly important for sorcery and curing.

In both North and South America the magical properties of tobacco were often exploited. Tobacco would be ingested through chewing, licking, and smoking, or it could be absorbed through the skin. Tobacco and other plants, such as members of the pea family, were often smoked or made into snuffs, which would be inhaled, usually through the nostrils, to achieve the desired hallucinogenic effect. In South America the state of sickness brought on by ingesting large amounts of tobacco was believed to aid the practitioner in achieving

supernatural empowerment. In its most potent state, tobacco use was thought to cause paranormal vision in the shaman. It also helped the shaman perform psychiatric healing and to embark on vision quests. Columbus and his men recorded the use of snuff among the Taino peoples inhabiting their first point of contact, the island named Hispaniola.

The San Pedro cactus has been used for more than 3,000 years by cultures living in South America, and it is still in use today. There is visual evidence that cultures understood the sacred nature of this plant as early as the Chavín culture (ca. 900–ca. 200 B.C.E.), which used the plant as a decorative motif in their art. This very thin, column-shaped cactus is used for healing and in witchcraft, suggesting that the plant possesses both healing and potentially destructive powers. One way that San Pedro cactus is still utilized today is in a cure that involves combining the plant with tobacco leaves, sugar candy, lime, cane alcohol, and perfume to create a mixture full of symbolic power. The concoction would be used as a curative drink to heal various illnesses.

ASIA AND THE PACIFIC

BY BRADLEY A. SKEEN

Most early societies have shamanic components within the scope of their religious practices. The shaman differs from the priest in claiming a personal relationship with the divine and in addressing his followers' personal concerns, such as illness or purification from sin, rather than collective concerns, such as the community's agricultural success, which may instead be mediated through priests. Practices that descend from shamanism are generally termed *magic*, while those as-

sociated with priests are termed *religion*, although the sharp distinction between magic and religion is most commonly found in European and Middle Eastern cultures. Ancient shamanic practices remained prevalent in much of medieval eastern Asia, including in Siberia and among the Ainu people of northern Japan as well as in the cultures of Australia and the Pacific islands. By the Middle Ages, shamanic practices had long been institutionalized in the advanced civilizations of India and China. These practices took the form of various occult sciences considered part of philosophical learning, among them, alchemy, astrology, and medicine.

In India the traditional expert in the occult sciences was the yogi, or practitioner of yoga. *Yoga* is related to the English word *yoke* and refers to the joining together of the human and divine. The goal of the yogi was to become divine or godlike. This was to be accomplished by meditation, the conscious manipulation of autonomic bodily processes such as breathing, the use of plant and mineral drugs, the control of the body through asceticism (such as fasting, going without sleep, or refraining from sexual activity), and the practice of occult sciences such as alchemy. Through all of these practices the physical body would be transformed, such that the yogi would be able to perform miracles such as flying or becoming invisible and could prolong youth and life indefinitely. In the Middle Ages popular yoga traditions were transformed into proper philosophical schools (such as that of hatha yoga, which was formed between 1100 and 1400 and is still widely practiced today) and systematically recorded in a textual tradition, especially within the diverse school of practices usually referred to as tantra. *Tantra* is something like the English *magic* in the sense of being a collection of practices that are supposed to accomplish miracles and that may or may not be legitimate from the point of view of philosophy and religion.

The miracle of turning base metal into gold is found early in the Indian tradition; yogis may have achieved this “miracle” through the means of a simple sleight-of-hand trick on the order of modern stage magic in order to inspire followers. The Greek pseudoscience of alchemy was actually invented in Hellenistic Alexandria and was transmitted to India in the early Middle Ages. This practice had the aim of purifying other metals (especially mercury) into gold, not for the purpose of obtaining wealth in the form of gold but under the belief that the purifications performed on the metals by the alchemist also purified his body and soul. By the time the final transformation into gold was achieved, the alchemist would have also transformed his body into a perfect one that would remain eternally young and his mind into one that knew all the secrets of the universe. Later in the Middle Ages the penetration of Islamic culture into India (beginning with the Islamic conquest of part of modern Pakistan as early

as 711) brought Islamic alchemy to India. Also, a version of Hellenistic astrology had been imported into India and flourished there essentially unchanged into the modern era.

In the 13th century a new school of medicine was developed in India, usually called iatrochemical medicine, since it used mineral rather than plant substances as drugs. (*Iatrochemistry* derives from the Greek *iatros*, or “physician,” and *chemeia*, or “alchemy.”) Alchemical in origin, the school revolved around empirical work performed in laboratories to create new compounds rather than around the mystical beliefs of alchemy. Texts of the school (by physicians such as Vrindra and Cakrapnai, of the turn of the 15th century) cite tantric yogis among its venerated predecessors. Modern versions of these texts do not claim to describe procedures that could result in eternal youth and immortality; they may instead be dedicated to the god who preserves human beings from sickness, old age, and death. Iatrochemical physicians may have been the first anywhere in the world to realize that various metals burn with distinctive colors when exposed to flame, a standard test in modern chemistry.

Daoism, which speaks of the *Dao*, meaning “the way” or “the path,” is a school of Chinese philosophy dealing with the creation and existence of the world. In China attempts to manipulate the world through magic have been part of Daoist practices. The purpose of such practices was to allow the sage to become a divine being. Purification would result not in the creation of a superior, immortal body but in the washing away of the body, leaving the sage a spirit no longer hampered by the limits of the physical. Alchemy developed independently in China, at about the same time as in the Greek world (in the third century B.C.E.), as the premier Daoist occult science. However, it was more limited in scope than Greco-Islamic alchemy, aiming at the single purpose of gaining immortality, that is, transforming a mortal into a divine being.

Alchemy gained prominence in medieval China owing to its earlier patronage by Qin Shi Huang (260–210 B.C.E.), the first emperor of a unified China. He wished to gain immortality and extend his personal rule indefinitely. One action in the effort to accomplish this was the dispatch of explorers in search of islands said in ancient myth to be inhabited by divine beings. Another action was the assembly of a committee of scholars whom the emperor commanded to produce an elixir of life that would make him immortal. The scholars decided that since gold is imperishable and since mercury is useful in refining gold, the emperor should consume large amounts of gold and mercury compounds (including the naturally occurring mineral cinnabar, or mercuric sulfide). This poisoned him, causing his mental impairment and premature death at age 50. Many later emperors held the same ambition and were likewise poisoned throughout the medieval period,

into the Ming Dynasty (1368–1644). Many of the alchemical theories produced during the time of the first emperor were collected and transmitted to the Middle Ages in the *Nei pian* (Inner Chapters), which was written in the early fourth century of the Common Era by the philosopher Ge Hong.

Medieval alchemical texts interpreted the first emperor's search for the land of the immortals as a symbolic expression of an inner journey of spiritual purification that the alchemist had to carry out together with purification of the body through such ascetic practices as long periods of fasting. Gold also was a metaphor for the purity found within the human spirit. Chinese tradition considered that all matter consisted of five elements—water, fire, wood, gold, and earth—and that these also constituted the human body, respectively corresponding to the kidneys, heart, liver, lungs, and stomach. Cinnabar was important in this system because its red col-

oration associated it with blood. If cinnabar is heated, pure mercury melts out of it, a transformation that was understood as expressing the possibility of physical rebirth through the alchemical manipulation of the body. Alchemists believed that ingesting cinnabar would reverse the effects of aging and purify the body until it was light enough to take flight. In this way, Chinese alchemy revolves around the manipulation of chi within the body. Chi, literally “steam,” is the vital breath that animates the body and is also the animating force of the whole cosmos. Purification consisted in properly balancing the chi. These same operative principles were the foundation for traditional Chinese medicine.

In Zen alchemy, developed after 1100, physical experiments upon metals and the ingestion of metallic drugs were dispensed with entirely. The transformations described in older alchemical texts were interpreted as taking place only within the alchemist's mind and spirit. The purification of intellectual gold could in this way be used to give birth to the elixir of life.

Astrology was a Greco-Arabic occult science imported into China in the Middle Ages. In its most spectacular application in China, the Buddhist monk Yi Xing (683–727) designed a water-powered armillary sphere, that is, a machine used to simulate the motions of the stars and planets. His design incorporated the invention of the escapement, a mechanical device that regulates the motion of a pendulum, allowing for precise clockwork movements. Similar mechanisms were not invented in Europe for another 500 years. This work was commissioned in 725 by the emperor Xuan Zong (685–762) to determine astrologically the best times for him to sleep with his wives and concubines so as to most likely produce male offspring.

Korea and Japan received overwhelming influence from Chinese culture. In certain instances ancient shamanic practices in these regions persisted unchanged, never having the chance to evolve in the face of already sophisticated Chinese religion and philosophy. Such practices were also preserved intentionally as a means of maintaining a separate national identity against Chinese influence. For instance, Shinto, the national religion of Japan, produced a new cult in 1279, the *Izuna shugen* (shamans of Mount Izuna). Followers of this cult sought to achieve magical effects by controlling fox spirits. The cult was widely patronized at the imperial court and by local feudal lords and was especially practiced by samurai, since the spirits in question were believed to bring luck in combat and to magically inspire skill in the martial arts.

The peoples of Australia and the Pacific islands did not have extensive contact with outsiders until the era of European exploration, well after the Middle Ages. Their religions remained essentially shamanic: individuals mediated their



Limestone guanyin, the Bodhisattva of Compassion with 11 heads; China, Tang Dynasty, ca. 703 (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)

own contact with a spirit world seen in dreams and manifest throughout all of reality. Early European anthropologists tried to use concepts from these cultures to find universal definitions of religion and magic, but that effort has generally been discredited because they relied on Western science's preconceptions. Many peoples in Polynesia, for instance, see the whole world as permeated by manna, a sort of divine energy that animates everything; to term this belief "magic" is a Western stereotyping of the native idea that does little or nothing to explain the concept within the context of the cultures where it existed.

EUROPE

BY AMY HACKNEY BLACKWELL

Medieval Europeans believed in magic. They knew little of science and medicine, and in a complex and dangerous world magic seemed to be a reasonable explanation for natural phenomena. People were willing to do whatever they could to give themselves a sense of control over their lives. Doing so often meant wearing relics, taking herbs, and chanting incantations, at least. Some "magical" charms had real value; many herbs, for example, do have medicinal properties. Alchemists took basic village magical practice much further, studying the work of other scholars and performing experiments that blended science and magic.

Medieval Europeans engaged in many types of magical practices. They used charms or rituals to protect their homes and themselves or to create other effects. Many people believed in the power of relics—the physical remains of holy people, such as saints—to have physical effects on the living. Pieces of what were said to be the True Cross (the cross upon which Jesus was crucified), the finger bones of saints, and fragments of the clothing of holy people were popular items for sale in medieval markets. Many people purchased and wore charms to protect them from harm; these charms could be items of jewelry or the bone fragments of saints. People continued to visit sites that had been sacred in pre-Christian times; although these holy sites often took on Christian identities throughout much of the medieval era, for many people the separation of Christian and pre-Christian beliefs was only partial.

Villages frequently had residents who specialized in the use of herbal medicines and cures. These people were often women who worked as midwives and who were called on to treat various ailments. Although these "wise women" were respected for their healing abilities, they were sometimes held in suspicion for fear that their powers would allow them to do harm. During the late medieval period this suspicion often caused people to call these women witches. Because wise



Red coral, popularly used to ward off ailments and for other magical purposes; Britain, ca. 1500 (© Museum of London)

women were frequently widows living alone, they were vulnerable to this sort of persecution.

Wise women and village healers made ample use of herbs in both medicines and magic potions. Different herbs were said to have specific magical properties. Dill, for example, was thought to protect people from falling prey to witchcraft and from losing lawsuits. Some people hung sprigs of fennel over the doors of their houses to keep out witches. Garlic, it was believed, could keep away all manner of malevolent magical creatures, from vampires to snakes; it could also enhance courage and sexual performance. Some people took ginger in an effort to stave off old age. Henbane could cause hallucinations that people interpreted as visions from the spirit world; witches were said to use henbane to help them fly. Some people would put a new piece of horseradish in their purses every New Year's Eve as a way to keep from running out of money during the year.

Love potions were extremely popular during the medieval period. Herbalists, alchemists, wise women, and ordinary folk made love potions from all manner of herbs: Lovage, marigold, mallow, mustard, mint, radish, sage, valerian, hops, ginger, cloves, and basil were just a few of the substances that people consumed in order to inflame others with lust or to enhance their own sexual performance. Basil, so it was said, had the additional virtue of being useful for magically breeding scorpions.

The more scholarly form of medieval scientific and magical inquiry was alchemy. The word *alchemy* may have come from the Arabic term *al-kimiya*, meaning "the art of transformation," which itself derives from the ancient Greek word *khemeia*, meaning "cast together," which may be the etymological root of the word *chemistry*. Alchemists practiced their art throughout the ancient and medieval worlds. The most

proficient alchemists of the early medieval period practiced their art in the Middle East. Europeans discovered their works in the 1100s, when many Arabic texts and the works of the Greek philosopher Aristotle (384–322 B.C.E.) were translated into Latin. European scholars became captivated with alchemical ideas, such as the concept that all substances could transform into a more pure and perfect state.

Medieval European alchemists pursued their goals using a combination of techniques, some of them not very different from modern scientific observation and others derived from mysticism, tradition, and magic. Alchemists sought several things. They are perhaps best known for their efforts to transform base metals (ordinary metals, such as iron) into gold. They also tried to brew a potion called a panacea, or a cure-all, that would restore youth, prolong life, and cure all diseases. Although these goals were impossible to achieve, medieval alchemists did accomplish a great deal of scientific inquiry that paved the way for the development of the modern fields of chemistry, physics, and metallurgy. Alchemical experiments resulted in the creation of dyes and pigments, the invention of different types of acid and other chemical compounds, insights into the properties of metals, and techniques for brewing various types of alcoholic beverages.

Alchemists were hampered in their pursuits by their lack of understanding of the properties of matter. They believed that all matter was made up of four elements: fire, water, air, and earth. This belief derived from the teachings of Aristotle. Alchemists theorized that each element was either hot or cold and wet or dry and that each metal had all of these properties. They reasoned that if they could rearrange these properties within a metal, they could transform it into a different kind of metal, ideally gold. Many alchemists believed that the transmutation of ordinary metals, such as lead, into gold could be facilitated by using a substance called the philosopher's stone. No one knows exactly what the philosopher's stone was, though it seems to have been imagined in powder form.

Alchemists tended to love secrecy and symbols. The foundations of their work were spiritual as well as physical, and much of their scholarship was based on mythology and mysticism. They also used astrology to explain physical phenomena. Consequently, the writings of alchemists were full of multiple meanings and cryptic suggestions, making them appear magical to the uneducated.

Many of the best-known scholars of medieval Europe were alchemists. Most of them were members of the clergy, mainly because the clergy were nearly the only people who knew how to read and who had access to books. The first scholars to venture into this field started with Arabic works on science and mathematics. Pope Sylvester II (ca. 945–1003) studied Arabic texts on science, mathematics, and astrology

NON-CHRISTIAN INCANTATIONS

Magical incantations or spells were common throughout medieval Europe. If a person wanted to achieve some result, such as bringing rain or making someone fall in love, he or she could probably find a series of words that, if spoken with the correct gestures and at the right moment, would have the desired effect. Although Christianity was widespread in medieval Europe, people saw no impediment to using charms and spells in addition to officially sanctioned prayers. The fact that an incantation might go against Christian doctrine apparently did not stand in the way.

Most incantations were passed on orally because most medieval people could not read or write. Some incantations, however, did survive because they were written down. For one reason or another, occasionally a priest or a monk would write down the words of local spells. Some of these manuscripts survive today. One of the most interesting of these manuscripts is the one that contains the Merseburg Incantations. These manuscripts, found in Germany, describe spells to free prisoners and to cure horses of broken legs. What is intriguing about the Merseburg Incantations is that they invoke the names of ancient Germanic gods, including Odin, Freya, and the Valkyries. Most medieval incantations, if they mentioned the divine at all, would have invoked the Christian god, Mary, or some other inarguably Christian figure. The Merseburg Incantations were composed in pre-Christian times, sometime before 750. The fact that a Christian cleric chose to write them down 300 or 400 years later suggests that people were still using these particular spells, Germanic deities and all, in an era when Christianity was supposedly supreme.

in Spain and introduced them into Europe. He was said to be a sorcerer. The English scholar Adelard of Bath traveled throughout the Arab world in the early 12th century and brought back with him several Arabic texts on astronomy and mathematics. By the late 12th century the works of Arabic scholars and Aristotle were more readily available to Europeans. Albertus Magnus (ca. 1200–80) supported the coexistence of science and religion. He was an excellent scientist for his time and wrote a great deal about botany, zoology, astronomy, and other topics, including music, particularly the way in which music could purify the soul. His work on astrology gave him the reputation of being a magician.

The most important of the medieval alchemists was Roger Bacon (ca. 1220–92), also called Doctor Mirabilis, or “wonderful teacher.” He was an English Franciscan friar who worked as a professor at Oxford and the University of Paris. He performed numerous scientific experiments and formed many ideas that he describes in his book *Opus majus* (Greater Work, 1268). This book covers scientific and mystical topics, including the influence of the planets on human life, the visible spectrum of light, and the chemistry of gunpowder. Bacon’s work influenced all subsequent European alchemists.

Alchemists of the 14th and 15th centuries were more like magicians than scientists. In their writings they generally assemble the work of earlier scholars rather than conducting and reporting on new experiments themselves. Their main interests were finding the philosopher’s stone and the elixir of youth. Many of them were persecuted as witches or sorcerers who were said to work against good Christian practices. Nicholas Flamel (ca. 1330–1417) spent his life searching for the philosopher’s stone and claimed to have discovered it through a copy of the Book of Abraham that he purchased in Spain. He said that he could indeed turn base metals into gold and also claimed that he and his wife had achieved immortality. The German alchemist Heinrich Cornelius Agrippa von Nettesheim (1486–1535) wrote a treatise called *Libri tres de occulta philosophia* (Three Books on Occult Philosophy, 1531), in which he describes the interaction of the natural world and the occult. Philippus Aureolus Paracelsus (1493–1541) is credited with transforming medieval alchemy into a more modern science and rejecting the image of the alchemist as a magician.

Church officials began taking a narrow view of witches and sorcerers in the early 1300s. Around this time magic, alchemy, and witchcraft became associated with Christian heresy. Many were accused of consorting with demons. Both alchemists and so-called witches used secret symbols and incantations in their work, giving rise to the suspicion that they had entered into pacts with the devil. Pope John XXII (1249–1334) issued an edict in 1326 forbidding priests and monks to practice alchemy. During the 14th century several people were tried for witchcraft or sorcery in France and Italy. Witch trials began occurring in England in the early 15th century. European witches were not persecuted on a major scale until the end of the medieval period. The first large European witch hunt occurred in Switzerland in 1427. The German book *Malleus maleficarum* (The Hammer of Witches), by Heinrich Kramer and Jacob Sprenger, was published in Germany in 1486 and became the scholarly basis for subsequent prosecution of witches. The height of the witch craze actually occurred during the early modern period, between 1580 and 1660.

THE ISLAMIC WORLD

BY DANIEL NICOLAE

Alchemy and magic are often named together in medieval Islamic treatises even though they are two different concepts. Alchemy generally denotes the science of transmuting base metals into gold, while magic could apply to nearly anything wondrous. Alchemy, as the precursor of modern chemistry, was a science of the laboratory, and its practice was thus not as widespread among the general population as were magical practices. Both terms, however, have a common reference to secret sciences. Moreover, they are used as polemical terms against heresies in general.

The hermetic tradition of late antiquity notably influenced alchemy and magic practiced among Muslims. Alchemy originated among the Greeks, and Arabic alchemical treatises generally aim to imitate their Greek models. Muslim alchemists tried to attract attention by using pseudonyms such as Hippocrates, Plato, or Aristotle. As for magical artifacts, pre-Islamic mystical imagery featuring lions, serpents, and scorpions can be found on talismans. Yet magic after the rise of Islam differed in many aspects, such as in the abandoning of animal sacrifice, the use of curse tablets, or the use of dolls to destroy the enemy.

The Koran and the sayings of the Prophet (hadith) depict a strict monotheism and do not admit the existence of powers other than those of God. Magic is strictly forbidden. Nonetheless, the scriptures give credibility to supernatural forces other than God. The Koran concludes with two suras (or chapters) that are frequently used among the common people to protect themselves from evil forces. Sura 113 mentions the Semitic magical practice of blowing upon knots made in a certain fashion to tie good or evil. One hadith records that someone bewitched the Prophet using this method and that he would recover only after having recited suras 113 and 114. In the same way, the first sura is used as a talisman; like the other two, it is written on paper, cloth, or stone to be carried on one’s body. In medical literature these suras would be applied in the treatment of illnesses caused by evil forces, particularly in the practice of exorcism.

The Koran alludes to an origin of magic according to which two angels, Harut and Marut, were condemned by God to live on the earth, because they had fallen in love with a woman. Out of malice they then taught humankind the practice of magic. Moreover, we find accusations by the enemies of Islam that Muhammad himself was a magician, since he captured the masses through his rhetorical skills.

Most Islamic amulets and talismanic objects took the form of pious invocations to God, comprising prayers or Koranic quotations. In this respect they differed substantially



Stone-paste cup in the shape of a harpy (Iran, late 12th or early 13th century); the harpy, a mythical bird with the head of a woman, features in many contexts as a creature with magical powers and otherworldly associations. (© The Trustees of the British Museum)

from pre-Islamic magic and enchantment as practiced in Europe because Islamic invocations most often addressed God or his intercessors instead of demons. Invocations usually employed the 99 beautiful names of God or names of angels to protect the bearer. Nevertheless, the use of magical symbols of pre-Islamic origin continued. Quite common was a row of seven magic symbols that represented the sigla, or scribal abbreviations, of God's holy name and included images such as the five-pointed star. Magic writing was another common feature, and entire treatises were devoted to magical alphabets or alphabets of earlier cultures. Through the supernatural properties of letters, magic writing was believed to control jinn (a certain class of spirit beings), and amulets or talismans were commonly used to ward off misfortune or the evil eye that was elicited by the envy of other people.

Also popular among the literate and illiterate masses were other magical implements, such as bowls, shirts, mirrors, and padlocks. In the 12th century C.E. interest in magic notably increased, and magical medicinal bowls were produced in considerable quantity. In contrast to pre-Islamic bowls, Islamic bowls were metallic and were not concerned with the supremacy of jinn and demons. The bowls were usually imprinted with either recipes or specific therapeutic instructions. Alternatively, they could have been decorated with Koranic verses, magical writing, and human or animal forms. There are also some preserved magic shirts dating back to the 15th century C.E., which have imprinted mystical symbols and verses from the Koran. Such shirts were worn to

cure fever or to aid the birth of a child. Also produced were magic mirrors that had talismanic designs engraved on the surface and padlocks that could be placed on sacred sites like the tombs of saints to indicate that a certain vow had been taken there.

Mystical and magical interpretation of letters and numbers was considered a legitimate study by virtually all medieval scholars. The most prominent form is the magic square, particularly after the 12th century C.E. The earliest magic square, possibly of Chinese origin, was a three-by-three square consisting of nine cells. In Semitic languages every letter equates with a number, and in the magic square letters were arranged so that every row and every column as well as the two diagonals would sum up to 15. The magical properties of this square were thought to be extremely powerful, and its very name (*buduh*) acquired its own occult potency.

Unlike magical practices that were recognized in the time of the prophet Muhammad, treatises on alchemy only developed in the ninth century C.E. They were especially influenced by the movement during which many Greek texts on philosophy and medicine were translated into Arabic. In contrast to magical practices, the influence of God or scripture was not deployed, but instead philosophical and chemical reasoning. Alchemists would argue that there existed various sorts of metals but that they were not fundamentally different. Their accidents, or properties, were subject to change, as could be seen in nature where metals grow in the bowels of the earth and become gold after a long time. The alchemist proposed to hasten this process and to achieve by his skill in one day that for which nature needs a thousand years. In alchemical literature we therefore find many different recipes for making gold. The most important and recommended method consisted of mixing an elixir that permeated the base metal and transmuted it into gold. The famous Muslim philosopher al-Farabi (ca. 878–ca. 950 C.E.) was of the opinion that such a transmutation was actually possible. Later philosophers and theologians, however, criticized this art, because it was seen as magic rivaling the omnipotence of God. Moreover, it would ruin the economy, since gold in abundant quantity would diminish its value.

Several Arabic treatises were dedicated to alchemy and magic. Jabir ibn Hayyan (ca. 721–ca. 815 C.E.) is considered to be the father of alchemy and magic. Up to the 10th century C.E. many treatises, commonly referred to as the *Corpus Gabirianum*, had been composed under his name, and it is difficult to determine what really was written by him. The corpus introduced an amalgamation of different religious thoughts, mostly of an esoteric nature. Such mixing of ideas was in vogue in the ninth century C.E. Shiism, a branch of Islam, proclaimed that a new imam (a spiritual leader) would

come to abolish the law of Islam and replace the revelation of the Koran by the light of Greek sciences and philosophy, among them alchemy and magic. The *Corpus Gabirianum* considerably influenced the development of later Arab alchemy, and its parts were frequently translated into Latin.

The writings of Ibn Wahshiyyah (fl. ca. 900 C.E.) were important to the development of alchemy and magic; he compiled a famous collection of cryptic alphabets later used in esoteric works and talismanic art. His works can be seen as successive rewritings and revisions of scientific and pseudoscientific materials surviving from antiquity, preserved, amplified, and modified by Syrian and Alexandrian Hellenism. Around this same time an unknown author wrote *Turba philosophorum* (Assembly of the Philosophers), which depicts a congress of alchemists with Pythagoras leading the congregation and pre-Socratic philosophers presenting their doctrines.

More than a century later, around 1200 C.E., the *Ghayat al-hakim* (The Aim of the Sage), commonly known as the *Picatrix* (possibly referring to Hippocrates), was written in al-Andalus and was falsely attributed to al-Majriti, a famous mathematician. A compendium of numerous magical and alchemical recipes, descriptions of magical instruments, and astrological theories, *Picatrix* is one of the most widespread treatises on alchemy and magic. Moreover, the work tries to prove magic and alchemy by the philosophical teachings of the Greeks. Another important work on magic was *Shams al-ma'arif al-kubra* (Sun of the Great Knowledge), which was written by the mystic Ahmad ibn Ali ibn Yusuf al-Buni (d. 1225 C.E.). His writings exerted considerable influence on the later theory of letter magic and magical squares.

SEE ALSO ART; ASTRONOMY; DEATH AND BURIAL PRACTICES; EXPLORATION; FESTIVALS; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; INVENTIONS; LANGUAGE; LITERATURE; METALLURGY; MINING, QUARRYING, AND SALT MAKING; MUSIC AND MUSICAL INSTRUMENTS; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SOCIAL ORGANIZATION.

FURTHER READING

- Richard N. Adams and Arthur J. Rubel, "Sickness and Social Relations." In *Handbook of Middle American Indians*. Vol. 6, *Social Anthropology*, ed. Robert Wauchoppe (Austin: University of Texas Press, 1967).
- Marjorie Mandelstam Balzer, ed., *Shamanism: Soviet Studies of Traditional Religion in Siberia and Central Asia* (Armonk, N.Y.: M. E. Sharpe, 1990).
- Carmen Blacker, *The Catalpa Bow: A Study of Shamanistic Practices in Japan*, 2nd ed. (London: Mandala, 1992).

- Kenneth C. Davis, "Out of Africa: The Myths of Sub-Saharan Africa." In *Don't Know Much about Mythology* (New York: HarperCollins, 2005).
- Mircea Eliade, *The Forge and the Crucible: The Origins and Structures of Alchemy*, 2nd ed., trans. Stephen Corrin (Chicago: University of Chicago Press, 1962).
- Peter T. Furst, ed., *Flesh of the Gods: The Ritual Use of Hallucinogens* (New York: Praeger Publishers, 1972).
- Stanton J. Linden, ed., *The Alchemy Reader: From Hermes Trismegistus to Isaac Newton* (Cambridge, U.K.: Cambridge University Press, 2003).
- Pseudeo-Majriti, *Picatrix*. Translated by Hellmut Ritter and Martin Plessner (Leiden, The Netherlands: Brill, 1962).
- Eugene L. Mendonsa, "Sacrifice, Magic and Witchcraft." In *West Africa: An Introduction to Its History, Civilization, and Contemporary Situation* (Durham, N.C.: Carolina Academic Press, 2002).
- Fabrizio Pregadio, *Great Clarity: Daoism and Alchemy in Early Medieval China* (Stanford, Calif.: Stanford University Press, 2006).
- Emilie Savage-Smith, ed., *Magic and Divination in Early Islam* (Aldershot, U.K.: Ashgate/Variation, 2004).
- Gary Seaman and Jane S. Day, eds., *Ancient Traditions: Shamanism in Central Asia and the Americas* (Niwtot: University Press of Colorado, 1994).

► architecture

INTRODUCTION

Architecture is a human activity that combines a number of fields, including art, design, geometry, engineering, construction, and materials science (the science that studies the properties of materials, such as their strength and durability). Architects draw on their knowledge of these fields to create structures for human use. Throughout the medieval world these structures included not only homes and castles but also a great many public buildings, including government buildings, palaces, and edifices used for religious purposes.

Much of the architecture from the medieval period served religious purposes. For example, some of the earliest architecture in medieval Europe was built in Ireland and included monasteries, bell towers, monumental crosses, and other structures that served ecclesiastical purposes. These Irish monasteries, often built on sacred sites, were centers of worship and learning. They were homes for priests and nuns and places of pilgrimage because they housed holy relics.

As the medieval period unfolded, cities, towns, and villages across northern and western Europe, including regions that had been part of the ancient Roman Empire, became the sites of magnificent churches and cathedrals. These buildings often enhanced the prestige of a local duke or other noble, who funded their construction as a way of asserting his power and authority. The nobility also constructed fortified castles,

which were both homes and military fortresses, and, again, enhanced the prestige of their owners. In Europe early medieval architecture often continued to reflect the building styles of ancient Rome and therefore is called Romanesque architecture. The Romanesque style was later replaced by the Gothic style; over the centuries, however, many buildings had to be refurbished or expanded, so many reflect both of these styles.

Architecture served religious purposes in other parts of the world as well. In medieval China pagodas—built to look like mountains ascending to heaven—reflected a Buddhist influence. Similarly, in India numerous cave temples and monasteries were built under the influence of Hinduism. Many of these cave temples were carved out of the rock rather than built with individual stones. Stupas were stone structures built to honor the Buddha. In Burma (now called Myanmar), some 13,000 temples were built, and in Cambodia the magnificent temple called Angkor Wat remains as a monument to Asian architecture.

At the same time, Africa constructed numerous religious edifices. Among the most prominent are the monasteries of Lalibela in Ethiopia, built by the Ethiopian king of the same name who wanted his city to be a major religious center. Lalibela is particularly known for its dozen churches hewn out of rock. The city is also home to numerous chapels and other religious structures, all fashioned and arranged to reflect the major events of Christianity in the Holy Land of the Middle East. Meanwhile, as Islam spread throughout the Middle East, North Africa, Asia, and southern Europe as far as Spain, its adherents constructed numerous mosques, along with hospitals, schools, and other structures, all designed to give honor to Allah, the God of Islam. In the Americas, particularly in Mesoamerica and South America, great temple-pyramids were built.

Not all medieval architecture, of course, served religious purposes. A great deal of architectural skill was applied to government and other public buildings—and to what today would be called urban planning. Few such buildings could be found in North America, but Mesoamerica and South America were the sites of numerous palaces and palace complexes that served government and administrative purposes. The Maya of Mesoamerica, for example, were noted for their architectural achievements in such places as the Yucatán Peninsula, Belize, Guatemala, parts of Honduras, El Salvador, and the Mexican states of Chiapas and Tabasco. Mayan architecture features large, stepped platforms topped by stone structures; one-story palaces that were administrative centers or royal residences. Later, both the Aztec in Mesoamerica and the Inca of South America built large and impressive stone structures for these purposes. Similar public structures can be found in Africa, such as the Palace at Ife in Nigeria. In Asia

the Chinese built numerous palaces and other public buildings as imperial centers.

The medieval period saw the emergence of distinctive styles of architecture and the development of new architectural techniques. In the early centuries of the period the Romanesque style was marked by rounded arches, thick walls to support the arches, barrel vaults, and cross-shaped piers. Later, the Gothic style made use of innovative techniques such as the pointed arch, ribbed vaults, and the flying buttress. Many churches and other buildings throughout Europe reflect both styles because Romanesque buildings were later expanded or portions of them were rebuilt.

Asia, too, developed distinctive architectural styles, which were found not only in public buildings but in homes as well. Chinese architects relied primarily on wood rather than stone. Thus, Chinese buildings, from small homes to grand imperial palaces, tended to be frame structures, so that the load-bearing parts were frames consisting of posts with beams laid across. Walls rarely bore any weight other than their own, which meant that builders could experiment with materials and ornamentation. Also, posts needed to be thick and sturdy, and the interiors of large buildings often needed many posts to bear the weight not only of the stories above but of the typically very heavy Chinese roof. Other Asian countries, such as Japan and India, made use of Chinese styles and techniques but adapted them to their own tastes. In contrast, the Mesoamericans, like the Europeans, relied on stone. The city of Teotihuacán influenced the development of architecture throughout Mesoamerica, especially through the talud-tablero style. This architectural technique is often used in pyramid construction, where a platform (talud) sits on and juts over a sloping wall (tablero).

Ornamentation became important to the architecture of many parts of the medieval world. In Europe this ornamentation typically took the form of iconography, referring to statues, paintings, and stained-glass windows that depicted important people and events in the history of Christianity. In the Islamic world, though, depiction of human figures was generally forbidden in many contexts, so Islamic architects relied on abstract geometric designs and intricate mosaics to ornament their buildings. Throughout the world, formal gardens and landscape architecture added beauty to the functionality of buildings.

AFRICA

BY BRADLEY SKEEN

The architecture of the Nile Valley and Ethiopian plateau saw dynamic development and the transformation of tradition into new forms. Over most of the continent architectural

forms did not change among peoples who continued their ancient way of life as hunter-gatherers or farmers. Cities grew up in western Africa as a result of increased economic activity triggered by trade with the Islamic world, requiring new styles of architecture. Southern Africa saw one of the world's great architectural mysteries appear in the form of the stone buildings called Great Zimbabwe.

EGYPT

Apart from the Islamic conquerors of Egypt, most important architectural works in the Nile Valley were undertaken by the Coptic Orthodox Church (separated from the Greek Orthodox Church on theological and liturgical grounds since late antiquity). The chief architectural invention of medieval Egypt was the monastery. The spiritual example of monks living lives of ascetic renunciation in the desert had been a leading factor in converting the masses of the Egyptian population to Christianity. Originally, monks had lived completely alone in the open air or in caves. A typical form of architectural construction in this period was the cenobitic cell, an artificial cave hollowed out in a hillside with the entrance bricked up, in which a religious ascetic lived. The hermits often lived inside for years with only a little food and drink brought to them by followers.

The systematic construction of monasteries began in the early fourth century with the circle of followers attached to Saint Anthony at Wadi Natrun in the Western Desert and the community of Saint Pachomius at Tabennisi in Upper Egypt. As Christianity became the dominant religion in the fourth and fifth centuries C.E. and the number of monks swelled, they came together in communities that lived collectively in monasteries under the authority of an abbot. Monks no longer built their own cells, but the new monasteries were constructed by monks coming together as a workforce under the abbot's direction. From an architectural viewpoint, these structures remained as simple as possible. Originally they would have been groupings of huts, perhaps with an enclosing wall, or bare brick buildings divided into cells for the individual monks. Cenobitic cells continued in use for the more solitary members of the communities on the outskirts of monasteries well into the eighth century. Additional buildings were added, such as guesthouses for pilgrims; buildings that could be used as a refectory (a hall for dining) or an office; and, surprisingly rarely, a church. (Monks of this early period were not usually ordained priests.) There were more than 7,000 monasteries in Egypt at the time of the Islamic conquest (639 C.E.).

One of the most important early monasteries was that of Saint Jeremias, founded about 475 C.E. It was built at Saqqara, a funerary complex outside Memphis (just south of the Nile

Delta) which had been used as a royal cemetery since about 3000 B.C.E. The site was purposely chosen to give the message through the buildings themselves that the old religion of Egypt had been overcome and replaced by Christianity. The main church at Saqqara had originally been a single-room structure of mud bricks. This was incorporated as the entrance hall for the new church that was built about 600 C.E. It took the form of a large basilica, meaning that it was a monumental building featuring a central isle with rows of columns on either side leading up to the altar and an apse behind it. On either side of the columns were smaller chapels, in this case unusually sunken into the ground at a lower level than the rest of the floor. Much of the building material, including entire columns, had been stripped from tombs in the nearby ancient cemetery.

The monks here used cells that were simply rows of adjacent rooms inside a large building. These cells, and the refectory, were extensively decorated with wall paintings (though none are well preserved). Many cells were decorated with simple geometric designs or blank fields of red paint, but others employed figurative paintings of Jesus and Mary in their theological roles as Pantokrator (Ruler of the Universe), Theotokos (Mother of God) and the like. Still other cells were decorated with wall paintings simulating veined marble and other stones used in the most prestigious and opulent architectural projects. The refectory seems to have been decorated with a series of saints' portraits. Saqqara flourished in the first few centuries of the Islamic conquest but was abandoned in the ninth century.

Many monasteries underwent architectural transformations in the Middle Ages. For instance, the Monastery of Saint Anthony, founded in 356 C.E. at the site believed to be the saint's grave at the foot of Al-Qalzam Mountain near Al Zaafarana, became important only after the Islamic conquest of Egypt (seventh century) because many monks of monasteries in the Nile Valley fled there seeking refuge in the remote mountains overlooking the Red Sea from attacks by Islamic tribesmen. Partially destroyed in the 11th century, however, even Saint Anthony's had to be reconstructed as a fortress to protect it from more organized attacks and raids. Nevertheless, it was captured and looted several times during the Middle Ages. The buildings of the monastery, including its immense walls and five separate churches, were made of mud brick (adobe). Constructed at various times throughout the Middle Ages, they imitate contemporary church architecture of more conventional structures made of stone, ranging from Byzantine styles marked by towers and other structures capped by squat domes to slender Gothic bell towers.

In the cities of Egypt many older Graeco-Roman and Egyptian temples were seized and converted into churches

during the long process of conversion to Christianity in late antiquity and the early Middle Ages (fourth to sixth centuries), but many churches were also specially built. They tended to follow the standard basilica plan of most churches elsewhere in the Byzantine world. Church building went on in the early Islamic period with little alteration except the adoption of an architectural plan with Syrian features. The eighth-century church of Saint Sergius (believed to have been built on the spot where the Joseph and Mary and the child Jesus lived after the flight into Egypt) in the Muslim-founded city of Cairo incorporated a scheme with three apses behind and to either side of the altar at the rear of the basilica. In the later Middle Ages, Coptic Church architecture actually became more complex, replacing flat roofs with systems of barrel vaults and domes, as in the Church of Theodore the Commander at Cairo (dating to the 13th century). Just as the Coptic Church had seized traditional temples and reused the architectural elements of destroyed temples and tombs to signify their triumph over the “pagan” past, once Christianity became a disadvantaged minority in Egypt, church architecture and design generally avoided artistic influences from Islamic styles to reinforce the Coptic community’s separate identity.

ETHIOPIA

The medieval monarchy of Ethiopia traced its descent to the kingdom of Axum, which had controlled the upper Nile Valley and the mouth of the Red Sea between the second and ninth centuries C.E. Axum had developed a unique architectural style. Monumental buildings tended to be erected on top of a stepped base of stone slabs. The structures were built of roughly cut stone blocks and fitted with wooden fixtures. The buildings were simple cubes or solid rectangles with little decoration, and if they consisted of several stories, the floors and stairs and so on were built entirely of wood. Decorative elaboration, if any, tended to be a simple pattern of recessed and projecting stonework on the facades.

A good example of this kind of architecture is the complex at Dungal in the southwestern quarter of the city of Axum proper, built between the sixth and seventh centuries. The foundation covers some 3,588 square yards. The structure might have been the house of an elite family or the rectory for a nearby group of churches. It seems to imitate the architecture of older imperial palaces. The main building comprises a group of living quarters. There are also a number of separate enclosed courtyards. Outbuildings consisted of a large kitchen and a Roman-style heated bath. The state of preservation of numerous other buildings on the same foundation is too poor to determine their purpose. This style of building, especially for the construction of churches, continued to be

used in Ethiopia long after the collapse of the Axum as an empire.

The characteristic boxy style of Axumite architecture coupled with their being carved directly into rock faces in situ or into the faces of enormous quarried stones may well have derived from the architecture of the Arabian city of Petra, where there is an enormous tomb complex (dating to the second century) carved into a cliff face, with each tomb resembling the facade of a freestanding building. Another factor that has to be considered in the development of Ethiopian architecture is the tradition of megalithic art common in the mountainous regions of Eritrea and southern Ethiopia. In these areas large stones were commonly erected for what archaeologists believe were funerary purposes. Many thousands of these stones, up to 9 yards tall, were erected between 1500 B.C.E. and 1200 C.E. Most are simple undressed stones while many are carved either into the shape of a phallus or a rough representation of a human being. A few are inscribed with representations of swords, weapons, human beings, or unintelligible symbols.

Axumite masons were remarkably skilled at dressing stone. Where conditions permitted—such as in the Ethiopian highlands with the construction of fortresses among outcroppings—masons could adopt their traditional style of architecture such that an entire building could be carved in place from a single stone. In the fourth century the masons began to quarry exceptionally large granite blocks to create stelae up to 36 yards high, possibly the largest single pieces of stone ever cut. The largest of these stelae were carved to resemble the outer walls of buildings, complete with false windows, doors, and bands representing stories or courses. These structures may have symbolized or perhaps been believed to function as the afterlife dwelling of the dead kings in whose honor they were erected. All of these traditions would be combined in a medieval renaissance of Ethiopian architecture.

Medieval Ethiopia also inherited the tradition of Byzantine church architecture. Once Axum converted to Christianity in 340, Ethiopia seems to have been in contact with Syrian Christians more than with the Coptic Church in Egypt. The oldest extant Christian Church in Ethiopia is the church of the Ethiopian saint Abuna Aragawi inside the walls of the Debre Damo monastery in Tigray Province in the northeast of the country. Its floor plan is a Byzantine basilica with a typically Syrian rounded apse under a small dome. There is a miniature copy of a Roman triumphal arch located between the nave and the apse, but the decorative scheme is inherited from Axumite architecture, especially the wooden coffered ceiling decorated with various carved animals that may have been salvaged from one of the old royal palaces in Axum.

While the city of Axum lost its position as the capital of a great empire, it was still venerated as the place of coronation for Ethiopian emperors. Thus, Axum's monumental architecture would have been well known to Ethiopian rulers, even as their country became an increasingly inward looking and rural civilization. The rock-carving tradition reached a new height in the form of entire churches carved out of natural rock outcroppings under the patronage of the Ethiopian emperor Gebre Mesqel Lalibela (r. 1189–1229), a saint in the Ethiopian Orthodox Church. According to Ethiopian tradition, Lalibela was responsible for building all the churches; some, however, appear to be reused Axumite structures, while others may have been built by his successors.

According to the Ethiopian hagiographical life of Lalibela, Lalibela had gone on a pilgrimage to Jerusalem in his youth while the city was controlled by the Christian crusaders. When Jerusalem was recaptured by the Islamic sultan Saladin in 1187, Lalibela, inspired by a dream, decided to build a new city of Jerusalem. He chose for its site his own birthplace, the town of Roha, which he renamed after himself. He made many superficial connections between the new city, which became the capital of Ethiopia for the next century, and Jerusalem, including renaming the local stream the Jordan and a nearby hill the Mount of Olives. But the architecture of the new Jerusalem was wholly Ethiopian and principally consists of 11 churches carved out of solid rock.

The construction procedure for such a church started with a large rock outcropping whose upper surface would become the roof of the building. Trenches were cut down through the rock to relieve the exterior walls of the building, which was left as a large, solid stone cube inside a deep pit. Then windows were cut and the interior of the structure chiseled out and removed. The outer walls were finally carved in detail to resemble the architectural features of conventional buildings built out of dressed stone blocks. This procedure is actually very close to the Axumite royal funeral stelae, which were large, solid pieces of stone carved to resemble buildings, but in this case carried further to actually hollow out the inside to allow them to be used as functioning buildings. There is some evidence also that at least three of the churches (Merkorios, Gabriel-Rufael, and Danagel) had originally been built in this fashion for use as fortresses by Axum several centuries earlier, at the height of that kingdom's power. In that case, Lalibela would have been inspired in his plan for the city in part by these already-existing structures, making a direct link with Axumite architecture. There are, however, hundreds of rock-cut churches in Ethiopia, mostly small single-room chapels, dating as far back as the 10th century; none compares in scale and complexity to Lalibela's. Excavating Lalibela's churches must have occupied a large force of stonemasons for many

years, though the life of Lalibela records that the work was done by an army of angels.

The churches are usually categorized into four divisions: the Northern Group, the Western Group, the Eastern Group, and the monasteries. In the Northern Group, Bete Medhane Alem (House of the Savior of the World), a regular basilica consisting of five aisles, is the largest monolithic structure in the world (at almost 45 yards high or, rather, deep). It was probably modeled on the Maryam Seyon (Mary of Zion) cathedral at Axum, which was destroyed in the 16th century. This group includes Bete Maryam (House of Saint Mary), Bete Dabra Sina (House of Mount Sinai), and Bete Golgotha (named for the site of Christ's crucifixion in Jerusalem), which contains life-sized wall carvings of saints and a tomb, possibly that of the emperor Lalibela himself. Bete Golgotha comprises the Selasse (Trinity) Chapel and a small monolith called Adam's Tomb. It has three monolithic altars decorated with low-relief carvings that recall the megalithic art of rural Ethiopia.

In the Western Group, Bete Giyorgis (House of Saint George) is often considered the most spectacular for its unique cruciform floor plan. The structure is cut 13 yards be-



Painted wooden lion's head (architectural element); Qasr Ibrim, Nubia, seventh to 10th centuries © The Trustees of the British Museum

low ground level. Its decorative roof pattern is three equilateral crosses, and the pointed-arch windows are derived from Islamic architecture.

The Eastern Group consists of Bete Amanuel (House of Emanuel), possibly the former royal chapel; Bete Merkorios (House of Saint Mercurios), which may have originally been an Axumite prison; the cavelike Bete Abba Libanos (House of the Abbot Libanos); and Bete Gabriel-Rufael (House of the Archangels), which may have originally been Lalibela's palace. Farther from the center of Lalibela lie two churches built within caves, Makina Madhane Alem (Church of the Redeemer) and Yemrehana Krestos (named for an emperor of Ethiopia), and the two monasteries Debre Damo and Ashtan Maryam.

SUB-SAHARAN AFRICA

Monumental architecture is generally lacking in southern Africa, aside from areas that became part of the Islamic cultural sphere. Local cultures that were seminomadic and based their subsistence on hunting and gathering or on agriculture had no need for grand structures and no way to build them. The typical building was a dwelling for either a nuclear or extended family. These structures would range from a simple roof of thatch-work leaves over bare earth, a floor of thatched mats, or a more permanent foundation of mud bricks or clay.

Traditional architecture in western Africa reached a height of sophistication in the main Yoruba city of Ife (in northeastern Nigeria) after 800 and especially between 1200 and 1400. There, ordinary domestic architecture took the form of square houses built of dried clay with thatched roofs around open courtyards. Additional thatching extended partially over the courtyard to provide shade. Individual rooms each housed a nuclear family in a multigenerational household. The main feature of interest is the courtyard floors, which were paved in elaborate designs with small stones and pieces of broken pottery. Even royal palaces followed this basic pattern, differing mainly in size and in the elaboration of carving of the wooden doors and posts supporting the roofs.

Towns and cities were surrounded by massive mud-brick walls. The Ashanti architecture of Ghana was similar, in that buildings were mostly mud based (adobe) and organized around central courtyards. However, they were often finished in mud plaster and decorated with murals. The shrine at Bawjiwasi, for instance, had walls built of wattle and daub and painted with spectacular animal designs. Specially cut palm leaves on the roof provided further decoration. Another feature of many traditions of western African architecture was a type of large mud-brick cone related to the ancestor worship important in indigenous religions. These cones may be seen as precursors to the spectacular mosques of Sahelian

architecture at Djenné (in present-day Mali), begun in 1240 and at the slightly later Sankore Mosque in Timbuktu.

Most of central Africa was populated in the Middle Ages by Bantu-speaking peoples. By 800–900, those in southern Africa (modern-day Botswana and Zimbabwe) lived by herding cattle and seem to have been organized under a hierarchical social control exercised by chiefs or other authorities from defensible hilltop positions. This culture—that of the Shona people—was the background from which emerged the civilization known as Great Zimbabwe.

Zimbabwe means “walled enclosure” in the Shona language, and the name Great Zimbabwe is applied to the center of a civilization that flourished between about 1250 and 1450 in present-day Zimbabwe. The city of Great Zimbabwe reached a population of as much as 18,000 immediately before its sudden abandonment in 1450. It is surrounded (at a distance of up to 125 miles) by lesser “Zimbabwes,” comprising settlements of a few hundred to a few thousand people. The civilization probably collapsed because it could not develop new forms of urban infrastructure and agricultural production to support its unprecedented (for the area) concentration of population. The principal architectural feature of the central site is its monumental enclosing walls. Its European discoverers fantasized that these extensive ruins of large masonry walls in the interior of Africa must be the lost city of the Queen of Sheba of biblical fame. Every effort was made, for political reasons, to argue that it had been built by anyone other than native Africans. In fact, the ruins are obviously those of a city whose architecture was an extension of African traditional building; as such, they are not comparable to city walls common in European and other civilizations but served a quite different architectural purpose.

On a site of more than 1,800 acres were three sets of enclosing walls. The most important set of walls comprised the Great Enclosure itself, which is believed to have been the seat of government for the whole region; others enclosed elite residences or perhaps treasuries or processing centers related to the gold trade that seems to have been the economic basis of the community. These walls and their architectural purpose are quite singular.

It is clear that the style of stonework in the walls and other buildings is unrelated to that found anywhere else in the world but evolved from older and simpler structures that had been built in that area for several centuries before the creation of the urban center. Wall construction dates from various times over the whole life of Great Zimbabwe and became more sophisticated as time passed. The ashlar, or stone blocks, were quarried from nearby hills whose granite had the property of naturally breaking into slabs 4 to 8 inches thick, which could easily be divided into usable pieces. The basic

technique was to lay the ashlar on top of the earth without a foundation, forming two parallel walls that would be stepped back as they were built up. The hollow space between was filled in with larger slabs and rubble. Originally, the ashlar were left very rough, and the course of the walls was sinuous and sometimes incorporated boulders that happened to be lying on the site. By 1400, however, the ashlar were very finely worked, and great care was taken in fitting together pieces of appropriate sizes to make tight joins.

In earlier walls, doorways were rectangular, whereas for later ones the masons had learned how to make the sides of the doorways rounded. At no time was any kind of mortar used to hold the ashlar together; hence, the technique is known as drystone masonry. The latest work produced walls that were 12 yards high on a base half that thick. The tops of the walls were decorated with turret-like bases for upright posts of wood or soft stone; they may have been carved for decorative purposes, but none have survived. The enclosures were not simply ringed by walls; they were subdivided by interior walls into separate courtyards and plazas. One of the walls of the Great Enclosure also contained a tower generally called the Elliptical Building, which rose up to twice the height of the surrounding walls. Its purpose is unknown.

Walls like these would not have been suitable for any military purpose, such as protecting a city. They also did not support roofs, so they were not exterior walls of traditional buildings. In fact, the city lay outside the walled enclosures. The external areas had housing sufficient for as many as 18,000 people by 1450, when the civilization collapsed. The huts consisted of low adobe walls worked to a molded decorative finish and painted, with thatched roofs. The areas inside the enclosures consisted of essentially identical huts sufficient for only a few families. Other structures inside the walls included altars of granite slabs covered in clay (though this facing does not survive except as traces, it would probably have been painted and decorated) as well as raised stone platforms used for the display of various objects, perhaps cult statues or other sacred objects.

Just as they served no defensive purposes, walls on this scale could not simply have been for privacy or shelter. Great Zimbabwe probably began as a religious center with stone walls used to mark off sacred space. As the wealth of the society grew, its resources were invested in creating mammoth stone walls to establish the elite status of the ruling kings or priests. The function of the walls was to define status within the society: inside were the powerful and the sacred and outside the ruled and the profane. The walls served the purpose of demonstrating the power of those who could divert a great part of the culture's wealth to purposes of display. If we compare the walls of the Great Enclosure with the architecture

of other cultures, they are not at all like defensive city walls (though the first Europeans to see them in the 16th century naturally thought of them as belonging to the class of city walls with which they were familiar) but more nearly like the walls of a palace or cathedral. Perhaps they are most like the architectural screen in a medieval Christian church, which separated the sacred drama performed at the altar from the audience of the congregation.

Among the various Shona states that succeeded the failed Great Zimbabwe culture, stone walls always served the purpose of surrounding the dwelling of the local ruler and his family. While there was little decoration in the stonework of Great Zimbabwe (the highest courses of stone in the Elliptical Building were laid in a chevron pattern while there are a few sections of walls with rows of blocks in a herringbone pattern, or using darker ironstone to create a pattern in the light granite stonework), decorative use of stone became regular in later enclosures which were always built on a much smaller scale.

THE AMERICAS

BY ARDEN DECKER

NORTH AMERICA

While most North American societies did not produce architecture akin to the monumental stone structures we often associate with an architectural tradition, their history is rich with diverse and innovative building practice. Much of what is known about North American architecture derives from documentation by explorers and settlers as well as the continuation of these practices into the modern era. In addition, several cultures did engage in the creation of large-scale building programs of a permanent nature that still exist today.

The most common building practice in the Arctic centered on the need for winter houses. With limited material resources, these were either dug into the ground or heavily sided by the earth. Often materials such as bone, rock, or driftwood were used to frame these houses. The Thule culture (ca. 1000–ca. 1600) made an improvement on the original design by creating a steep passageway leading to an angled door that led up into the floor of the house. This allowed for a more weatherproofed environment. The igloo is another Arctic invention that may have its origins in the winter houses of the Thule. Made of snow bricks, these dome-shaped dwellings were primarily used for protection from winter weather. The shape of the igloo's roof was designed to avoid collapsing. The snow bricks required carefully selected snow, as the consistency could not be too loose or too tightly packed.

The wigwam served as the primary building type for many groups such as the Ojibwa (also called Chippewa) and Algonquian in the Great Lakes and northeastern areas of North America. The wigwam's design makes for easy transportation, because it consists of a simple frame and roof covering made of reeds or bark. The frame, typically constructed from bent tree saplings tied together to create tears, gave the structure an oblong shape. Often a hole would be left in the roof covering to allow for smoke to escape. These structures would house one to two families and generally ranged from 7 to 20 feet in diameter. Some variation in size and shape (such as the extended and conical shaped wigwam) also appeared. In the Great Lakes a special type of ceremonial building developed, called Midewiwin lodges. These structures were very large and featured barrel-roofed frames that would be covered by bark or mats.

Building in the form of earth mounds is perhaps the most distinguishing characteristic of architectural practice among the southeastern cultures. The Mississippian tradition (ca. 750–ca. 1500) ushered in the continuation and spread of mound building. These designs often took on elaborate geometric designs and required extensive labor and planning. Although they mostly served as a means of denoting ceremonial or burial space, they do demonstrate a propensity for building on a monumental scale. An outstanding example may be seen at Cahokia (near modern-day Saint Louis, Missouri), where beginning around 800 more than 100 mounds defined a large city center. The largest of these, Monk's Mound, grew higher than 100 feet high as the result of a series of 14 separate building phases. The temple mound would have been topped by wattle-and-daub construction. Perhaps the most well-known example of mound building is the Great Serpent Mound in Adams County, Ohio.

The Mogollon culture (ca. 500–ca. 1400) of central and southwestern New Mexico improved upon the ancient pit house design by lining the walls with stone masonry. Called great kivas, these ceremonial and social structures appeared around 800 and were large and rectangular in their plans. The Hohokam culture (ca. 500–ca. 1400), located in the southern part of Arizona, was unique in their development of defense, ceremonial, and dwelling structures. These buildings were constructed using thick walls formed by hand-shaped adobe. There is evidence of Mexican influence on Mogollon sites such as Casa Grande and Snaketown, where ball courts have been found, though they are either egg shaped or feature bulbous ends rather than the Mesoamerican I-shaped design. There is also evidence of large-scale complexes of adobe and wattle-and-daub buildings that may have been used for protection against attack. These structures feature observation holes, suggesting that the complexes also had cosmological associations.

The Anasazi (ca. 900–ca. 1300; located near the present-day Four Corners region of the southwestern United States) developed large, multistoried dwellings made of adobe brick and stone. These structures were often situated beneath overhanging cliffs for protection. The most impressive example is Mesa Verde in the southwestern part of Colorado. The Anasazi also built kivas that were circular and were used for ceremonial purposes beginning around 950. The kivas would be entered through a hole in the roof by way of ladder, and the interiors often featured a bench, hearth, and air vent. The Anasazi began to construct "Great Houses" in the 11th century at sites such as Chaco Canyon. These towns were made up of kivas, plazas, towers, and terraces and required a considerable amount of raw material to construct.

The Pueblo Indians, also living in the Four Corners area, constructed large-scale, multistoried, multiroom adobe dwellings. The layout of the pueblo, or town, often suggests some cosmological association. Domestic dwellings were constructed near the central sacred plaza, indicating a close relationship of the people to the sacred.

MESOAMERICA

The medieval period ushered in tremendous developments in monumental architecture throughout the Mesoamerican and Central American regions. The great commercial and military city of Teotihuacán (ca. 1–ca. 700) had already begun to influence the development of architecture significantly throughout Mesoamerica, especially through the talud-tablero style. This architectural is often used in pyramid construction, where a platform (talud) sits on and juts over a sloping wall (tablero). Despite the widespread influence of this style, contemporary and later cultures began to place their own stamp on monumental architecture. The most significant of these innovations were carried out by the advanced and sophisticated cultures of the Maya, Toltec, and Aztec. It should be noted that monumental architecture throughout Mesoamerica as well as South America was most often constructed as a means of defining sacred space. Therefore, ceremonial centers often feature plans designed to reflect a culture's cosmological model.

The region that the Mayan peoples occupied is vast and varied, since it encompasses the Yucatán Peninsula, Belize, Guatemala, parts of Honduras, El Salvador, and the Mexican states of Chiapas and Tabasco. Despite the proliferation of architecture throughout the Mayan world, their cities lack any standardized system of planning, such as a grid. Rather, Mayan sites tended to grow in a more sprawling, organic fashion that was strongly influenced by the shape of the natural landscape. Classic Period (ca. 200–ca. 900) Mayan architecture is generally characterized by large, stepped platforms topped by

stone structures; one-story palaces that served as administrative centers or royal residences; and limestone temple-pyramids reaching nearly impossible heights. Many Mayan sites are also marked by the inclusion of ball courts of varying size and quality.

Located in western Honduras, the center of Copán features several impressive examples of Late Classic Mayan architecture. Much of the site's construction was commissioned under "18 Rabbit," the 13th ruler of Copán. Among these projects is the impressive Temple of the Hieroglyphic Stairway (eighth century, finished under the 15th ruler, "Smoke Shell") and is named for its elaborate staircase. The steps of this staircase are decorated with some 2,500 glyphs outlining the dynastic history of Copán. As one walks down the temple steps, one journeys backward through time. Temple 22 was also a product of "18 Rabbit's" rule and was designed as a symbolic representation of a mountain.

A large site located in the heart of the Petén region of northern Guatemala, Tikal is marked by a central Great Plaza that is defined by two impressively tall temple-pyramids (Temples I and II), an earlier dated acropolis on the north side, and a palace complex called the Central Acropolis on the south side. Indeed, much of the architecture found here is connected to the Great Plaza by a causeway. Starting in the seventh century the rulers of Tikal began building programs that resulted in ever-more elaborate and vertical temple designs. The largest and most impressive, Temple IV, measures nearly 230 feet in height. Very steep stairways lead to the tops of the temples, which are then capped by large roof combs. Much of this temple-pyramid construction was arranged to mimic the design of the Great Plaza. Recognized as twin-pyramid complexes, these centers were constructed in 20-year intervals, suggesting a correspondence to the 20-year period of the Mayan calendar known as *katun*.

While it is not the largest of the Classic Period sites, Palenque was one of most heavily populated of the Mayan region. Located near the Usumacinta River in the present-day Mexican state of Chiapas, Palenque comprises over 1,000 structures of varying size and function built upon man-made terraces. One of the most significant architectural achievements found here is the seventh-century palace complex. Built on a trapezoid-shaped platform, it is composed of vaulted rooms surrounding interior patios. This complex also features a square four-story structure known as the Tower that is believed to have served as a watchtower or observatory. The most significant examples of temple-pyramid construction may be seen in the Temples of the Sun, Cross, and Foliated Cross, all of which share similar design elements, including a stepped platform with staircase, various vaulted and divided interior spaces, and a mansard roof (a roof with two slopes)

and fretted roof comb. Another significant temple found at Palenque is the Temple of Inscriptions, so named for the hieroglyph-filled panels found on the interior. This structure is unique in that it is the first instance of a stepped pyramid containing an interior vaulted crypt. It is now commonly believed that the Temple of Inscriptions was commissioned as a funerary monument to the important ruler Pakal the Great, who died in 683.

While the Zapotec peoples first began to construct buildings on the hilltop site of Monte Albán located Oaxaca Valley as early as 500 B.C.E., the majority of Monte Albán's central structures were constructed between 400 and 900 C.E. The style of urban planning at Monte Albán lies somewhere between the free-form, organic plans associated with Mayan sites and the rigid, gridlike plan of Teotihuacán. While some of the earlier structures of the site demonstrate Mayan influence, by the Classic Period these elements had disappeared in favor of motifs resembling the talud-tablero developed at Teotihuacán. For the most part, the architecture consists of stone-faced platforms with stairwells flanked by wide balustrades as is seen in Building H located at the center of the main plaza. It is believed that these structures would have originally been covered with stucco and painted. Central to Monte Albán's Classic Period development is the I-shaped stone ball court with sloping sidewalls. This style of ball court would later appear throughout central Mexico. There was also a proliferation of richly painted, corbel-vaulted (where stones are offset and project toward the center of an archway or vaulted ceiling to support weight) underground tombs constructed throughout the site during this period.

It is during the Terminal Classic Period (ca. 650–ca. 900) that many of the Classic Period cities of the southern Mayan lowlands and central Mexico began to collapse. Populations became increasingly uprooted, and conflicts between cities increased. The exact reasons for this dramatic shift remain unclear, but we do know that while great upheaval was affecting many city-states throughout Mesoamerica, others—including Xochicalco located in Morelos, Mexico, and El Tajín in northern Veracruz, Mexico—were experiencing new growth both economically and architecturally. Many of these same issues of warfare and new alliances became even more solidified during the Early Postclassic Period (ca. 900–ca. 1200).

The northern Yucatán site Chichén Itzá is unusual in that it demonstrates two distinct architectural styles: that of the Maya in the Terminal Classic Period and that of the Toltec in the Early Postclassic Period. The primary architectural style of the Terminal Classic Maya Period is known as *puuc* and may be characterized by the presence of elaborately decorated facades that incorporate mask and latticework designs. The architectural highpoint of the Terminal Classic Period was El



Lintel 17 from structure 21 at Yaxchilán (Mayan culture, ca. 600-ca. 800); the ruler Bird Jaguar IV is seen performing a bloodletting ritual with one of his wives. (© The Trustees of the British Museum)

Caracol, a structure at Chichén Itzá that received its name from the snail-shaped plan. El Caracol is made of stacked concentric circles that suggest a spiraling motion, and it is believed to have served as an observatory from which the positions of the setting sun, moon, and Venus might be recorded.

Like many Early Postclassic Yucatán cities, Chichén Itzá bears the mark of Toltec invasion. This may be seen most readily in the four-sided pyramid known as El Castillo and the Temple of the Warriors. The sculptural program associated with El Castillo indicates both Mayan and Toltec influences as well as imagery that is unique to the Toltec Chichén period. The Temple of the Warriors bears a remarkable likeness to Pyramid B found at Tula, which, like the example at Chichén Itzá, is a stepped platform surrounded by colonnaded halls and topped by a sanctuary space supported by Toltec warrior Atlantean columns. At Chichén Itzá a very large I-shaped ball court flanked on either end by smaller temples also was constructed.

The Toltec city Tula, founded around 900 and located in the state of Hidalgo, Mexico, is a site of particular importance to the history of later Aztec and Mayan cultures. Tula features a ceremonial core composed of several massive pyramids, the best example of which is Pyramid B. This royal residence takes on a stepped pyramid-platform design with a single staircase leading to the top and a long colonnaded hall in the front that originally would have been covered by a perishable roof. The four sides of the structure are decorated with a relief sculpture program of warrior symbols. On top of the pyra-

mid itself are several giant Atlantean columns carved in the likeness of Toltec warriors. A similar design plan may be seen in the adjacent “Burnt Palace,” which also features colonnaded halls but would have served as a meeting or ceremonial center. Sometime around 1156 Tula succumbed to increasing warfare, and the Toltec, without a permanent base, headed south, spreading their style throughout Mesoamerica.

While city centers continued to pop up across Mesoamerica, the Late Postclassic Period (ca. 1200–1521) is dominated by the rise of the Aztec, who founded the great city of Tenochtitlán in 1345. Indeed, the Aztec Empire was the largest, most sophisticated center in Mesoamerica at the time of the Spanish conquest.

The rise of the Aztec was not the only development to take place in Mexico during the Late Postclassic Period. After Monte Albán was forcibly abandoned at the end of the eighth century, a new Zapotec site emerged at Mitla in Oaxaca. This center is famous for the abstract, geometric stone mosaics that decorate the architecture, the most elaborate of which is the Hall of Columns. It has been suggested by scholars that the mosaics are meant to imitate various woven textile patterns.

Sometime around 1350 a group of Nahuatl-speaking peoples arrived at Tenochtitlán, thus beginning a settlement that would grow to be the center of the Aztec Empire. Built on an island in a lake that is now Mexico City, Tenochtitlán followed a grid plan composed of a system of streets and canals. Essentially, the city was divided into four residential areas that surrounded the ceremonial center. Perhaps the most significant architectural achievement of the Aztec is at the heart of this ceremonial center, the Templo Mayor, or Great Pyramid. In fact, much of what is known about Aztec art and culture has been found within the Templo Mayor and its related ceremonial structures.

The entire ceremonial center was defined by an L-shaped Coatepantli, or Serpent Wall, constructed of stone. The Templo Mayor was built and enlarged in many stages, the final of which was completed in 1487. While most of the original structure was lost to later colonial structures, much is known about the Templo Mayor from colonial accounts and modern-day archaeological excavation. The architectural style of the Aztec borrowed from both that of nearby Teotihuacán and that of Tula. The great temple was a double pyramid oriented westward toward the nearby volcanic mountains. From the base of the pyramid grew the main body composed of four terraces. Dual staircases led to the top, where two shrines were installed: one dedicated to the rain god Tlaloc and the other to Huitzilopochtli, the god of war and the patron god of the Aztec. This double shrine was meant to be symbolic of the Aztec people, their origins as nomadic people, and their rise

to an imperial state. There are many existing examples of Aztec-style architecture found in peripheral sites like Tepoztlán (near Cuernavaca) and Malinalco (southwest of Mexico City) that demonstrate the influence and dominance of the Aztec before the Spanish conquest.

SOUTH AMERICA

Like the cultures active in Mesoamerica at this time, those in South America produced equally sophisticated and innovative architectural forms. Building on the traditions of previous cultures, such as the Chavín and the Moche, medieval South Americans constructed large and complex city centers throughout the central Andes. During the Middle Horizon Period (ca. 500–ca. 1000) two competing cultures developed in modern-day northern Chile and Peru. Both Tiwanaku and Wari (also Huari) wielded tremendous power and influence and were equally sophisticated and organized, but they developed distinct architectural traditions.

Located near Lake Titicaca (between Bolivia and Peru), the city of Tiwanaku began around 375 and collapsed sometime around 1000. The plan of the site most likely was designed to reflect the religious and political power of the Tiwanaku, as it seems to recreate on a smaller scale an island floating in the great lake of Titicaca. Similarly, great pains were taken to ensure the division of sacred space. One of the most unusual features of this site is a man-made moat that encapsulated the center and defined it as sacred space. Within this center was the large, seven-terraced pyramid called Akapana, standing 56 feet high. The basic structure was formed from earth and gravel that was then faced in cut stone that showed off the remarkable skill of Tiwanaku stonemasons. A sunken courtyard was built into the top of the temple and was used primarily for elite residences. Buried within the pyramid itself was a system of drains, which turned the entire structure into a big fountain. Once water collected in the top terrace, it would be carried by drainpipes to the next and would then spill over onto the subsequent level. Another important architectural development found at Tiwanaku is the Gateway to the Sun, located in a second city center of Tiwanaku. The Gateway to the Sun is a portal carved from a single stone, and it features a double-jamb door. The upper part of the gate is covered in carved stone relief featuring both Tiwanaku and Wari images.

The Wari capital was located in the Ayacucho Valley of the central highlands in Peru. This site features a relatively irregular plan, and much of the remaining monumental architecture consists of high, multistory stone walls. Tiwanaku influence is evident in the appearance of Tiwanaku-style stonework on temples and burial chambers that are faced with expertly cut stone slabs.

Located near the modern-day city of Lima, Peru, Chan Chan was the chief city of the expansive Chimor (sometimes called Chimú) kingdom. The site of the Late Intermediate Period (ca. 1000–ca. 1400) is most notable for its use of adobe. It is arranged into several rectangular enclosures called *ciudadelas* (or citadels) that are surrounded by adobe brick walls reaching up to 60 feet high. The arrangement of structures within the enclosures varies from highly symmetrical to irregular, and the structures themselves range from royal palaces to storage chambers. Two of these enclosed compounds, Uhle and Tello, feature U-shaped structures known as audience rooms that probably served an administrative function. During the later phases of Chan Chan construction, *ciudadelas* such as Rivero, Bandalier, and Tschudi demonstrate a fairly regular layout, and the structures grow more and more complex in their designs. Many of these royal compounds feature geometric adobe relief decorations and openwork walls that resemble textile patterns.

By the end of the Late Intermediate Period most of the Andes were under Inca control. While Incan architecture may at first seem overly simple, with further investigation the complexity of their stonework and innovative city planning may be understood. The Inca were often forced to find means of building in the inhospitable landscape of the high Andean mountains. The most distinguishing characteristic of Incan architecture of the Late Horizon (ca. 1400–ca. 1534) is the labor-intensive use of carefully carved monolithic stonework and the alteration of the natural landscape to meet the functional needs of the people. The manipulation of the natural rock outcroppings from the Andean mountains is one of the most significant innovations made by the Inca. These outcroppings were altered to take on the shape of organic or abstract forms such as semicircles or zigzags. Sometimes outcroppings served a practical function in the form of irrigated terraces for planting crops. But others, as may be seen at Qenqo and Ollantaytambo, served primarily as ceremonial spaces that engage a series of steps and channels to create geometric designs.

The capital city of Cuzco, located in the Urubamba Valley in the Andes of southeastern Peru, is a carefully planned city that served as the ceremonial and political center of the Inca Empire. The planning of this city was so calculated that it took on the shape of an animal sacred to the Inca, the puma. This animal shape was defined by a system of roads and the use of astronomically oriented lines. As the Inca believed that stone was a living being, its use carried significant symbolic weight. Buildings and walls were constructed using monoliths, or single stones, that feature carefully articulated beveled edges. This carving style allows the stones to fit perfectly together without the use of mortar, almost like puzzle pieces,



Architecture was extremely important to the Inca Empire. Two of the most important sites were the cities of Cuzco and Machu Picchu.

and has the added benefit of creating a surface with beautiful effects of light and shadow. Cuzco has some of the best examples of this complex use of stonework. Structures such as the main temple, called Qorikancha (also spelled Coricancha), or “Golden Courtyard,” are demonstrative of the architectural style that was seen as fit for elite and religious use. Examples such as Qorikancha, which also served as an observatory, emphasize the special sacred nature of the site.

Machu Picchu, which was constructed on a ridge high above the slopes of the Andes along the Urubamba River, seems to be an almost impossible location for building architecture. Owing to its location and the types of building, the site most likely held tremendous religious importance for the Inca. In fact, it has been suggested that the site functioned as a royal estate. An elaborate site despite its smaller size, Machu Picchu contains terraces, stone buildings, gardens, baths, and a large oblong-shaped plaza. On the northeast side of the site are a series of elite residences whose designs were variations on a plan consisting of rectangular units within stonewalled, open-air patios. These royal compounds feature the same impressive stonework that was utilized in Cuzco, and they begin to incorporate the use of windows. Temples were also built of stone at Machu Picchu for ceremonial rituals.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The architecture of the region of Asia and the Pacific in medieval times was enormously varied, with styles varying according to the kind of shelter required for the particular environment and to the available building materials as well as to people's tastes, as influenced by religion and tradition. That the Chinese, Japanese, and Indians developed the most influential architectural styles should not suggest that the styles of other cultures were somehow inferior: There is awesome beauty in the boat-shaped structures of Sumatra, ingenious design in the yurts of central Asia, and a strong binding influence on communities by the longhouses of Southeast Asia. In almost every area of Asia and the Pacific people showed impressive ingenuity in their architectural solutions to their needs for shelter, community, and spirituality.

CHINA

A great deal is known about medieval Chinese architecture through a book published in 1103, called *Ying zao fa shi* (Treatise on Architectural Methods) and written by Li Jie. This book was a manual that the imperial government wanted architects throughout China to use. One of the most impressive effects of its distribution was that builders were able to prefabricate parts in one place in China and have the parts fit

together with other parts built thousands of miles away. By following the instructions in the book, Chinese builders were able to bestow their structures with a distinctively Chinese look. On the other hand, the dictates of Li Jie's book were not slavishly followed; medieval Chinese architects were by and large practical people who adapted the designs in the book to suit various environments and terrains. For instance, walls that were designed as perfectly rectangular in the book might have been realized with dips and swerves, as appropriate to rocky or sloping ground.

One aspect of Chinese building that began in the ancient era and continued into the medieval era was that all structures followed the same basic pattern, from small peasant houses to grand imperial palaces: They were frame structures, meaning that the load-bearing parts were frames consisting of posts with beams laid across. Walls rarely bore any weight other than their own, which meant that builders could experiment with materials and ornamentation. Also, posts had to be thick and sturdy, and the interiors of large buildings often needed many posts to bear the weight not only of the stories above but also of the typically very heavy Chinese roof. As such, multiple stories were usually reserved for special buildings such as pagodas, with most other buildings, whether small homes or palaces, being one story only.

Posts were usually wooden and were painted with a mixture of hemp, oil, and brick dust to protect them from insects and weather. Sometimes, in expensive buildings, lacquer was used to coat the posts. It was probably out of this practice intended to preserve wooden posts that the custom of decoratively painting posts was derived. The color was most often red but could be other hues.

In the far north of China buildings tended to have wooden walls as thick as 40 inches, for protection from the bitter cold. In southern China, where heat was more of a problem than cold, walls could be much thinner, being composed of wooden boards or even just paper. Whether a building was in the north or in the south, an open space between the walls and roof would allow smoke to escape, as the medieval Chinese did not build fireplaces. Windows in walls were built not to allow light into the interior but to allow air to circulate. Often the windows were covered by no more than paper that could be raised to allow fresh air to enter.

The spectacular medieval Chinese roof often draws the most attention from observers. The heavy posts of the frame had lintels laid across their tops; a lintel is a horizontal beam laid across the tops of vertical posts. On these lintels, smaller vertical posts would be set, with additional lintels laid atop them. Those lintels would have yet smaller posts set on them, with again more lintels atop. Each level of the roof would be narrower than the previous one, and this pattern could con-



Pavilions on the banks of a river; color on silk, China, Ming Dynasty, 1368–1644 (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)

tinue as high as the structure could bear, creating a trabeated pyramid; the word *trabeated* comes from the Latin for “beam,” so this term essentially means “beam pyramid.” This design differs from the A-frame structure that bears the weight of the roof in many modern Western buildings; the Chinese knew of the A-frame but used it only as scaffolding to bear the weight of the roof while it was being set in place. Afterward, the A-frame would be removed, as the roof’s own weight was expected to hold it in place, with the pressure of the weight of each level being transferred outward down to the lowest posts. The impressive weight of the roofs came from the glazed clay tiles on them. If an architect wanted the eaves of the roof to extend outward far enough to provide coverage for a walkway alongside the structure, additional posts would be placed beyond the wall to hold the overhanging eaves. As such, galleries of posts could be created.

Sometimes architects wanted additional space without having to use additional posts. For this, they used brackets called *dou gong*. When Li Jie prescribed the proportions for interior space in buildings, he included standardized instructions for how the *dou gong* brackets were to be used. The

dou gong bracket resembles a Chinese puzzle box; its central core has upward-curving braces with grooves in their ends in which rest longer braces that also extend from the core and which may brace still longer braces. Thus, the *dou gong* bracket allowed great weight to be brought inward to the post on which it rested in an aesthetically pleasing way. The medieval Chinese decorated these brackets with bright colors, calling attention to their graceful form. By altering the height and width of *dou gong* brackets, an architect could design gracefully curving roofs, undulating roofs, or even gables.

When people think of Chinese architecture, they often think of pagodas, which are tall towers built to honor the Buddha. These towers derived from Indian structures symbolizing mountains, and in China they represented the climb from mortal existence to spiritual enlightenment. A typical pagoda was hollow inside, with a large statue of the Buddha occupying the interior. Some pagodas had separate floors going up, with windows with statues of the Buddha gazing benignly out, usually to the west, north, east, and south. Pagodas often were built at the northern edges of towns, where they blocked the passage of evil spirits that came from the north. They were built most often of wood but also of stone or brick. Perhaps the oldest brick building in China is the Song Yue pagoda, which was built in 523. Stone pagodas such as the twin pagodas at the Guiyuan temple (in Quanzhou, from the 1200s) were often built to resemble wooden ones and therefore preserve the sloping eaves and load-bearing posts of the wooden structures. The oldest standing wooden pagoda in China is Yingxian (near Datong, Shanxi Province), which was built in 1056. It has survived numerous earthquakes, some of which flattened all other buildings nearby, attesting to the soundness of its design. At 183 feet tall, it remains an architectural tour de force, featuring numerous variations in its structure, including 56 varieties of *dou gong* brackets.

JAPAN

Little is known of the everyday architecture of Japanese houses at the start of the medieval era. Archaeological digs on the island of Honshu have revealed circular pits that were the bottoms of round houses that developed around 300 to 200 B.C.E. and remained common into the medieval era. On the island of Kyushu houses may have been oval. Postholes suggest that these houses had walls of wood; the nature of their roofs has been open to speculation, with some archaeologists and artists suggesting that they were thatched. A typical Japanese farming village had one or more storage houses. These were set on wooden stilts, probably to keep out rodents. They had wooden floors and wooden steps leading to a doorway, and they may have had pitched roofs for shedding rainwater.

It is not known when Chinese architecture began influencing Japanese architecture; the influence probably was transmitted by immigrants from Korea. Before 800 C.E. Japanese architecture became divided into three types: one employed for commoners, one for the aristocracy and temples, and one for fortresses. For aristocrats the style *shinden-zukuri* developed. A *shinden* was a central hall, and rooms in buildings in the *shinden-zukuri* style were built around the central hall. The rooms were expected to be symmetrical.

In the 1000s Japanese architecture began to change with the rise in power of the samurai, who ushered in the *shoin-zukuri* style. A building in this style could in theory be enlarged forever, if space allowed. Such buildings were asymmetrical, with rooms and exterior gardens sometimes interweaving, since one goal of the architects was to have as many rooms as possible look out on gardens. Roofs stretched far beyond the walls, and multistoried buildings would have verandas that provided shelter for people walking below. Among lakeside homes, verandas extended over the water and were called “fishing galleries.”

Out of the *shoin-zukuri* style emerged the distinctive Japanese national style of architecture, as influenced by Chinese architecture but reflecting Japanese needs and tastes. The Chinese-style roof persisted throughout the medieval era, but the Japanese modified it: The roof was peaked, but its eaves flared outward from the sides, such that the A-shaped central frame seemed to rise out of the roof. On a two-story building, upper eaves would flare out over second-floor windows; below these windows a lower set of eaves, as if a second roof, would flare out even farther from the wall and carry rainwater far from the side of the house.

Prior to 700 Japanese architects had developed structures that could be quickly built and also quickly dismantled and moved, as monarchs tended to move their palaces from city to city. The establishment of Nara as the capital city in 710 may have put an end to the practice of dismantling and reerecting palaces, but the skills learned from finding ways to simplify a building's structure to make it easy to reconstruct became part of the *shoin-zukuri* style, resulting in the modular approach to Japanese architecture. The basic module was about 6 feet by 3 feet, and floor plans would be worked out in multiples of the basic module, allowing for remarkable versatility in interior designs. One area could be raised higher than the rest of the floor and would be the sleeping area. A module could be designated for storage and become a sort of fitted cupboard—a set of drawers that functioned like a dresser.

Buddhist households often displayed religious pictures over their dining tables, and this became part of Japanese architecture in the form of the *tokonoma*, a recess in a wall specially made to display a picture, often secular. Interior walls

of paper were set into runners and could be slid into configurations that allowed for privacy or for a large space for entertaining guests. Like Chinese buildings, Japanese ones relied on posts and lintels to bear the structure's weight, allowing outer walls to be light. The outer walls were usually made of latticework bamboo plastered with mud and straw.

The islands of Japan were very heavily wooded in medieval times, making wood a favored building material. Many regions of Japan lacked stone suitable for building, making its use for ordinary structures rare, but stone was used in fortresses. Granite was often used for the bottom floors of the fortress, with the stone blocks carefully dressed to fit neatly together. The stone walls curved slightly inward as they rose, a design intended to help the fortress flex during earthquakes. Atop the stone levels would be wooden structures that were vulnerable to fire but hard to reach because attackers would have to climb the stone walls to reach them. A moat frequently was dug around the fortress.

KOREA

Not much is known about the indigenous architecture of the Koreans, largely because wars destroyed most of what had been built. The medieval Koreans were heavily influenced by Chinese architecture. In the Bo-Hyan-Su Temple, located in the Diamond Mountains of Korea, the still surviving Chil-Song-Gak, meaning “Hall of the Pleiades,” is a fine example of how Koreans adapted Chinese architecture. Built in the 600s, Chil-Song-Gak features heavy tree trunks as the posts of its corners, with a post-and-lintel frame. The roof uses the same trabeated pyramid structure found in medieval Chinese buildings, with cedar columns used to help bear some of the load. During the medieval era the Koreans elaborated on the basic structure found in Chil-Song-Gak. They set the posts in bronze or stone, which was often carved decoratively, and the posts and lintels were painted. Exteriors, especially eaves, were carved into figures and lacquered. Perhaps to enhance a building's ability to flex in bad weather or during earthquakes, the Koreans typically placed two lintels instead of one over the tops of posts.

CENTRAL AND NORTHERN ASIA

Cities along the routes of trade between China and regions west featured houses of stone and brick. They tended to be square or rectangular and show influences from ancient Greece, the Middle East, and China. How the houses were built and what purposes they served have yet to be determined by researchers.

Many people of central Asia and Siberia were nomads. They developed a flexible and portable structure called a yurt. A yurt is a circular shelter that can vary in size according to

how many sections of latticework are used in the walls. It was designed for portability and for ease of setup and takedown. The walls of the typical medieval yurt consisted of light wooden lattices, while the roof was composed of wooden ribs that were lashed to the wall. The lattices folded into small, lightweight sections; the heaviest part was usually the door, which was made of solid wood and fit into a light rectangular frame in the wall. Thick felt mats covered the whole structure; several layers of felt mats might be used, as the interior had to be kept warm even when outside temperatures dropped to 40 degrees below zero. The yurt was sturdy enough to endure severe windstorms.

INDIA

Most Indian structures of the medieval era were made of wood, which has proved problematic for modern researchers into India's architecture: Much of India is very humid and subject to frequent rainfall, contributing to the decay of wood. Further, India's territories were invaded repeatedly by Islamic bandits and sometimes by armies, and the invaders objected to the Indian inclination to decorate buildings with images of their deities. Thus, beginning in the 1100s entire palaces and cities of wood were burned to the ground, destroying most

of India's architecture. By the end of the medieval era few wooden structures remained untouched. As a result, historians have only a skewed view of medieval Indian architecture: Stone buildings are what remain to represent the architecture of the period, yet stone buildings were the exception and not the rule in medieval Indian construction.

Some of the architecture of wooden buildings can be deduced from the surviving stone structures, from modern structures built using traditional methods, and from medieval writings about buildings. The writings of Indians and Chinese Buddhist pilgrims tell of buildings rich in art. Even modest wooden walls would be carved with images of animals, plants, benevolent spirits, and gods and goddesses. Indian architects believed that no building was complete without images of women on it. Cities featured buildings of two stories or more, and people could watch city life from their upper windows. The wooden palaces were said to be spectacularly beautiful, with open courtyards surrounded by gardens and brightly decorated walls.

Among the world's most spectacular medieval structures were the cave temples and monasteries of India. The practice of carving whole temples out of solid rock seems to have begun in southern India in the ancient period. In the Deccan Plateau



The Mosque of Delhi and the Iron Pillar; *watercolor on paper, India, 13th century* (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)



Model of Muhafiz Khan's mosque (India, 1492) in Ahmedabad; artist rendering dating to 1838 (Los Angeles County Museum of Art, gift of the Ancient Art Council, Photograph © 2006 Museum Associates/LACMA)

of the south, Hindu temples were carved into solid granite. A curious feature of India's cave structures is that they were usually carved to resemble wooden buildings. Some even had actual wood installed in their ceilings to appear to be rafters. From these hints found in stone structures, scholars have deduced that medieval Indian architects used the post-and-lintel design for bearing weight, which suggests that their walls were free to be light. In southern India walls may have been left entirely open, to allow cooling air to circulate.

Some historians believe that two national architectural styles developed in India, one northern and one southern. The southern style of medieval India seems to have been lighter, favoring walls that had many openings; the northern style is thought to have been heavier, emphasizing thick walls and presenting a solid, earth-heavy image. Most of the surviving buildings are temples composed of stone, although brickwork was sometimes used, especially for stupas; a stupa was a hemispherical mound of dirt that was overlaid with bricks, within which were relics of the Buddha. These structures were first built soon after the Buddha left mortal life, and they

were refined over centuries. By the medieval era the grounds surrounding a stupa might feature four gates decorated with sculptures. Images would be arranged around the stupa so that visitors could circle clockwise and see the progress of the Buddha's life.

The major religions of medieval India—Hinduism, Buddhism, and Jainism—saw the cosmos as a vast ocean out of which arose the world. At the center of the world was a mountain, at the top of which were the chief deities, and at the bottom of which lived human beings. Thus, the Indians built tall towers that were intended to represent mountains. These towers would be decorated with sculptures representing the many deities of the cosmos or, in the case of Buddhism, representing the ascension from mortality to full enlightenment. In southern India temple complexes often included *gopuras*, gate towers soaring several stories high.

The architectural marvels of India were widely influential. In Burma more than 13,000 mountain-temples were built. These temples were made of brick and covered by plaster, which, when dry, was painted with spiritual images. In Sri Lanka magnificent stupas were built, as were Buddhist monasteries of stone and wood, imitating Indian styles.

SOUTHEAST ASIA

Most Southeast Asians were farmers and lived in villages in buildings somewhat similar to ones also found in Indonesia. The longhouse seems to have been common. Raised on stilts, it could be over 100 feet long and was one long interior room in which several families would live. Sleeping, lovemaking, and crafts such as weaving took place inside. Floors were wooden planks; the walls could be wooden or composed of bamboo latticework.

Most of what is known about medieval Southeast Asian architecture derives from its impressive temples and palaces, which were usually modeled after Indian architecture. Along the Mekong River are scattered remains of the Funan kingdom, which arose in the 200s, including stone temples decorated with Hindu images. Early in the seventh century Funan was overthrown by the vassal state of Chenla, which was ruled by the Khmer.

The Khmer built some of the world's most beautiful buildings; they attempted to impose a cosmic order on the undisciplined rain forest of what is now Cambodia. Although Angkor Wat, a temple found in Angkor, is the most famous of their structures, it is but one among hundreds of impressive buildings set on mountains and in valleys. The word *Angkor* roughly translates as "capital city," and *Angkor Wat* means "temple of the capital city." The temple was built just outside the walls that encompassed a vast city and palace. Construction began in the 1100s, as overseen by Hindu kings who not

only sought to demonstrate their power and impress people by building huge monuments but also wanted their capital city to reflect the order of the cosmos. Accordingly, the architects of Angkor designed towers that imitated the towers in India that represented mountains, atop which dwelled the god Brahma. Around these structures were situated reservoirs of water that had profound symbolic importance, as they represented the primordial cosmic sea out of which life arose.

The temples and palaces built by the Khmer were designed like stacks of ever-narrowing blocks, with ledges intended to hold statues of deities and of spirits. When the royal family converted to Buddhism, large blocks of stone with the face of Buddha carved on them were added to the sides of structures, often covering ledges, doorways, and windows. In Angkor Wat the effect was such that visitors might have felt as if the Buddha were watching over every place benevolently from every direction. Almost all of that temple was originally built with precisely cut stone and without the use of mortar, and the careful working of the masonry remains impressive in modern times.

Despite all their skill in designing impressive stone buildings, the architects of Angkor were not skilled in building them to weather the years. At first, foundations of stone rubble and sand were used, allowing the easy fashioning of level surfaces on which to rest buildings. Rainwater penetrated the sands, however, causing foundations to shift and walls and towers to collapse. In efforts to build stronger foundations, they hollowed out foundation stones, placed tree trunks inside them, and fitted additional hollowed stones over them; on these stones they set their buildings. The humid climate caused the tree trunks to rot, however, and from time to time entire walls of masonry would slide down. Sometimes the faces of the Buddha would drop. The buildings required constant repair.

INDONESIA

The Indonesian archipelago is composed of thousands of islands with many cultures, some very remote from the rest of the world. All seem to have in common the building of structures with wood. In medieval times two kinds of structures predominated: the longhouse and the boat-shaped or saddle-shaped house. The longhouse was usually built lengthwise beside a stream or river. It rested on pillars of wood, keeping it above seasonal floodwaters. On the side by the stream was a veranda of wooden planks, on which people fished, prepared food, and sometimes practiced their crafts. The interior was one long room enclosed by walls of wood or woven branches. The roof was a wooden frame covered by leaves that was usually pitched to shed rain, with the eaves overhanging the veranda. Sometimes communities of several families lived in-

side one longhouse, sometimes so deep in the rain forest that a hike of several days would be required to reach the island's edge or other people.

The boat-shaped house was deliberately constructed to resemble a boat and symbolized a community's connection to the ocean. It was built on wooden stilts, partly to place it above floodwaters and partly to allow the structure to sway rather than break during earthquakes. The boat-shaped house usually had no door on its sides; instead, a trapdoor could be found in the floor near one end of the house, with the residents using a ladder to climb in and out of the house. Typically, walls were wooden boards. In Sumatra roofs were clad with wooden shingles; in Sulawesi the roofs tended to have a more exaggerated sway and were covered by thatch. The walls of Sulawesi houses tended to be made of bamboo. This kind of house was particularly favored by farmers and is still common on the island of Sumatra in the northern mountains and in Batak country.

Building with stone was uncommon on the islands of Indonesia. When Hinduism and later Buddhism reached the region, converts to the new religions built stone monuments in imitation of those built in India and on the South-east Asian mainland. The most impressive of the monuments still standing is Borobudur, in central Java, on the Kedu Plain, built in the 800s. A towering structure symbolizing the climb from mortal existence to spiritual freedom, it was constructed of unmortared stone. It was a flawed masterpiece, with too much pressure pushing the walls outward, and the walls indeed buckled over time, owing also to the foundation shifting from the effects of rain and earthquakes. Yet Borobudur never collapsed, despite outward signs that it would. The stones had been fitted together with stone mortises and tenons, which took a long time to decay; moreover, the stones had been locked together with iron joints, and when the walls buckled, the added pressure served to lock the joints more firmly into place. Much of the structure held together until repairs were made in 1907 and then in 1982.

OCEANIA

Oceania is a vast region encompassing many different styles of building reflecting environmental needs as well as cultural tastes. In Australia people built huts. These huts consisted of frames of wooden branches tied together with roots and walls and roofs of reeds strapped in place by roots. This sort of structure was used by people who did most of their living outside, using shelters only for sleep and protection from the elements. Similar huts were to be found throughout much of Oceania.

The people of the islands of Oceania were often dependent on the ocean for survival, so, as in Indonesia, some of

them developed houses shaped like boats. These structures are still to be found in New Guinea, for example. Tree trunks were used for the posts of the frame, and floors of wooden planks were hung on the posts. The main floor may have been raised above the ground or may have been the ground itself. The roof swayed in the middle and rose to peaks at each end, probably consisting of branches and thatch woven together. These houses, too, were often no more than shelters from rain and therefore lacked walls. Circular houses were common throughout Oceania. Walls were made of wood and bark; roofs were peaked in the center, with branches or saplings radiating out to the edge, as covered by palm leaves or bark.

The people in many parts of Oceania, including the Philippines and Samoa, were capable of constructing spectacular buildings with cavernous interiors, usually for community meetings or as places of worship. The frames of such buildings consisted of bamboo poles that were bent inward and lashed together, while the walls were made of wood. The roofs would be built on the ground and then raised onto the structure. In New Guinea structures six stories high and 120 feet long still survive.

EUROPE

BY MICHAEL J. O'NEAL

At the beginning of the medieval period, corresponding with the fall of the Roman Empire in the late fifth century, northern and western Europe did not have the same extensive architectural tradition that could be found in much of the rest of the world, especially the Mediterranean (in places such as Rome and Greece), the Near East, and parts of Asia. Throughout the medieval period northern, western, and eastern Europe developed traditions in domestic architecture, including the castle, which served as both a home and a fortress. Additionally, ecclesiastical (that is, church related) architecture became important, particularly in early-medieval Ireland. In about the fifth century Christianity came to Ireland. Beginning in the sixth century a large number of monasteries were built and became centers of learning and spirituality. These monasteries were erected on sacred sites and most often were associated with a water well. A good example is Saint Brigid's Well, which still exists on a site near Kildare, Ireland, where Brigid (452–524) had a monastery built. Additionally, these monasteries were built in connection with ancient burial grounds. These enclosed burial grounds were usually round, representing a circle, and they were positioned in such a way that at the winter solstice the sun shone into them. The monasteries themselves were also generally circular.

Another common architectural feature of the Irish monastery was the bell tower. These towers frequently were used

as a place of refuge when the community came under attack. However, their significance was primarily spiritual. A common height was seven stories, the number 7 representing the sum of 4 + 3. The number 4 was significant as representing the four cardinal directions, and typically such towers had four windows, one each facing north, south, east, and west. The number 3 represented the Trinity of God the Father, God the Son, and God the Holy Spirit. By adding these numbers together, early Irish Christian architects believed that they were capturing in stone the perfection of God's creation.

Another common architectural achievement that survives from medieval Ireland is the High Cross. About 60 such crosses remain intact, and fragments from at least 100 others have been found. While some of these crosses, such as the one at the monastery of Saint Kevin (d. ca. 618) in Glendalough, County Wicklow, Ireland, are plain, many are highly ornamented. Some are referred to as scriptural crosses because carved on them are depictions of important events in Christianity, such as the crucifixion of Christ. One of the best examples of a scriptural cross is the High Cross of Muiredach at Monasterboice.

Primarily under the influence of the Catholic Church, ecclesiastical architecture began to spread throughout Europe. After the Roman Empire fell, the city of Rome remained an important center of influence, prestige, education, literacy, and wealth because it remained the headquarters of the Catholic Church in western Europe. To Europeans, from peasants to nobles, it was the pope, not a civic ruler, who could determine the fate of a person's immortal soul, so the pope wielded considerable power. In eastern Europe the Eastern Orthodox Church, the other main branch of Catholicism, held equal sway and exerted its architectural influence even into the eastern portions of western Europe in places such as Vienna, Austria. The result was that the Church had a profound influence over the architecture of medieval Europe. Additionally, Islam made major inroads into southern Europe, particularly Spain, and the influence of Islamic architectural styles can still be seen there in such buildings as the Salamanca Cathedral.

These cathedrals, churches, and monasteries were vital to the community. Their immensity provided a place where all the members of the community could gather under one roof, and they were homes for priests, nuns, and scholars. Monasteries and nunneries served as places of refuge and as way stations for travelers. They functioned as educational centers and libraries. They were places where relics and holy objects could be stored, preserved, and protected. They educated peasants and the illiterate about the doctrines of the church; their statues, paintings, carvings, and stained-glass windows, at a time before books became more widely available, made available pictures of saints, martyrs, the life and

THE HAGIA SOPHIA

The Hagia Sophia in Istanbul (at the time called Constantinople), Turkey, was arguably the greatest of the early medieval Byzantine churches. It is popularly believed that the church was named after a Saint Sophia, but in fact the name comes from the Greek and means “Church of the Holy Wisdom of God” (*sophia* being the Greek word for “wisdom”). Amazingly, given its immensity, the church was built in just five years, from 532 to 537. It was erected under the orders of Emperor Justinian I, so it uses many Roman building techniques. The architect was the physicist Isidore of Miletus, though Justinian had appointed a second architect who died just a year later.

The most prominent architectural feature of the Hagia Sophia is its large central dome, which spans 104.6 feet and rises to a height of 182 feet. The dome collapsed during an earthquake in 558, but its reconstruction was completed in 562. Another earthquake struck in 989, and once again the dome had to be reconstructed. Viewers are struck by the apparent weightlessness of the dome, which appears to be supported by a continuous circle of arched windows, allowing the interior to be flooded with light. The circular dome, though, rises over a rectangular base. This posed a problem for the architect, who solved it by supporting the dome on what are called pendentives. A pendentive is a triangular segment of a sphere. At the bottom, it tapers to a point. At the top, it projects outward. The tops of the four pendentives of the Hagia Sophia spread outward to form a continuous support for the dome, transferring the weight of the dome to four massive piers at the corners of the base.

The entrance to the Hagia Sophia is at the western end. Liturgical services took place at the eastern end. At the eastern end one of the arched openings is extended outward by half domes, which in turn are supported by a series of exedras. An exedra is itself a domelike structure that forms a recess in a building’s facade. Thus, the Hagia Sophia gives the impression of a hierarchy of domes, a feature unique in medieval architecture. While the outside of the building is faced in relatively plain stucco, the inside surfaces are covered with gold, marble, green and white porphyry, and intricate mosaics.

The Hagia Sophia originally served as the seat of the patriarch of Constantinople, the head of the Eastern Orthodox Church. In the 13th century it served briefly as a Roman Catholic cathedral. But in 1453 the Turks conquered Constantinople and immediately made the building into an Islamic mosque. In 1935 the first president of the modern republic of Turkey, Mustafa Kemal Atatürk, converted the Hagia Sophia into a museum.

death of Christ, and even the torments that waited in hell for sinners. Perhaps just as important, they served as focal points for the prestige and power of a local prince, duke, or other ruler, who competed with his neighbors to see who could finance the most magnificent church. They were living, vital parts of the community.

MEDIEVAL ARCHITECTS

Until about the middle of the 11th century, the architects who designed and oversaw the construction of buildings, particularly churches, were largely monks and priests. After that time, though, the buildings became more elaborate and complex, so a professional class of architects was employed. These men were not called architects; that term did not come into use until about the 16th century. Rather, they were called master builders, indicating that their training and experience were in construction and stone masonry.

Early on, these masons took part in the physical work of building. Later, though, they functioned more as overseers, submitting plans, supervising budgets, obtaining building

materials, organizing labor, drawing up contracts, and directing the work of artisan guilds that in turn oversaw the actual work of construction. The role of the priests, monks, and bishops at this point became that of finding a site and raising funds, often by selling indulgences to the faithful—that is, release from the torments of Purgatory after death. Unskilled labor was provided by serfs, hired workers, and in some cases by conscription; that is, bishops exploited their spiritual authority to force people to provide labor.

Historians know the names of many of these master builders. In some cases, their names remain inscribed on the buildings whose construction they oversaw. One of the most famous of these medieval architects was Villard de Honnecourt (ca. 1225–ca. 1250), a master builder who lived in northern France. He is best known for his sketchbook, compiled possibly in the 1230s. As he traveled about Europe, he visited construction sites and made sketches of the architectural features and building techniques he saw. His sketchbook remains a valuable resource for scholars interested in the techniques builders used in the 13th century.

TYPES OF MEDIEVAL ARCHITECTURE

Two major types of architecture flourished in medieval Europe. The first is called Romanesque, a name that suggests its roots in the architectural styles of the Roman Empire. This type of architecture was especially prominent in the 11th century. The related Norman style, which originated in Normandy, a region on the northwest coast of France, also became prominent during the 11th century, primarily in England. Scholars regard English Norman architecture as essentially the English version of Romanesque.

But the form of architecture that remains most associated with the European Middle Ages is the second style, called Gothic, which underwent an enormous flowering beginning in the 12th century, specifically between 1137 and 1144 with the rebuilding of the royal Abbey of Saint-Denis by the abbot Suger (1081–1151). Interestingly, some Gothic buildings have characteristics of both the Romanesque and the Gothic—and even of later styles—principally because they took so long to construct that architectural styles changed over the generations. Some buildings have combinations of styles because they later needed to be expanded or because they were damaged and parts needed to be rebuilt.

Medieval Europeans did not use the term *Romanesque*. This term came into vogue in about the 18th century, when historians first began to study and classify the types of architecture they observed in Europe. They noticed that much of Europe's early architecture bore strong similarities to the architecture of ancient Rome. Because the Roman Empire had exerted its influence through large portions of Europe, especially Italy, France, England, and parts of eastern Europe, its architectural influence remained behind, to germinate and grow some five centuries later. Hence, historians coined the term.

Romanesque architecture was the direct result of the explosive expansion of the Catholic Church. During this era a large number of religious orders were founded. These religious orders, including the Cistercians, the Cluniacs, and the Carthusians, constructed monasteries to house their members. The result was a concentration of religious communities that spurred a building boom. Their chief characteristic was that their floor plan was in the form of a cross, symbolic of the cross on which Christ died. Running down the center of the building was a nave—the long, central aisle of a church—with aisles on each side. Projecting from the nave was an apse, or a semicircular portion with a vaulted ceiling that typically provided a “stage” for the choir. If the nave can be thought of as running north–south, the portion of the building called the transept ran east–west, completing the cross design.

If later Gothic architecture is said to “soar,” Romanesque architecture is sometimes said to “squat” because of a num-

ber of characteristics. First, instead of the pointed arch of the later Gothic, Romanesque architecture used rounded arches, usually semicircular, made of stone. The disadvantage of this type of arch is that it has a tendency to push supporting walls outward, so it requires a great deal of supporting stonework. Sometimes the supporting walls are as much as 10 feet thick. This feature gives buildings with rounded arches a somewhat squatter, less elegant look.

Second, these buildings often featured barrel vaults, sometimes called tunnel vaults. A barrel vault essentially takes a semicircular arch and extrudes it horizontally, creating what looks like the semicircular half of a barrel lying on its side. Again, the problem is a tendency to push the supporting walls outward, so once again the walls supporting these vaults are extremely thick. An alternative, though, was to make use of groin vaults, an architectural feature produced by the horizontal intersection of two barrel vaults at right angles. This concentrated the downward and outward thrust at the “groins,” sometimes called “arrises,” which are the four diagonal edges where the barrel vaults intersect. Groin vaults then can be supported by pillars rather than thick walls.

Finally, Romanesque buildings used cruciform piers. The word *cruciform* means “cross shaped,” and a pier is a vertical support, like a post. While the cross section of a pier can take any shape, typically it is square or rectangular, reflecting the shape of the stone blocks that are stacked to form the pier. In Romanesque buildings they took the shape of a fat cross. Piers were stronger than simple rounded columns, though once again they were not as elegant. A common practice was to alternate the two forms of support in a row down the side of a building: a pier and then a column or sometimes two or three piers and then a column.

Romanesque buildings were made with local stone that in itself was not always very attractive. Marble was more attractive, but it was scarce, particularly in France. To compensate, many Romanesque buildings have a profusion of sculpture: statues, relief work, carvings, and the like, all designed to enhance the building's aesthetic appeal. Poorer communities might not have been able to afford such sculpture, so the buildings were much plainer in appearance.

Examples of Romanesque architecture, or at least of architecture that reflects the Romanesque style, can be found all over Europe. Numerous examples can be seen in France, including the abbey church at Cluny and Notre-Dame-la-Grande in Poitiers. The Romanesque style was especially popular in Spain, with noteworthy examples including the church of Saint Clement in Catalonia, the monastery of Santo Domingo de Silos, and the church of Santiago de Compostela. In Germany, the Schottenkirche in Regensburg was built in the Romanesque style, as was Saint Mary Magdalene Church

in Wrocław, Poland. These, however, are just a handful of the hundreds of Romanesque buildings that can be found in these countries as well as in Italy, Portugal, Austria, the Netherlands, and the Czech Republic.

Norman architecture in many respects was not a distinct style but rather an offshoot of the Romanesque, and some architectural historians regard Romanesque and Norman architecture as essentially the same. In 1042 Edward the Confessor became king of England. Edward had spent much of his early life in Normandy, France, so he and his court brought with them many French customs and influences. It was Edward who began construction of the famous Westminster Abbey in London, a building that now reflects the later Gothic style. Then, in 1066, William the Conqueror invaded and subdued England and was crowned king on Christmas Day that year. William, too, was from Normandy, so the Norman influence on English architecture was cemented during his reign and that of his successors.

William appropriated much of the wealth of the English nobles and turned it over to the church. The result was what amounted to almost a building frenzy in England, as English bishops tried to outdo one another in the magnificence of their buildings. At the same time, the English nobles tried to match the bishops in a frenzy of castle building. About the nobles, the contemporary historian William of Malmesbury (ca. 1080/1095–ca. 1143), in his *Gesta regum Anglorum* (Chronicle of the Kings of England) wrote: “Nearly all tried to rival one another in sumptuous buildings in the Norman style, for the nobles felt that day lost which they had not celebrated with some deed of magnificence.”

Norman architecture was similar in many important respects to Romanesque architecture. It featured rounded arches, barrel vaults, thick piers, and massive walls, though sometimes the walls were not as thick as those of continental buildings because the ceilings they supported were made of lighter-weight wood rather than stone. Also, because of England’s damp climate, Norman-style buildings did not feature much in the way of external carving and sculpture, for builders feared it would rapidly deteriorate in the damp.

Modern historians of architecture can find only distant echoes of the Norman style. The reason is that most Norman buildings later underwent remodeling in the Gothic style. Thus, for example, rounded Romanesque arches were replaced by pointed Gothic arches. In many cases only the original Norman floor plan remains. The only pure Norman building remaining in England is the cathedral at Durham, begun in 1093. This cathedral, though, was just one of many that were built in the Norman style but later altered. Others, with the date construction began, are identified only by their location and include York Minster (1075), Saint Alban’s



Capital with figures representing Luxury and Lust; yellow sandstone, Spain, ca. 1175–ca. 1200 (Los Angeles County Museum of Art, William Randolph Hearst Collection, Photograph © 2006 Museum Associates/LACMA)

Abbey (1075), Ely Cathedral (1081), the cathedral at Rochester (1083), the cathedral at Worcester (1084), Old Saint Paul’s (1087), Gloucester (1089), Norwich (1096), Chichester (1100), Tewkesbury (1103), Exeter (1112), Peterborough (1116), Ramsey Abbey (1120), Fountains Abbey (1140), and Saint David’s in Wales (1176).

The term *Gothic* was originally coined during the Renaissance and used as a pejorative. The word is a reference to the Goths, one of the “barbaric” tribes of northern Europe, and it was first used in the sixteenth century to refer to anything regarded as crude. It has nothing to do, though, with the Goths themselves. Applied to architecture, it suggested something crude and barbaric. In the 19th century, though, interest in Gothic architecture revived, and art historians, critics, and the public began to regard it more favorably.

Gothic architecture, like Romanesque architecture before it, can be found all over Europe, as architects and builders traveled about and shared their techniques with one another. The Gothic, though, is especially associated with France, and no tourist to France, particularly to Paris and its environs, is likely to miss two of the most magnificent examples of Gothic architecture, the cathedral at Chartres and the Notre-Dame cathedral in Paris itself. Other noteworthy Gothic buildings include Westminster Abbey in London, the Salisbury Cathedral in England, the Strasbourg Cathedral in France, the multicolored Siena Cathedral in Italy, and the Spanish cathedrals in Salamanca and Santiago de Compostela.

Historians of architecture often divide Gothic architecture into variations, which emerged as the Gothic style devel-

oped. In France, for example, distinctions are made between Early Gothic (exemplified by the west facade of the cathedral at Chartres), the High Gothic (as in Notre-Dame in Paris), the Rayonnant style (seen in the Abbey Church of Saint-Denis outside Paris, where nearly every French king was buried), and the Late Gothic (for example, the north tower of the cathedral at Chartres). “Rayonnant” refers to a style that placed a great deal of emphasis on light and large windows, the name suggesting “rays” of the sun. Similar distinctions are made in reference to the Gothic architecture of other European nations. It should be noted that while the term *Gothic* tends to be applied widely to churches and cathedrals, secular (that is, nonreligious) buildings were also constructed in the Gothic style or at least had some of the features of the Gothic.

The chief feature of Gothic architecture, one that virtually defines the style, is the pointed arch, often called an ogive, a word used to refer to any curved feature, figure, or shape. The pointed arch had two purposes, one religious and one technological. The religious purpose was to create a sense of the building pointing toward heaven. The technological purpose was to redistribute the weight of the building. The disadvantage of Romanesque architecture was that rounded arches tended to push outward on the supporting walls, requiring thick walls and piers to support them. The pointed arch directed the weight straight downward rather than out, allowing architects to design buildings with less massive walls and thinner supports, which then could be elaborately decorated. The pointed arch was used not only for roofs and ceilings but also over doors, windows, and any other feature where an arch was needed over an opening.

The pointed arch led to a number of other architectural innovations. First, buildings could be built more vertically. This again gave them a sense of “soaring” toward heaven, in contrast to the squatter buildings of the Romanesque. Because the roof’s weight was directed downward, ceilings could be built with ribbed vaults—or vaults that had visible supports similar to a ribcage, creating the naturalism that 19th-century British art historian John Ruskin described as giving people below a sense that they were walking under the overarching branches of trees. Again because of the distribution of weight, a considerable amount of glass could be used. Often, this glass was elaborately stained; the rose window at the Cathedral at Chartres, one of the most magnificent stained-glass windows in the world, is perhaps the best example.

Yet another feature that for many almost defines Gothic architecture is the flying buttress, in French called the *arc-boutant*. A buttress is any structure built against a wall or projecting from it to reinforce the wall. A flying buttress is used to direct the thrust of a vault across an interior space, such as a chapel, an aisle, or a cloister, and out to the exterior

of the building and into the ground. A chief advantage of a flying buttress is that it allows more open space on walls for windows and ornamentation. Otherwise, these open areas would severely weaken the walls.

Some Gothic architecture is plain and has a relatively simple design. Most Gothic architecture, though, is highly ornamented and decorated. Different colored stone could be used to create stripes and other visual features; perhaps the most noteworthy example is the cathedral in Florence, Italy, with its alternating green and white stripes. Niches overflowed with statuary, especially gargoyles. Gargoyles were carved in the shape of grotesque human or animal figures, most with a frightening aspect. The word comes from the French *gargouille*, meaning “throat” and referring to the gurgling sound, like “gargling,” of water as it passes through a drain. The term was used because many gargoyles were used as ornaments at the mouths of water drains. Strictly speaking, a gargoyle is a waterspout, but the word has come to encompass any kind of grotesque, fantastic carving of a human or animal. In the medieval imagination gargoyles warded off evil spirits.

MEDIEVAL DOMESTIC ARCHITECTURE

Domestic architecture throughout Europe was varied, depending on climate conditions and, particularly, the availability of building materials. Thus, for example, medieval England had a considerable supply of oak, so oak beams were cut from logs. In parts of eastern Europe such as Romania, hardwood was in short supply, so entire logs, usually of pine, were used in home construction.

Two types of homes, however, stand out and can be found, with variations, throughout Europe. One is the cottage constructed of daub and wattle, often with a thatched roof. The other is the half-timbered building. Both of these types of homes can still be seen in Europe. A person standing in a village in France, Germany, or England can touch the wood beams used in half-timbered homes constructed centuries ago. While few wattle-and-daub homes have survived the elements over the centuries, many modern homebuilders use medieval construction techniques to create similar historical homes, complete with thatched roofs. In England roof thatching remains a skill for which modern homeowners pay a considerable sum of money.

Typically, wattle-and-daub homes were built over a frame of hardwood, such as poplar. This hardwood skeleton gave the homes strength and a measure of durability over the years. The next step was to fill in the walls with panels made of woven staves, usually made with a hardwood such as oak. These panels looked very similar to the lattice that many modern homeowners put around the bottoms of outdoor decks and

porches. These panels were then covered with daub, a plasterlike substance usually made of subsoil mixed with straw. The daub was spread over the staves of the panel to fill in the wall. The home, then, was covered with a thatched roof. Typically, the thatch was made of a material such as wheat straw. To modern people, thatched roofs do not seem capable of keeping out the rain, but in fact they did a reasonably good job. The straw channeled the water downward over the eaves, and the roofs were so thick—often more than a foot—that the interior stayed dry. The biggest problem with thatched roofs was, and still is, birds and pests.

In some respects, half-timbered homes were similar to wattle-and-daub homes. The main difference is that the timbers show on the exterior of the building. Typically, in this kind of construction a square timber was cut out of a log. These timbers provided the framework for the house. They were generally made of oak, so they were extremely durable, and many such homes survive throughout Europe. The spaces between the timbers were filled with lattice and covered with plaster, similar to daub and wattle. Over time the oak timbers weathered and aged, turning very dark brown, almost black. The contrast between the dark timbers and the white plaster still creates a striking effect.

A peculiar feature of many half-timbered houses is that the second story often projects out over the first story, often by several feet. The reasons for this were twofold. One is that people were taxed on the basis of the amount of footage the house occupied along the street. To minimize footage, half-timbered houses tended to be very narrow. The projecting upper story, which was not taxed, provided additional room. The second reason is that the projecting upper story protected the lower story from rain and snow.

CASTLES

Of course, not all Europeans lived in these kinds of ordinary homes. Noblemen and their families often lived in castles, primarily as a form of protection. Until the time of William the Conqueror most European castles were built on high ground out of wood, but wood had the disadvantage of being flammable, so many such castles were destroyed by invaders, who simply set them on fire. After that time stone was the favored material. Castles were not comfortable. They were cold and damp, and occupants lived in relative darkness because the windows were little more than slits.

The chief function of any medieval castle was defense. Surrounding a castle was a curtain wall, which was typically reinforced at strategic points. A sequence of gates also helped to deny entrance to invaders. Typically a drawbridge allowed access through the main entrance. The drawbridge and other gates were protected by machicolations, or openings in the

wall, from which projectiles could be rained down on invaders or from which boiling pitch could be poured. Battlements, or parapets at the top of the walls, were crenellated, meaning that there were regularly spaced gaps. These crenellations were decorative, but their main purpose was to provide protection for archers and other defenders, who could shoot from the openings, then duck behind the adjacent section of wall.

Within the walls of a castle was the keep, or a stronghold that provided refuge. Staircases were always spiral and ascended by winding to the right. Since most people are right-handed, most invaders carried their swords in the right hand, but because a staircase wound to the right, their ability to use their swords was impeded while defenders had more room to wield their swords. A watchtower not only enabled sentries to observe the movements of invaders but was also a sign of status. A castle's main place of entertainment was the great hall, called a *palas*. No castle would be complete without a chapel as well as interior gardens.

THE ISLAMIC WORLD

BY MOHAMMAD GHARIPOUR

ORIGINS

After the death of Prophet Muhammad, Islam was introduced in a vast geographical area that included lands from Spain to China. The architecture created after Islam, despite its regional variations, had common characteristics, such as multifunctionality, simplicity, invisibility, and transparency. In contrast to the surviving pre-Islamic monumental buildings, early Islamic buildings were simpler in design, were more climate oriented, and had more social qualities. The early buildings in this period were multifunctional places in which people could live, meet, and socialize. The origins of this idea could be found in the Prophet's mosque in Medina, which also served as a hostel for poor families and at the same time as a place for social gatherings.

Following the theory that form does not necessarily follow function, Muslims used prototype plans for buildings with different functions, such as the four-*iwan* plan, which was used in mosques, madrasas (colleges), hospitals, houses, and caravansaries. The concept of Allah as the only creator of the universe and the point of unity led to the idea of "internality" in architecture. In other words, this architecture, regardless of its function, has a high degree of invisibility, which improves the spirituality of the building. Moreover, the prohibition of the use of figurative forms in religious buildings led architects to use abstract forms and calligraphy as ornamentation inside and outside buildings. This new kind of decoration not only transferred transcendental meanings but

also attempted to define spaces and change spatial qualities. In addition, light was used as a metaphysical element to make buildings seem weightless and transparent.

EAST

The eastern boundaries of Islamic countries include regions from Iran (Persia), central Asia, and India. After the invasion of Persia by Arabs in 651, while several local governments ruled in different regions (contemporary to the Umayyads and the Abbasids), architectural developments experienced a hiatus of sorts. Through cultural changes within society, royal palaces were replaced by mosques, which were more communal and democratic. Stressing the inner concentration and excluding the outer world, the earliest mosques were built based on Sassanid concepts and techniques. Using local materials, techniques, and styles, architects decorated secular buildings with polychromed cut-stucco and intricate motifs. The first powerful dynasty in the Islamic world was the Seljuk Empire (1038–1194 in Iran and Syria and 1038–1307 in Anatolia), which spread from Syria to Transoxiana.

This age was the highest point of creativity in architectural concepts, forms, and techniques in Islamic Persia. The most important achievement of Seljuk architecture, which was later widely used as a model, was the four-*iwān* plan, which originated in Parthia as a prototype in the plans of religious buildings, such as Friday mosques at Qazvin (1113–15) and Ardestan (1180). The Seljuks developed the use of stucco, tiny fragments of tile (*moarraqh*), naked-brick architecture, polychrome, and geometrical forms in decoration. Moreover, despite using heavy material like brick, Seljuk architects attempted to lighten the domical mass both physically and visually. They also showed an interest in creating monumental portals (*pishtaq*), which were rectangular frames surrounding an arch. In Seljuk architecture in Anatolia, as opposed to the brick architecture of the Iranians and the Byzantines, the walls were made of rubble or rough stone and then faced with large blocks of beautifully dressed stone.

Although the invasion of Iran and central Asia by Genghis Khan (ca. 1162–1227) in 1218 caused serious destruction, his successors, the Ilkhanids, who were impressed by Persian civilization, were great patrons of art and architecture. The Ilkhanids' most important capital was Sultaniya (early 14th century), which was founded by Öljeitü (1280–1316). The only remaining building from this imperial city is Öljeitü's octagonal mausoleum, with its enormous dome and majestic scale. The Ilkhanids emphasized the verticality of the building by designing higher portal minarets, very tall portal arches, domes of immense size, and elongated panels, examples of which can be seen in Friday mosques in Varamin (1322) and Yazd (1442).

After the Ilkhanids, Timur (1336–1405) chose Samarqand as his capital and a center for artistic invention. He collected all the artisans of his empire in this city. Registan, Shah-i-Zinda, Gur-i Amir, and Ulugh Beg complexes in Samarqand are the best examples of this glorious age. Most Timurid buildings are impressive brick structures with glittering multicolored tile decorations on the exterior and inventive systems of plaster vaults of *muqarnas* (geometric decorations) on the interior.

WEST

The Umayyads (661–750), the successors of the prophet Muhammad, established their capital in Damascus and adopted Hellenistic and Sassanid architectural elements and concepts in their buildings. Umayyad mosques were square or rectangular plans that included a central courtyard and a hypostyle (with a roof resting on columns) prayer hall. The Umayyads used local materials, especially ashlar stone and brick on the exterior and marble in the interior of their mosques, such as the Great Mosque of Damascus (706) and the Al-Aqsa Mosque of Jerusalem (715). Constructed with stone and brick, such Umayyad palaces as Qusayr Amra (712–715) and Qasr al-Hayr (727–729) were square in plan with a central courtyard. Although the Umayyads' rule officially ended in 750, the so-called Umayyad architecture (in Spain) after this period refers to the patronage of the dynasty founded on the Iberian Peninsula by the Umayyad prince Abd ar-Rahman I (731–788), whose most important building was the Great Mosque of Córdoba, with a hypostyle hall of spolia (reused from former buildings) columns and capitals supporting arcades of horseshoe arches.

Supported by Persians who were frustrated with Arab rule, the Abbasid Dynasty (749–1258) seized political leadership from the Umayyad caliphs. The Abbasids, who moved the caliphal capital from Damascus to Baghdad, were highly influenced by Sassanid structures that still remained in Iraq. Their new capital, Baghdad, which was founded near the Sassanid capital of Ctesiphon, had a round plan with governmental and religious buildings in the center. Their monumental buildings were structural systems composed of massive brick piers and arches with brick and molded stucco decorations. Using a hypostyle model, Abbasid mosques, such as the Great Mosque of al-Mutawakkil at Samarra and the Ibn Tulun Mosque in Cairo, were monumental. The Abbasid palaces of Samarra (836) and Bayt al-Khalifa (836) included military quarters, extensive gardens and recreational spaces, residential courts, and richly decorated ceremonial spaces in extensive complexes along the Tigris River.

Contemporary to the Seljuks, the Fatimid Dynasty (909–1171) established itself in North Africa and claimed the ca-

liph al title. The Fatimids, who were Shiite Muslims, founded the cities of al-Mahidiya in Tunisia and Al-Qahira in Egypt and built congregational mosques, such as al-Mahdiya, al-Azhar, and al-Hakim in Cairo, applying hypostyle plans. Fatimid buildings, which were mostly symmetrical in terms of the arrangements of portals and minarets, were characterized by their precise masonry work and ornament. Epigraphy (inscriptions), keel-shaped arches and fluted niches, and *muqarnas* were permanent elements of their decorations.

The Ayyubids (1169–1260) were one of the successor dynasties of the Seljuks, who were established in Syria and in Egypt after the fall of the Fatimids. In design of plans and facades, Ayyubid buildings utilized motifs and elements that had been established by the Fatimids and the Seljuks. Two massive fortifications, the citadels of Cairo and Aleppo, are examples of Ayyubid architecture that were founded by the sultan Saladin.

The Mamluks (1250–1517), successors to the Ayyubids, ruled Egypt and Syria for about three centuries. The architecture of the Mamluks was similar to the architecture of their predecessors, the Fatimids and the Ayyubids. The Complex of Sultan Qalaun in Cairo (1283–85) is a good example of Mamluk architecture. Mamluk buildings that were monumental used keel-shaped niches and *muqarnas* to decorate the hoods

of arched portals and niches. The interiors of the buildings had multicolored stone revetments (facings), mosaics, and carved wood. Carved stone domes, striped stone facades, *mashrabiya* (wooden screen work) balconies, and monumental portals encrusted with *muqarnas* were characteristic of this architecture.

The Ottomans (1281–1924), the successors of the Seljuks and the Byzantines, invaded Anatolia and the Balkans as well as Arabia to Algeria in the 13th century. During the reign of Mehmed II (1444–46 and 1451–81) Ottomans conquered Constantinople and erected many buildings in the city. Most Ottoman buildings had weightless and massive domes, which provided a great harmony between light and shadow inside the buildings. In decoration they focused on the interior, adding ceramic tile revetments and monumental inscriptions. Ottomans expanded existing buildings, such as Mehmed II's Fatih Complex (1463–71), which was constructed on the former site of the Byzantine Church of the Holy Apostles, adding vaults, semidomes, and columns, and more decoration. Byzantine architecture, such as the church of Hagia Sophia, served as a model for many Ottoman mosques.

URBAN STRUCTURE

The main difference between cities in Islamic countries and their precedents in Syria, Egypt, and Persia was their organic structure. This structure was based on the quarter system, which was also called *mahalla* or *har* or *dar*. Each quarter, which was a combination of narrow streets with such minor public open spaces and public buildings as bathhouses, mosques, and local shops, was controlled by a manager, called a sheikh. In most cases, people from close families lived in the same quarter, making the area safer and more secure. The structure of a quarter, which was also a result of the underground irrigation system (*qanat*) and, to an extent, over-ground water streams, shaped a kind of street life that included ceremonies and social meetings.

The process of urban design was very climate oriented for architects and planners. They attempted to control the air circulation while providing the most shade for people who lived in such arid climates. The facades of buildings in a quarter were designed to maintain harmony within the whole quarter. Since the privacy of the residents was the most important factor in the physical connection between houses and alleys or streets, in some cases a foyer was designed to avoid a direct connection between a house and the street. Most Islamic cities were surrounded by walled fortifications to protect the city against attacks and also to control the entrance. The most important public spaces in cities were Friday mosques, near which the markets were located. In planned cities, such as Samarqand, Herat, and Isfahan,



Fragment of a balustrade; Iran, late 13th–early 14th century (Los Angeles County Museum of Art, the Phil Berg Collection, Photograph © 2006 Museum Associates/LACMA)

the urban planning was based on an enormous number of gardens, which shaped the whole city.

MOSQUES, COLLEGES, AND MAUSOLEUMS

The religious architecture in Islamic countries includes mosques (Friday mosques, royal mosques, local mosques, and *musalas*), religious schools (madrasas), and memorial shrines. The term *mosque*, or *masjid*, literally means “a place of prostration.” Mosques functioned not only as sacred religious buildings for five mandatory daily prayers but also as public places for social gatherings, ceremonies, charity events, and even business meetings. Friday mosques of different scales (which varied from neighborhoods to a whole city) were places for Friday prayers, while *musalas* were natural clearings or walled-in enclosures to hold two feast prayers (to celebrate fulfilling the Ramadan fast and the Mecca pilgrimage).

The earliest mosque, erected by the order of the Prophet, was a walled-in square, including a courtyard separating a back portico from a roofed prayer hall. This plan, which was called hypostyle, was used in Arabic countries and was later modified in other regions. For example, in Iran and central Asia the four-*iwān* plan was used as a prototype. The roofing system was more a local decision. In Anatolia a central domed space flanked by smaller spaces flourished. The mosques in Indonesia followed regional patterns with pyramidal roofs. In China mosques with traditional hip roofings were designed. The prayer hall was required to face *qibla* (the direction of Mecca). Thus, architects oriented spaces and whole plans in mosques in certain directions. In most mosques pools were located in the center of the courtyard in order to accommodate the cleaning ritual before the beginning of the prayer.

The architecture of the madrasa followed the same plan as for mosques. In most cases, four-*iwān* plans were used, with several rooms surrounding a central courtyard. With the advancement of science, astronomy, and philosophy and the emergence of Persian scientists, such as Omar Khayyam (ca. 1034–ca. 1131), Ibn Sina (980–1037), and Razi (ca. 865–between 932 and 935), madrasas played a vital role in the medieval Islamic world. The first madrasas were probably built in the ninth century in the eastern regions of Iran. The construction of madrasas was in most cases the result of political administrative decisions to expand knowledge and sometimes to take over other religious sects or political movements. The madrasas were sometimes *iwān* buildings attached to mosques of the houses of their founders. During the rule of the Seljuks in Persia and the Mamluks in Egypt and Syria several madrasas were built.

Although erecting mausoleums was not encouraged in Islamic regulations, Abbasid caliphs began reviving this tra-

dition, which had roots in pre-Islamic architecture in Persia, Anatolia, and Egypt. The earliest-surviving mausoleum, Qubbat al-Sulaibiya, erected in Samarra in the ninth century, was an octagonal monumental mausoleum and resembled Roman mausoleums. This trend was continued later by nomad Turks, such as the Seljuks and the Ghaznavids, who erected towers on tombs of kings or members of the royal families.

PALACES AND CITADELS

Administrative buildings in the Islamic world can be divided into two categories: palaces and military fortifications. The first palaces in the Islamic world were built in the Umayyad Period, when caliphs rejected the simple lifestyle of the Prophet and his successors. The architecture of Umayyad palaces located at Syria, Jordan, and Palestine is related to Roman villas and Sassanid palaces erected in pre-Islamic ages in the same region, when the construction of palaces and villas was the result of the kings' and nobles' desire to show their power. After the Umayyads and the Abbasids, nomad Turks, who gained power, were more interested in constructing pavilions that were similar to their tents, such as the Ghaznavid palaces in central Asia. The Ilkhanids' most important palace was in Takht-i-Suleyman, which was originally a Sassanid palace and temple. After the 15th century the Timurids, the Ottomans, and the Safavids erected several palaces in central Asia, Iran, and Turkey. Besides erecting palaces and stabilizing the frontiers of the Muslim world, Muslim leaders established a formalized system of defense. The result was the creation of several fortifications in North Africa, Spain, Anatolia, and central Asia. At the same time, the citadel, which was a fortified defensive unit, was occupied by the king or the lord. In the Islamic world these fortresses, which were based on Near Eastern architecture, especially in Assyria, varied in size and importance. With baths, reception halls, walls, towers, and probably rest areas, some citadels were initially located far from cities to accommodate alien soldiery.

GARDENS

Gardens occupied a significant place in the architecture of Islamic countries. They were developed in two different forms; the first form was an open planted garden with a pavilion, while the second form was an inner courtyard enclosed within a building. The so-called Islamic garden was a fourfold garden that originated with Cyrus the Great's (ca. 585–ca. 529 B.C.E.) garden at Pasargadae. After the rise of Islam, Abbasid caliphs, whose palaces (in present-day Iraq) were in areas close to the Sassanid capital (Ctesiphon), continued the Mesopotamian and Persian tradition of making gardens for pleasure and hunting. Muslims, for whom pleasure gardens were traces of paradise on earth, attempted to

design gardens that resembled Koranic descriptions of paradise gardens (*Ferdows*).

These gardens still followed the pattern of the Achaemenid garden at Pasargadae, in which a pavilion was located above a fourfold planted garden with a pool in the center and trees and flowers planted in rectangular form. The gardens not only worked as spaces for pleasure but also acted as permanent components of architecture. Later, in the Timurid and Safavid periods, gardens were designed to shape urban areas, such as streets, squares, and whole cities. Although the same pattern was more or less exported to all Islamic territories, the elements of the garden, such as arrangement of trees, ornamentation, contents, and scale, were based primarily on local traditions. While Mughal gardens in India and Kashmir included large unplanted areas with plenty of local fountains, the gardens in Morocco and Spain were smaller, with a pool in center. In addition, Mughal Indians replaced pavilions in gardens with mausoleums. Two most famous examples of gardens in Islamic territories are the Hasht-Bihisht garden in Isfahan and the Taj Mahal in Agra. Muslims also used gardens as places for producing plants, medical herbs, flowers, and fruits.

MARKETS AND CARAVANSARIES

After the establishment of Islam, Prophet Muhammad made specific regulations to recover trade in Arab society and to decrease the disparity between the wealth of classes within the society. Based on these regulations, collecting wealth without considering others' benefit was prohibited. At the same time, lawful and decent trade was strongly supported in order to improve the quality of life within society. In the Islamic world the construction of markets, which might have had roots in the Byzantine and Parthian empires, facilitated international trade for people in various regions. In addition, the role of the Islamic countries, such as Persia and Turkey, as important sections of the Silk Road; the importance of travel as a tool of learning for Muslims; and the significance of the pilgrimage in Islam encouraged governments to create markets and caravansaries to facilitate trade and financial contacts in the whole region.

The typology of caravansaries was the result of climatic circumstances, except in mountainous areas, and an enclosed plan with a central courtyard (probably with adjacent buildings, each with a central courtyard) was used. The caravansaries outside cities served as hostels for travelers and tradesmen, whereas the caravansaries inside cities functioned within markets as places to accommodate travelers and to sell merchandise. The structure of markets was based on the organization of trades and crafts (guilds). Merchandise of a particular type was sold in a specific caravansary or shop-

ping center or shopping street. Moreover, the structure of the bazaar was based on an organization to provide maximum security, especially for high-ranking businesses or expensive crafts. Markets became the backbones of Islamic cities, serving as the main circulation streets within cities and as connectors between important neighborhoods. In small towns the markets were close to the one or two gates to the town, while in larger cities the markets were placed in the center of the city. In large cities the markets were connected to the main civic centers in which temporary and occasional exhibitions were held to sell certain merchandise or in which social gatherings and administrative activities were conducted.

HOUSES

The residential architecture in the medieval Islamic world included private houses located in cities and villages and caravansaries located inside cities or as isolated buildings outside cities and villages. The plan of caravansaries was climate oriented, and in hot and dry areas the four-*iwan* plan was applied, in which rooms were located around a rectangular or square central courtyard. Except in nonarid areas, the private houses included a central courtyard around which rooms were located. In accordance with Islamic instructions regarding the importance of guests, the largest and most decorated rooms were allocated to guests. The designs of houses stressed interior spaces, while the exterior of a house was designed in a very humble way without any fancy ornamentation. Generally, the size and complexity of houses depended on the wealth of their owners. Houses owned by rich people were sometimes complexes of several houses occupied by relatives in a large family. In these cases the houses were expanded and developed based upon the family relations among the occupants. The spaces inside houses were arranged in a way to provide the greatest privacy for residents (against visitors), especially for the women. Additionally, the size and location of rooms were based on the hierarchy of the residents in the family. The garden located in the center of the courtyard, with trees and flowers and a central pool, was a symbol of paradise that practically improved air circulation inside the houses.

ARCHITECTS AND CONSTRUCTION

Architects in Islamic countries were usually specialists in calculation and design and were innovative and imaginative in conception and structure. In most cases, occupations related to art and architecture were family heritages. Construction, whether done by Muslims or non-Muslims, was considered a sacred process, in which architects and craftsmen took advantage of their faith in order to create a transcendental architecture. For this reason, except in a few cases, the names of architects did not appear on their buildings. The movement

MATHEMATICS IN STONE

Architecture has sometimes been called “mathematics in stone.” An architect in any culture has to have a firm grasp of the principles of measurement, angles, the weights and carrying capacities of materials, and similar mathematical concepts. This grasp of mathematics was nowhere more apparent than in medieval Islamic architecture, particularly in the elaborate and highly complex designs of tile work found in surviving medieval Islamic buildings.

Only in the 21st century have scientists come to appreciate fully the complex mathematics that may have been involved in the construction of this tile work. Many of these scientists are crystallographers, or scientists who study the crystalline patterns of substances. Using highly sophisticated instruments that measure the diffraction of light, they can examine in minute detail the form and arrangement of crystals and what are called *quasicrystals*. While crystals are associated with glass or glasslike substances, quasicrystals are associated with such substances as aluminum, copper, cobalt, and nickel. The prefix *quasi-* means “similar to” or “resembling.”

A crystal is a symmetrical arrangement of atoms along three dimensions or axes. The pattern can be repeated over and over, causing the crystal to grow and to fill up whatever space it occupies. A quasicrystal exhibits the same structure of atoms, but instead of doing so along three axes, a quasicrystal exhibits the pattern along 10. Thus, quasicrystals are often referred to as decagonal quasicrystal structures, with the word *decagonal* deriving from the number 10.

Only in 2007 did scientists discover that the crystalline structure of medieval Islamic tile work exhibits this decagonal quasicrystalline structure—a concept that was “discovered” by Western scientists only in the 1970s. They use the term not to refer to the physics of the materials out of which the tiles were made but to refer to the symmetrical properties of the designs themselves. Put differently, when they look at a sample of medieval Islamic tile work, what they see is a pattern that replicates the kind of crystalline pattern they would see in a substance under a microscope. Clearly, such a pattern is complex beyond belief.

The question that arises is how medieval Islamic architects could have created these crystalline patterns to produce the breathtakingly beautiful tile work that adorns the mosques and other buildings they constructed. To create simple geometric patterns, straightedges and compasses can be used. But as patterns become more complex, it is inevitable that geometric distortion will occur, even when such tools are used. If geometric distortion can take place with the simplest arrangement of tiles in a row, it seems almost inevitable that it would occur when the pattern becomes seemingly infinitely more complex. However, scientists who have examined these patterns in Islamic tile work find virtually no distortion. Thus, they conclude that the architects had not only an understanding of the complex geometry involved but also tools far more sophisticated than straightedges and compasses.

of architects in different areas of the Islamic world led to similarities in architectural designs and concepts throughout the region. These architects began construction with delicate geometrical drawings as well as fragmentary drawings. Masonry techniques included stonework, brickwork, clay walling, carpentry, plastering, and tiling. Architects in the Islamic world also developed special types of construction, such as vaults, domes, and minarets.

DECORATION AND ORNAMENTATION

One of the characteristics of architecture in the Islamic world was the special treatment of decorations and the development of types of ornamentation that were not common outside Islamic territories. The ornamentation in buildings, whether part of the structure or the exterior, was in contextual harmony with the spatial qualities of the architecture. In other

words, the components of decoration, as a complex overlay, not only formed surfaces but also defined spaces. The prohibition of the use of sculptures and figural and animal art encouraged Muslim artists to find other techniques to decorate their buildings. Taking advantage of the heritage from Mesopotamia, Persia, and to some extent Rome, early Muslim artists developed their decorations in three main phases. In the first three centuries after Islam, patterns, repetition of elements, and intricacy in stone and stucco were applied as the main elements of decoration.

The second phase, developed mainly in eastern areas, created decorative effects through brick and terra-cotta patterns. The most glorious age of this phase was the Seljuk Period (1038–1194), when ornamentation and structure were completely integrated in construction. From the 10th century the decoration of portals and mihrabs became fashionable in

the Islamic world. Using glazed tiles to decorate portals and facades of buildings and stucco to ornament mihrabs reached its highest point in the Timurid Period (1370–1506).

The third phase was marked by an emphasis on color rather than on texture. While in western areas, such as Spain and North Africa, tiles and stucco were combined with carved wooden elements in geometrical and symmetrical schemes, in Iran and central Asia brick and tile covered the whole surface of buildings. At the same time, the Ottomans used stone as a decorative element on the exterior of buildings and tiles on the interior of buildings, while Mughals in India used decorations on facades with an emphasis on white marble and red sandstone.

The decorative elements of Islamic buildings include calligraphy, geometrical patterns, floral patterns, the arabesque (an intricate floral pattern), and figurative and animal patterns. Replacing figurative arts in Western architecture, calligraphy, a way to record God's words in the Koran, was a central decorative element in Islamic architecture. From the earliest Islamic building, the Dome of the Rock, calligraphy as a sacred element was used to connect the physical space to heaven. The inscriptions were usually framed geometrically on portals, on cornices, on domes, and even in corridors. Though the inscriptions were different in purpose and decoration, the meanings of the inscriptions used in different parts of the building typically were connected through symbolic associations. Geometric patterns, with their abstract forms, which were developed in Islamic art to avoid realism, originated in Parthian and Sassanid decorations. These geometrical patterns were used to balance positive and negative areas of a building and to dematerialize architecture. The application of these patterns obliged architects to work with mathematicians to develop complicated systems of geometry.

Muslim artists, especially after the 15th century, produced floral patterns to create symmetrical and repetitive schemes. Flowers and trees depicted in manuscripts were used as motifs in objects, textiles, and buildings. Another decorative element, which also had roots in the Hellenistic Near East and Parthia, was arabesque, which was widely used after the 10th century. Arabesque as interlacing plant forms and

abstract curvilinear motifs was characterized by a series of counterpoised and leafy stems that split off and returned into the main stem. The arabesque patterns were placed on a carefully designed network of grids designed on complex mathematical principles. In western areas, such as Spain, Egypt, and Morocco, stucco, marble, and mosaic decorations were used in decorations of parts of buildings; in eastern regions arabesque provided an overall and monumental decoration.

Although Islam discouraged the depiction of figures in art and architecture, under European and Buddhist influence figural art, more or less, was applied, especially in private buildings. In addition, light and water were used not only as components to define spaces but also as decorative elements. For Muslims, light was a symbol of God, while water was a symbol of purity of soul. In addition to its patterns, forms, and designs, natural light changed with the time of day or year. This change could create different phenomenal properties in space and also could provide a mobile projection of patterns. The interplay with light and shade, especially in religious structures, was a tool to enhance spirituality while defining the function of each space. The movement of water in channels or fountains and its stability in pools played a significant role not only in cooling the environment but also in defining new dimensions, such as sound and reflection, and even in highlighting the interplay of light and shadow.

See also ART; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; BUILDING TECHNIQUES AND MATERIALS; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FESTIVALS; FORESTS AND FORESTRY; ILLUMINATION; METALLURGY; MILITARY; MINING, QUARRYING, AND SALT MAKING; NUMBERS AND COUNTING; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; SPORTS AND RECREATION; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; WAR AND CONQUEST.

Europe

≈ Procopios: "On the Great Church" (Hagia Sophia), excerpt from *De aedificiis* (sixth century) ≈

The emperor, thinking not of cost of any kind, pressed on the work, and collected together workmen from every land. Anthemius of Tralles, the most skilled in the builder's art, not only of his own but of all former times, carried forward

the king's zealous intentions, organized the labours of the workmen, and prepared models of the future construction. Associated with him was another architect [mechanopoios] named Isidorus, a Milesian by birth, a man of intelligence,

and worthy to carry out the plans of the Emperor Justinian. It is indeed a proof of the esteem with which God regarded the emperor, that he furnished him with men who would be so useful in effecting his designs, and we are compelled to admire the wisdom of the emperor, in being able to choose the most suitable of mankind to execute the noblest of his works. . . .

[The Church] is distinguished by indescribable beauty, excelling both in its size, and in the harmony of its measures, having no part excessive and none deficient; being more magnificent than ordinary buildings, and much more elegant than those which are not of so just a proportion. The church is singularly full of light and sunshine; you would declare that the place is not lighted by the sun from without, but that the rays are produced within itself, such an abundance of light is poured into this church. . . .

Now above the arches is raised a circular building of a curved form through which the light of day first shines; for the building, which I imagine overtops the whole country, has small openings left on purpose, so that the places where these intervals occur may serve

for the light to come through. Thus far I imagine the building is not incapable of being described, even by a weak and feeble tongue. As the arches are arranged in a quadrangular figure, the stone-work between them takes the shape of a triangle, the lower angle of each triangle, being compressed where the arches unite, is slender, while the upper part becomes wider as it rises in the space between them, and ends against the circle which rests upon them, forming there its remaining angles. A spherical-shaped dome standing upon this circle makes it exceedingly beautiful; from the lightness of the building, it does not appear to rest upon a solid foundation, but to cover the place beneath as though it were suspended from heaven by the fabled golden chain. All these parts surprisingly joined to one another in the air, suspended one from another, and resting only on that which is next to them, form the work into one admirably harmonious whole, which spectators do not dwell upon for long in the mass, as each individual part attracts the eye to itself.

From: *The Church of Sancta Sophia, Constantinople*, trans. W. R. Lethaby and Harold Swainson (New York: Macmillan and Co., 1894).

Europe

≈ Paul the Silentiary: "The Magnificence of Hagia Sophia" (sixth century) ≈

Above all rises into the immeasurable air the great helmet [of the dome], which, bending over, like the radiant heavens, embraces the church. And at the highest part, at the crown, was depicted the cross, the protector of the city. And wondrous it is to see how the dome gradually rises wide below, and growing less as it reaches higher. it does not however spring upwards to a sharp point, but is like the firmament which rests on air, though the dome is fixed on the strong backs of the arches. . . . Everywhere the walls glitter with wondrous designs, the stone for which came from the quarries of seagirt Proconnesus. The marbles are cut and joined like painted patterns, and in stones formed into squares or eight-sided figures the veins meet to form devices; and the stones show also the forms of living creatures. . . .

A thousand others [lamps] within the temple show their gleaming light, hanging aloft by chains of many windings. Some are placed in the aisles, others in the centre or to east and west, or on the crowning walls, shedding the brightness of flame. Thus the night seems to flout the light of day, and be itself as rosy as the dawn. . . .

Thus through the spaces of the great church come rays of light, expelling clouds of care, and filling the mind with joy. The sacred light cheers all: even the sailor guiding his bark on the waves, leaving behind him the unfriendly billows of the raging Pontus, and winding a sinuous course amidst creeks and rocks, with heart fearful at the dangers of his nightly wanderings-perchance he has left the Aegean and guides his ship

(continued)

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against adverse currents in the Hellespont, awaiting with taut forestay the onslaught of a storm from Africa—does not guide his laden vessel by the light of Cynosure, or the circling Bear, but by the divine light of the church

Itself. Yet not only does it guide the merchant at night, like the rays from the Pharos on the coast of Africa, but it also shows the way to the living God.

From: *The Church of Sancta Sophia, Constantinople*, trans. W. R. Lethaby and Harold Swainson (New York: Macmillan and Co., 1894).

The Islamic World

≈ *Ibn Battuta: Excerpt from Travels in Asia and Africa (1325–54)* ≈

From Gaza I travelled to the city of Abraham [Hebron], the mosque of which is of elegant, but substantial construction, imposing and lofty, and built of squared stones. At one angle of it there is a stone, one of whose faces measures twenty-seven spans. It is said that Solomon commanded the jinn to build it. Inside it is the sacred cave containing the graves of Abraham, Isaac, and Jacob, opposite which are three graves, which are those of their wives. I questioned the imam, a man of great piety and learning, on the authenticity of these graves, and he replied: “All the scholars whom I have met hold these graves to be the very graves of Abraham, Isaac, Jacob and their wives. No one questions this except introducers of false doctrines; it is a tradition which has passed from father to son for generations and admits of no doubt.” This mosque contains also the grave of Joseph, and somewhat to the east of it lies the tomb of Lot, which is surmounted by an elegant building. In the neighbourhood is Lot’s lake [the Dead Sea], which is brackish and is said to cover the site of the settlements of Lot’s people.

On the way from Hebron to Jerusalem, I visited Bethlehem, the birthplace of Jesus. The site is covered by a large building; the Christians regard it with intense veneration and hospitably entertain all who alight at it.

JERUSALEM AND ITS HOLY SITES

We then reached Jerusalem (may God ennoble her!), third in excellence after the two holy shrines of Mecca and Medina and the place whence the Prophet was caught up into heaven. Its walls were destroyed by the illustrious King Saladin and his Successors, for fear lest

the Christians should seize it and fortify themselves in it. The sacred mosque is a most beautiful building, and is said to be the largest mosque in the world. Its length from east to west is put at 752 “royal” cubits and its breadth at 435. On three sides it has many entrances, but on the south side I know of one only, which is that by which the imam enters. The entire mosque is an open court and unroofed, except the mosque al-Aqsa, which has a roof of most excellent workmanship, embellished with gold and brilliant colours. Some other parts of the mosque are roofed as well. The Dome of the Rock is a building of extraordinary beauty, solidity, elegance, and singularity of shape. It stands on an elevation in the centre of the mosque and is reached by a flight of marble steps. It has four doors. The space round it is also paved with marble, excellently done, and the interior likewise. Both outside and inside the decoration is so magnificent and the workmanship so surpassing as to defy description. The greater part is covered with gold so that the eyes of one who gazes on its beauties are dazzled by its brilliance, now glowing like a mass of light, now flashing like lightning. In the centre of the Dome is the blessed rock from which the Prophet ascended to heaven, a great rock projecting about a man’s height, and underneath it there is a cave the size of a small room, also of a man’s height, with steps leading down to it. Encircling the rock are two railings of excellent workmanship, the one nearer the rock being artistically constructed in iron and the other of wood.

From: Ibn Battutah, *Travels in Asia and Africa 1325–1354*, trans. and ed. H. A. R. Gibb (London: Broadway House, 1929).

FURTHER READING

- Bruce Allsop, *Romanesque Architecture: The Romanesque Achievement* (New York: John Day, 1971).
- Sheila Blair and Jonathan M. Bloom, *The Art and Architecture of Islam, 1250–1800* (New York: Yale University Press, 1994).
- Jean Bony, *French Gothic Architecture of the 12th and 13th Centuries* (Berkeley: University of California Press, 1983).
- Martyn Bramwell, ed., *The International Book of Wood* (New York: Crescent Books, 1987).
- Roy C. Craven, *Indian Art: A Concise History*, rev. ed. (London: Thames and Hudson, 1997).
- Susan Denyer, *African Traditional Architecture: An Historical and Geographical Perspective* (London: Heinemann, 1978).
- Richard Ettinghausen and Oleg Grabar, *The Art and Architecture of Islam, 650–1250* (New York: Penguin, 1987).
- Peter S. Garlake, *Early Art and Architecture of Africa* (Oxford: Oxford University Press, 2002).
- Graziano Gasparini and Luise Margolies, *Inca Architecture*, trans. Patricia J. Lyon (Bloomington: Indiana University Press, 1980).
- Georg Gerster, *Churches in Rock: Early Christian Art in Ethiopia* (London: Phaidon, 1970).
- Michael Gervers, “The Rehabilitation of the Zaguë Kings and the Building of the Däbrä Sina—Golgotha—Sellassie Complex in Lalibäla.” Available online. URL: <http://www.utoronto.ca/deeds/pubs/golgotha/golgotha.html>. Downloaded on July 22, 2007.
- Marilyn E. Heldman, “Architectural Symbolism, Sacred Geography and the Ethiopian Church,” *Journal of Religion in Africa* 22 (1992): 222–241.
- Robert Hillenbrand, *Islamic Architecture: Form, Function, and Meaning* (New York: Columbia University Press, 1994).
- Ann Nottingham Kelsall, “China.” In *Builders of the Ancient World: Marvels of Engineering* (Washington, D.C.: National Geographic Society, 1986).
- Jeff Karl Kowalski, ed., *Mesoamerican Architecture as a Cultural Symbol* (New York: Oxford University Press, Inc., 1999).
- George Kubler, *The Art and Architecture of Ancient America: The Mexican, Maya and Andean Peoples*, 3rd ed. rev. (London: Penguin Books, 1990).
- Brian D. G. Little, *Architecture in Norman Britain* (London: B. T. Batsford, 1985).
- R. J. Mainstone, *Hagia Sophia: Architecture, Structure, and Liturgy of Justinian’s Great Church* (London: Thames and Hudson, 1997).
- George Mitchell, ed., *Architecture of the Islamic World: Its History and Social Meaning* (New York: Thames and Hudson, 2002).
- Peter Nabokov and Robert Easton, *Native American Architecture* (New York: Oxford University Press, Inc., 1989).
- Ellel Nnamdi, *African Architecture: Evolution and Transformation* (New York: McGraw-Hill, 1997).
- Patrick Nuttgens, “The Holy Mountain and the Sacred Womb: Southern Asia, 2500 B.C. to Eighteenth Century A.D.” and “Puzzles and Modules: China and Japan, Third Century B.C. to Twentieth Century A.D.” In *The Story of Architecture* (Englewood Cliffs, N.J.: Prentice-Hall, 1983).
- Joyce Stewart, “India and Southeast Asia.” In *Builders of the Ancient World: Marvels of Engineering* (Washington, D.C.: National Geographic Society, 1986).

Otto Georg von Simson, *The Gothic Cathedral: Origins of Gothic Architecture and the Medieval Concept of Order*, 3rd ed. (Princeton, N.J.: Princeton University Press, 1988).

► art

INTRODUCTION

The art of the medieval world was very diverse and as sophisticated and complex as art of the modern world. Medieval artists were constantly working with their audiences, trying to communicate ideas or to satisfy an audience’s desires. This complex interaction between artist, art, and audience was true even in regions where one might be tempted to call the art “primitive.” For instance, in Australia and in southern Africa people still painted rocks as had their ancestors 25,000 years earlier. Still, the rock art of the medieval era was not simple scratches of primitive minds. An Australian had to fit his or her work among the works of thousands of years. These works told the history of a tribe, from antiquity to the present, and the images not only had to conform to the story told by earlier paintings, it also had to carry a great weight of symbolic content. This meant that the artist had to be familiar with the language of the community’s art—that is, the strokes of paint or incised lines that would enable a viewer of his culture to quickly understand the topic of the work of art and the actions it was intended to convey.

In southern Africa the rock art of the San and Khoikhoi was used for initiation rites and was expected to explain through images the responsibilities of adult life. As with the Australians, the southern African artist had to draw on the symbolism of his or her culture and incorporate it into a coherent work of art. The tasks of the rock painters were as demanding as those of the European painters of the same era, whose audiences expected them to incorporate Christian symbols into their works, making the symbols an important part of the impression the artists hoped to convey.

It is worth considering the role of symbolism in medieval art. Not all medieval art was symbolic. For instance, one may gaze upon a courtly painting of the Chinese Ming Dynasty (1368–1644) and see a woman feeding birds. It is possible that the painting is part of an instruction manual about how courtly women were supposed to behave, but it could be that the image itself was meant only to give pleasure, without deep inner meaning. Sometimes the purpose of a work of art is no more than to be a work of art. An easy trap for archaeologists to fall into is the notion that every painting, sculpture, or casting must have a purpose, even if the purpose is unclear. This is a habit of mind: Archaeologists are often trying to fill in portraits of entire societies with scant evidence, and every

artifact is examined for what it might say. Yet what does a pot from the Mississippi region say with its painting of jagged lines or geometric patterns? It is possible that the image has symbolic importance, such as identifying the social class of the original owner, but it may be that the image was just meant to be pleasing.

It is in the pleasing effect of much art that common ground may be found among the artistic traditions of the vastly varying cultures of the medieval world. If it is possible to make a generalization about art, it may be this: People want beauty in their lives. It is possible to cite individual people who for one reason or another do not respond to art or regard art as evil, but the vast majority of humanity responds to art. Tastes may differ, but pleasure is still derived from one or another form of art. If one were to look at the tastes in design of the medieval Japanese, one would find a pleasure in simplicity. House, temple, and palace emphasized spare lines and simple decoration, but in almost any Japanese home one would find niches built exclusively for the display of paintings. In fact, so profound was the Japanese culture's love of art that it found even wild lands, unshaped by human hands, to be works of art. There was not a rejection of ornate decoration but an embracing and including in their lives of the spirit of the artist. They experienced the art of painters and sculptors by living in it and making it a part of everyday events.

To varying degrees this was true elsewhere. For instance, in Europe no ordinary object was complete without artistic expression. Crossbows might have rams' heads carved on the ends of their shafts. Exposed ends of timbers in houses or cathedrals would have angels, animals, or plants carved on them. The image might be of a theme—an angel would fit in a cathedral's religious mission—but the principal impulse probably was that no structure was complete without art that spoke to the heart or gladdened the eye. In medieval China and Korea, cultures very different from that of Europe, one still sees the same impulse at work. It seems that no pot, no home, no government office was complete without the touch of an artist. In India almost no public space was complete without art. Indeed, Indian architects believed that no building was truly complete without images of women, either as statues or paintings.

It is in some of the saddest events in India's history that one can plainly see the importance of art to a culture. Invasions of India from central Asia and from the Near East resulted in the wholesale destruction of Indian art in northern India. Their fabulously carved wooden cities were burned, and their elaborately decorated temples were defaced or even dismantled. This stemmed in part from a profound disagreement over what art should be. Invading Muslims thought that art should not depict human forms, and religious art should

not depict any sort of living creature, because to do so would be to encroach on God's divine authority as creator of life, a point of view opposite to that of Indians, who regarded their art as a celebration of life and God. Further, the destruction of Indian art was an effort to repress Indian culture by taking away the artistic expression of the culture. Not only in India but indeed throughout the world many people regarded the works of their artists to be fundamentally important expressions of their cultures. Perhaps it is in this that modern people may learn about the minds and emotions of the peoples of the medieval world, because their art was an expression of what they valued and what they believed was beautiful.

AFRICA

BY SHARON PRUITT

In much of medieval Africa the concept of artist, as it is known in Western cultures, was unknown. Moreover, African languages do not have a word for the Western concept of art, although expressions for describing objects as beautiful, made, or embellished do exist. The artistic portrayals of human figures associated with religion are stylized rather than representational. The figures are both people friendly and spirit friendly because individuals used them to contact the spirit world. Although many medieval African artworks are associated with religion, some were simply utilitarian and included items like household objects, weapons, and agricultural tools. Medieval African artists made both utilitarian and ritual sculptural art objects that served various purposes for the individual, the family, and the community.

Many problems exist in the study of African art with respect to artists' names, the provenance of pieces, and dates. Regardless of the media, the names of traditional African artists are anonymous to Westerners. African artists do not sign their works, as most Western artists do. Although the owners of artworks or other members of the community knew the names of the artists, early Western collectors of African art failed to ask or record their names. In addition, Westerners labeled the artworks by the culture from which they obtained them. Sometimes this creates problems, because the artwork may have originated in another culture and country and become displaced because of trade or human migration.

Specific dates for many art objects are unknown or approximated. For example, medieval terra-cotta and metal art objects, representing some of the oldest art in Africa, often are dated by radiocarbon methods. The medieval period began with the Iron Age and moved into the Bronze Age. The dates for wooden masks and figural sculptures, which are the most well-known African artworks among Western audiences, correlate best to the Western modern and contemporary pe-

riods. During the medieval period in Europe, Africans were probably producing and using wood art objects; however, there is no evidence of their survival because of the perishable nature of wood in the tropical and dry climates combined with infestations of termites. In other words, in Africa the life expectancy of wood sculpture is less than 100 years from the time the wood is cut from the tree. Westerners began to collect and acquire African wood mask and figures avidly in the 20th century; thus the dates for most African wood artworks are not before the 19th century.

NORTHEAST AFRICA

By the fifth century the Coptic Christian religion was firmly established in Egypt. The Coptic Church followed the Monophysite doctrine of recognizing Christ as one person with one nature. Coptic religion and art spread throughout Egypt and farther south in the neighboring countries of Nubia (present-day Sudan) and Ethiopia. The geographical connections and cultural influences of Christianity and the Coptic religion were complex. During the fifth century Egypt was ruled from Constantinople, the capital of the eastern Roman or Byzantine Empire. From 619 to 629 Egypt was under Persian rule, adding a strong Persian influence to Coptic art. The art varies by region in northeastern Africa. Stylistic unity is difficult to

discern because its influences are Egyptian, Greek, Persian, Byzantine, Syrian, and Christian.

A subject of some important Coptic artworks is Saint Menas, the most popular saint of his native country, Egypt. His cult spread throughout the Mediterranean, reaching its zenith from the fourth to the ninth centuries, when his tomb was a great pilgrimage site. Menas, born in Qetwa or Mareotis in Egypt, was the only child of wealthy Christian parents. While he was still a teenager living in Phrygia, his parents died, and Menas consoled himself with his Christian faith. Desiring to be an officer, he entered the Roman military. The Roman emperors Diocletian and Maximian issued an imperial decree against the Christians stating that all the inhabitants of Phrygia must worship pagan gods. Menas refused, left the army, and sought martyrdom.

After his execution in 295, Menas's body was preserved by Christian soldiers, who were able to prevent his remains from being burned. A Phrygian commander agreed to take the body to Egypt aboard his ship. During the sea voyage Menas's body was said to have protected the vessel from the evil forces of animals with long necks, similar to camels, that attacked the boat but were rebuffed by flames emanating from the corpse. The miraculous protective powers bestowed on Menas were believed to have continued in Egypt. When the



Coptic wall painting of the martyrdom of the saints; Wadi Sarga, Egypt, sixth century (© The Trustees of the British Museum)

time of Christian persecution ended, Pope Athanasius of Alexandria attempted to take Menas's body back to Phrygia, but each camel on which he placed the body refused to move. Thus Menas was buried in a wooden casket on the spot, in a desolate region southwest of Alexandria (present-day Abu Mina).

The martyr's tomb was a shrine in a basilica with underground chambers. The miracles at the shrine were recorded in several languages: Greek, Latin, Ethiopic, Nubian, and Coptic. The recordings portray Menas as punishing misdeeds, performing acts of healing, or saving people from disaster. Pottery flasks called *ampullae*, which were manufactured in great quantities and transported all over the Mediterranean from the sixth through eighth centuries, were said to have miraculous powers, even at a distance, when filled with sacred oil or water. On some flasks Menas, like many Egyptian saints, is portrayed on horseback prepared to fight a war against the forces of evil. Other objects, such as a sixth-century ivory box (*pyxis*) displayed in the British Museum, portray him in a sanctuary flanked by camels or being executed. Some scholars doubt Menas actually existed and believe that his cult represented a survival of Egyptian religion, incorporating the cults of the ancient gods Osiris, Horus, Anubis, and Amen.

Coptic fresco paintings portraying Menas are found in a room of a small temple in the enclosure wall of Medinet Habu, the Mortuary Temple of Ramses III, in the Coptic town of Jême on the west bank of the Nile. The color palette is limited to black, gray, three shades of red, and white. Coptic paintings tend to stylize the human figure, flattening it out and portraying enlarged, opened eyes. Like the subject on the pottery flasks, Saint Menas appears on horseback, with camels, sometimes engaged in a miraculous act.

NORTHWEST AFRICA

The Soninké people built their capital city, Kumbi Saleh, on the edge of the Sahara, located in present-day Mauritania. Kumbi Saleh became extremely important in the trans-Saharan trade routes. The inhabitants not only were farmers but also engaged in trade connected with the salt and copper mines, which developed to the north. To the south, trade routes extended into Ghana, which had extensive gold mines. During the Middle Ages, Kumbi Saleh became the capital of the empire of Ghana. The trade routes opened opportunities for raids from northern invaders and for the spread of Islam, which entered North Africa in the early seventh century. Kumbi Saleh was pillaged by the Islamic Almoravids in 1086.

A pre-Islamic presence in Kumbi Saleh is distinguished by ceramic objects, such as the fragment of a terra-cotta female figure that dates to about the sixth or seventh century. The small figure fragment, which measures 4½ inches, possi-

bly was used as a portable art form. It portrays a slender waist and pronounced buttocks.

WEST AFRICA

Bura is located in southwestern Niger close to the Niger River. Little is known of the Bura civilization (ca. the third to 11th centuries). Most of the objects excavated from the site in Niger known as Asinda-Sikka are terra-cotta heads and vessels. Some stone heads and human figures also were found. Whether made of terra-cotta or stone, free standing or attached to pots, all the heads at Asinda-Sikka portray similar features. They are flat and round, rectangular, or arrowhead-shaped forms with elongated necks. Their simplified vertical noses, small circular eyes, and oval-shaped mouths (when present) are raised from the background. The Bura artists created the raised features using a technique that is similar to relief but is the additive modeling technique for clay rather than the subtractive sculpture technique. The heads are distinctively different from one another and characterized by varying hairstyles, scars, and head shapes. It is unknown whether the different styles reflect stylistic changes that occurred over time.

More than 600 terra-cotta vessels were found at a burial site in Asinda-Sikka. The funerary pots contained iron arrowheads, teeth, and other portions of human skulls. Traditional African cultures commonly refer to the significance of the head, which is considered the location of spiritual essence, vital energy, and four of the human senses. The preservation of parts of human heads in the pots at Asinda-Sikka seems to reflect spiritual empowerment. The spiritual connection to the head is further emphasized in the portrayal of human elements on the funeral pots. Some of the round pots are covered with depictions of facial features, while others include extensions, such as a flattened head attached to an elongated neck, that emanate from the mouths of the vessels. Tall cylindrical pots support human figures, and although women are sometimes depicted, many of the figures are men on horseback. Both men and horses are stylized, with raised facial features similar to those on the heads discussed earlier. In addition, the clay is modeled on the surface of the figures to simulate jewelry (necklaces, pectorals, and bracelets). In African cultures this type of jewelry display indicates royal status. These pots thus may mark the burial site or royalty.

Igbo Ukwu is the name of a culture and an excavation site located east of the Niger River. The people of Igbo Ukwu, ancestors of the present-day Nri people who are part of the Igbo ethnic group, were the earliest known smiths of copper and its alloys to produce metal sculpture in West Africa. The artwork found at the site is associated with a senior titled man from a specialized clan of ritual leaders known as the Eze Nri

who still preside among the eastern Igbo. The *eze*, or king of the Nri peoples, is a position affiliated more with a ritual leader than a political head. The Igbo Ukwu people were organized into self-contained villages, or federations of village communities, with elders and age-grade organizations sharing various governmental functions.

The history of art in southern Nigeria is characterized by three cultural traditions of the lost-wax process of metal casting. The arts of Igbo Ukwu (ninth to 10th centuries), Ife (12th to 15th centuries), and Benin (15th century to 1897) are chiefly productions in bronze, an alloy of copper and tin. Lead added to the alloy distinguishes the Igbo Ukwu artworks from the later metal castings of Ife and Benin artists, who added zinc to the alloy to form brass. In brief, the surfaces of the Igbo Ukwu lead bronze works cannot be altered after casting, which requires accurate design in the initial stages to form a precise mold. At the beginning of the process the artist must gauge precisely how the artwork should look when completed. The relationship between the Igbo Ukwu works and other metal-casting traditions in Nigeria's southern region, such as Ife and Benin, is unknown.

The art of Igbo Ukwu has been uncovered at three excavated sites related by proximity and material: a burial chamber, a shrinelike chamber, and a refuse pit. The first site was the grave of an *eze*, who was buried as if appearing in a ceremony, seated upright on a round stool and secured with two metal brackets propping up his arms. Fragments of fabrics found in the chamber indicate that the *eze* was donned in ceremonial attire. Buried with him were ivory tusks, woven mats, a leopard skull on a staff, a lead bronze of a male horse rider for a staff head or fly whisk handle, a fanlike feathered staff, a feathered crown, a pectoral plate, and thousands of glass beads, which were probably used in jewelry worn on the legs and wrists and around the neck. This Igbo Ukwu burial site is reminiscent of those of Egyptian pharaohs, who were also buried with their ritual and funerary art.

At the second site an array of lead bronze cast objects with finely worked, decorative surfaces were placed on a clay platform, possibly a shrine. Included among these objects were pendants, one in the shape of a human head containing facial scars and others portraying a leopard, elephant, and ram; vessels in the shape of calabashes and shells; ornate staff heads and knife scabbards; a hollow stand with figures and snakes; and a cast pot on a pedestal encased in a network of realistic-looking cast ropes. The surface treatments of many of these objects include various details in the lead bronze cast—for example, animals like the spotted leopard, geometric patterns such as spirals, and insects like flies.

The third site contained numerous decorative terra-cotta pottery pieces, which were possibly originally used in ritual

ceremonies. The surfaces of these pots were adorned with deep grooves of curved lines.

Ife is an ancient city in southwestern Nigeria. There is evidence that the city was occupied prior to the eighth century C.E. Scholars propose periods of development that include an Archaic Period (before 800), a Pre-Pavement Period (800 to 1000) and a Pavement Period (11th to 15th centuries). The origins of Ife can be traced back to around 350 B.C.E., when it began as a cluster of about 13 hamlets. Ife holds particular importance to the Yoruba, a historically urban people who represent one of the largest ethnic groups in Nigeria. According to the Yoruba worldview and religious philosophy, Ife is the place of origin of all humankind. It is the place where the creation of the world began and where the custom of kingship began. For this reason, Ife has great religious and political significance. Here the deities Oduduwa and Obatala descended to earth under the instruction of the creator Olodumare. Oduduwa's legacy is associated with forming the city of Ife and becoming its first divine king, while Obatala is associated with creating the inhabitants of Ife out of clay. Yoruba kings still trace their ancestry to the original Ife people and their sacred kingship system.

The Opa Oranmiyan, or staff of Oranmiyan, belongs to Ife's Archaic Period and dates to around 800. The staff is a granite monolith rising 18 feet, much taller than other stone monoliths built in Ife during the period. One of the legendary sons of the god Oduduwa, Oranmiyan was the founder of the Yoruba city-state of Oyo and the 14th-century Edo kingdom of Benin located in central Nigeria. Therefore, the Opa Oranmiyan monolith commemorates a ruler, warrior, and progenitor. The spiral-headed iron nails on this monolith may relate to Oranmiyan's association with Ogun, the Yoruba deity of war and iron (used for weapons and tools).

Human and animal subjects from the Pre-Pavement Period are stylized but more naturalistic than those from the Archaic Period. A stone male figure known as Idena ("Gatekeeper") is columnar in form. The simulated beaded necklace and bracelet on the figure suggests that he symbolizes a person of high rank. His hair is composed of wrought-iron nails. These materials link this figural sculpture to the iron and stone works that date to the Archaic Period.

In the Pavement Period paved courtyards in the palace, shrines, and gateways were sacred places that contained ritual pots fitted with lids representing various animals (rams, elephants, hippopotami, and leopards) sacred to the power position of the king. The bottom of each pot was broken to allow the poured sacred liquids to penetrate the ground. The body of the terra-cotta pots contained decorations that had symbolic religious and political meanings.

Ife kings, as descendants of Oduduwa, ruled by divine right. During the Pavement Period terra-cotta and cast brass

heads were made in their honor and possibly were primarily intended to be placed on shrines. The naturalistic heads seem to represent both male and female royalty (kings and possibly queens). The terra-cotta heads are adorned with decorative crowns; while some of the brass heads of the kings have holes around the hairline, probably for a colored glass-beaded veiled crown to be inserted. The crown symbolically shades the metaphorical king—who serves as a spiritual entity and whose speech is sacred—from the profane world. The holes around the mouth of the brass male heads are believed to have originally held hair for a beard and mustache, symbolically referring to their wisdom. It is believed that these brass heads were placed on wooden bodies that were clothed in the king's ceremonial attire and seated on a throne. They were effigies of the king erected while he was away from the palace and possibly suggest his omnipresence. Some of the terra-cotta and brass heads have lines around their necks to symbolize wealth and good health.

One brass full figure representing a king is bear chested and wears a traditional wrapped cloth around the lower portion of his body. In his hands he holds objects that may symbolize his spiritual powers as a leader. This standing figure exhibits the traditional African figural style. He is rigid in posture, frontal in presentation, and symmetrical. His head, which is naturalistically rendered, is attached to a stunted body. In fact, the head is three to four times the size of the entire body. The disproportionate size of the head on this figure reflects the African religious philosophy that the head is the most important part of the body because of its spiritual empowerment.

The Tellem lived the Bandiagara Cliffs in the Sanga region of eastern Mali. Tellem art consists of wood sculptures of human figures and utilitarian objects, such as neck rests, spoons, and bowls. The figural sculptures are stylized forms and have raised particular interest because several were originally attributed to the Dogon but later were attributed to the Tellem. The figures' upraised hands, invoking rain for crops in this dry climate, are characteristic of the Tellem style. This art style influenced Dogon figural sculpture and continued in Dogon sculpture well into the 20th century. The Tellem wood figural sculptures, intended to be placed on shrines, are covered with a thick encrustation, the result of repeatedly placing or pouring sacred liquids on or over the wood for each religious ceremony associated with the sculptures.

Tellem textiles were used for both clothing and burial blankets. The strip-woven cloths are some of the earliest extant examples of this type of West African fabrics. In the 11th and 12th centuries ritual terra-cotta pottery decorated with a plaited roulette. Possibly before and definitely beginning in the 13th century utilitarian terra-cotta pots were made by the

paddle-and-anvil technique and decorated with impressions from woven mats. Other Tellem art objects include finely knotted plait work (natural vegetable fiber weavings of skirts, belts, and mats); leather objects (sacks, sandals, and boots painted with geometric designs); and iron hairpins, spears, arrowheads, and hoes.

SOUTHERN AFRICA

Southern Africa is the region encompassing the countries presently known as Namibia, Botswana, Zimbabwe, Mozambique, Swaziland, Lesotho, and South Africa. As elsewhere in Africa, much of the art history of the region remains obscure. Around the third or fourth centuries a gradual southern migration of peoples produced settled farming communities and show evidence of iron smelting.

Seven terra-cotta Lydenburg heads, named for the burial site where they were found, are the earliest known works of art produced by the culture that emerged in the eastern Transvaal at the beginning of the Common Era. Dating to the sixth century, these heads were produced by a culture in the Lydenburg Valley and represent the oldest known artworks from the Iron Age south of the equator in Africa. Slag in the area is evidence of the local forging of metal and firing of clay. The heads were found buried in a pit along with animal bones, pottery shards, beads, and metal ornaments.

Although not identical, all the Lydenburg heads show similar characteristics. They are hollow terra-cotta constructions with protruding noses, eyes, and mouths. Decorative details made with incised lines represent facial scars, hairstyles, and wide neck rings. White pigment residue suggests that the heads originally may have been painted. The heads are group in terms of size. The two larger ones differ from the smaller ones by a stylized animal figure surmounting the top.

The function of these heads is unknown. Speculation is that they may have been used in ritual ceremonies associated with initiation and perhaps were worn. Two are large enough to fit over a human head and neck and may have been worn as helmet masks. The five smaller ones have small holes on both sides of the neck, which suggest they may have been attached to a structural support. Although scholars have connected small pottery figurines to initiation rites throughout southern Africa, it is unclear whether the Lydenburg heads served a similar function.

THE AMERICAS

BY JULIA MARTA CLAPP

MESOAMERICA

The art of Mesoamerica from the fifth century to the 16th century is exceptionally rich. Variations in climate and types

of settlements as well as shifts in power have yielded equally varied objects of ritual, history, celebration, and memorial. In Mesoamerican art history the epochs encompassed by the medieval era are the Classic Period (ca. 150–ca. 650), the Epiclassic Period (ca. 650–900) and the Postclassic Period (ca. 900–1521).

THE CLASSIC ERA: THE MAYA

The Maya are one of the most studied civilizations in pre-Columbian Mesoamerica. Unlike many other groups, there are still Maya populating parts of Mexico and Honduras, Guatemala, and El Salvador. Before the Spanish conquest, the Maya were concentrated primarily in the northern parts of these countries as well as the Yucatán peninsula of Mexico. The Yucatán is surrounded on three coasts by the Gulf of Mexico and the Caribbean Sea. The regions occupied by the Maya are traditionally referred to as the lowlands and the highlands. The lowlands region encompasses the peninsula and takes its name from the flat landscape. The peninsula of the northern lowlands is formed by a great limestone shelf, and its flatness contrasts greatly with the Mexican and Central American highlands.

The archaeology and study of Mayan artifacts are especially popular among scientists, historians, art historians, and the general public alike. Part of their popularity is due to the Mayan form of hieroglyphic writing, from which we are able to learn a great deal about Mayan culture. Mayan art is also quite aesthetically captivating, as it tends to be both ornate and grand. The Maya have come to be thought of as the embodiment the Classic Period, as their culture was particularly rich and their methods of self-expression proficient and profound. Some art historians define the Classic Maya Period as the period in which the Maya were using the Long Count calendar.

Much Mayan art of this period was monumental. One of the many examples is found in the Mayan city Palenque, where archaeologists discovered the remains of the king Pakal (r. 615–683) buried within a pyramid called the Temple of Inscriptions. The lid of his tomb (ca. 683) was decorated with the image of Pakal as he died. The lid is ornately decorated, and Pakal's body seemingly falling through the air is carved in stone.

The Maya also made stela, carved stone markers that are similar in shape to modern-day gravestones. These were placed on the ground in front of temples or occasionally in plazas. Stelae often depict a ruler positioned frontally, with the face in profile. Lavishly dressed with an elaborate headdress, the figure usually carries such objects as scepters, which connote political power, or spears and shields, which connote military success.

Political leaders were not the only individuals whom the Maya represented in art. Although Mesoamerican civilizations have shown variations among various societies' primary deities, in the Classic Period a pantheon of gods began to solidify, and they persisted into later centuries. The rain god and the maize god, related to agriculture, were particularly important to the Maya. To these gods, the Maya made monuments whose corporeality and three-dimensionality contrasted with the flat carving of monumental stelae. Two from the important highland site called Copán—one of a scribal god and another of the maize god—are approximately 2 feet tall and are carved in stone. These figures are carved with a high degree of realism: Their body parts are proportional, and their features generally resemble those of human beings. Facial expressions vary, and each god wears a headdress and ornate jewelry around the neck. These figures, along with stelae, were placed around the interior and exterior of major temples.

Not all Mayan art was made of stone, however. The site of Tikal had less stone sculpture than such others as Copán. Instead, the pyramids were decorated with wooden lintels carved in relief. One of the most famous of these wooden lintels is from Temple IV at Tikal, which depicts a Mayan king, Ruler B, sitting on a throne and holding a spear and shield that confirm his power. The lintel, partly eroded, is densely and ornately carved.

The Maya have often been erroneously perceived as peaceful and benign, contrasting with the notoriously warlike Aztec (15th–16th centuries). However, like the Aztec, the Maya also practiced blood sacrifice, which is depicted in a stone relief carving called Lintel 24 (3 feet, 7 inches high, from the early 8th century), which depicts a ruler's wife named Lady Xoc. In the carving the kneeling Lady Xoc pulls a rope through her tongue and draws blood. Above her stands the Yaxchilán ruler named Shield Jaguar. He holds a flaming staff over her head.

Among the most amazing archaeological finds from the Classic Period Maya are the well-preserved murals of Bonampak (ca. 800), located in a region that had been largely unexplored and previously thought by archaeologists to be unremarkable. The murals are in narrative form: They tell a historical account of battle and leadership. The figures are shown both frontally and in full profile and are splendidly dressed in war regalia, headdresses, and spotted animal skins.

THE CLASSIC ERA: TEOTIHUACÁN

Teotihuacán, located in central Mexico (about 20 miles outside modern-day Mexico City), was one of the major cities in its time (ca. 1–650). At its zenith it had a population of about 200,000, making it comparable to contemporary Euro-

pean cities, such as Constantinople, the capital of the Roman and Byzantine empires. Little is known about the people who lived there, but they left behind the remains of a stunningly grand metropolis that included housing, giant plazas, two gigantic pyramids, and other architectural achievements. Teotihuacán's historical legacy continued into Aztec times, half a millennium later; the Aztec viewed Teotihuacán as a holy and historically important site.

The sculpture of Teotihuacán is vastly different from that of the Maya. While Mayan art is ornate and intricate, Teotihuacán artisans created forms that were simple, blocky, and geometric. This style is similar to that of the Aztec. The art of Teotihuacán includes basalt sculpture of deities. One of a woman may represent a water goddess and—at 13 feet high—weighs 22 tons.

Teotihuacán art is perhaps best characterized by the plentiful and beautiful masks that have been found there. The masks do not specify gender or age, and they give a general feeling of anonymity. It is not clear how they were used—they were perhaps displayed or used in burial. The masks were made of clay, stone, serpentine, onyx, or granite. One of the best known of these masks is made of stone and has a broad forehead, almond-shaped eyes, and an open mouth. The surface of the face is inlaid with pieces of turquoise, and the eyes are inlaid with shell.

As did the Maya, the citizens of Teotihuacán painted murals. Some of the earliest evidence of pigmentation is on the surface of the Temple of the Feathered Serpent (ca. 300), where red, blue, white, and yellow polychrome is still evident many centuries later. At Teotihuacán this practice led to mural painting, which has been found in abundance in apartment complexes from the fifth through the eighth centuries. Red is an important color in these works, which generally depict culturally and politically important themes, such as warfare, sacrifice, and various deities. The images are repetitive and have been compared to wallpaper.

THE POSTCLASSIC ERA: THE TOLTEC, THE MIXTEC, AND THE AZTEC

Several centuries after the fall of Teotihuacán and after the collapse of the Classic Maya civilization (which was gradual and documented in art with the depiction of numerous war scenes), the art and culture of Mesoamerica assumed a distinctly different aesthetic. Shifting territories, alliances, and ensuing battles led to the abandonment of Classical Period cities.

The Postclassic city Tula (inhabited by the Toltec) was celebrated by the Aztec, who elevated the importance of Toltec accomplishments and (perhaps erroneously or in exaggeration) ascribed other civilizations' achievements to the Toltec as well. Nowhere is the change in artistic approach more

evident than at Pyramid B in Tula. The low, vast building is the platform upon which massive Atlantean columns stand. These represent warriors and are adorned in warrior costume; each holds an atlatl (a spear thrower). These figures are large and are meant to be seen from far away, underscoring their symbolic importance in military defense. Their blocky, geometric simplicity and imposing silhouette are wildly different from the detailed ornament favored by the Maya.

Monumental sculpture was hardly the rule, however, during the Postclassic Period. Metalworking came north to Mesoamerica from greater Central America and was subsequently practiced by the Mixtec in Oaxaca, in the Mexican highlands. For example, in a tomb at the site Monte Albán (whose occupation spanned centuries throughout pre-Columbian history) archaeologists found an 8.5-inch piece of gold jewelry that had small, intricate carving of bells, a ball



Masked male figure; ceramic with paint, Mayan culture, Mexico, ca. 700–ca. 900 (Los Angeles County Museum of Art, gift of John Gilbert Bourne, Photograph © 2006 Museum Associates/LACMA)

court, and the sun. The ornament is composed of many parts, which are joined by tiny, delicate clasps.

The Aztec Empire, along with Teotihuacán, was one of the most powerful civilizations in pre-Columbian Mesoamerican history. The Aztec (also known as Mexica) were immigrants who came from a mysterious northern land called Aztlán. In central Mexico they established the Triple Alliance, a network of three polities that exerted hegemonic control over neighboring areas. The heart of the Aztec Empire was Tenochtitlán, a stunning city of boulevards and canals that was located on an island in a lake. After the conquest the Spaniards drained the lake, and Tenochtitlán became Mexico City.

The Aztec were notorious for their practice of human sacrifice as well as for their totalitarian and warlike manner of rule, and the beauty and spirituality of Aztec art have nearly been eclipsed by their scandalous reputation. The Aztec were prolific artists whose monuments, sculpture, ornaments, architecture, and manuscripts were deeply meaningful and filled with symbolism. Major themes in Aztec life and art include religion, sacrifice, and politics; all of these ideas were completely enmeshed. Unlike the Maya, who tended to depict rulers and warriors, the Aztec portrayed their gods. One of the most astonishing Aztec sculptures is the 11-foot, 6-inch-tall statue of Coatlicue (ca. 1487–1520), which was discovered in Mexico City. Coatlicue is an important goddess in the pantheon, as she is the mother of Huitzilopochtli, the primary deity of the Aztec. The monumental statue shows the goddess decapitated and without her feet or hands. In place of her head, two serpent heads symbolize flowing blood. Coatlicue was a victim of murder at the hands of her children, but the statue portrays her not as a sympathetic victim but rather as an imposing, menacing figure.

The most famous Aztec sculpture is called the Calendar Stone (ca. 1502–20). This enormous disc measures 11 feet in diameter. It is carved in relief and represents an extremely complex system of cosmological symbols. *Calendar Stone* is actually a misnomer, as the work functions not as a calendar but rather as a record of different epochs as perceived by the Aztec. In the center of the disc is a face, which represents perhaps either the earth or a solar creature. Radiating from the central figure are the 20 day signs, which are part of the 260-day divinatory calendar, and other cosmological symbols.

The Aztec also created charming sculptures of plants and animals, such as a gourd, a dog, a grasshopper, a flea, a toad, and many serpents. The sculpture of a dog is particularly appealing. The heavy stone animal has large paws like a puppy and sits in the position of a wolf baying at the moon. However, the carved mouth is upturned at the corners as if it is smiling. Many of these animals appear so delightful that it is difficult

to imagine that a culture like that of the Aztec was capable of creating them. However, the Aztec were deeply connected to the natural world, in terms of both spirituality and daily life. The function of these animals is not known, but the care and observation evident in their creation suggest that these animals were quite culturally meaningful.

NORTHWEST COAST OF NORTH AMERICA

One of the greatest discoveries in the second half of the 20th century was that of Ozette (in 1970). Ozette was a Native American settlement in modern-day Washington State that was occupied before the conquest and inhabited until about the 16th century. Owing to a mudslide that preserved objects at the site, archaeological excavation has yielded tens of thousands of artifacts. Especially remarkable is the preponderance of wooden objects, which are especially unlikely to survive intact over several centuries (compared with other durable materials, such as stone). Many of the objects from Ozette were created for practical use: There were tools, carved tool handles, bowls, and boxes. One tool handle in particular is carved with a human face. While the lower part of the handle remains uncarved, the top is formed into a simplified and somewhat abstract face with recognizable, elongated features. A wooden box called a kerf box (in which one piece of wood is bent into shape, rather than made of joined multiple parts) has incised, simplified outline images of whales, an important animal resource for this water-based community. The significance of the whale could have been supernatural or related to hunting or both.

THE NORTH AMERICAN SOUTHWEST

In the southwestern region of the present-day United States (modern-day Arizona), the Hohokam (ca. 500–ca. 1400) were known for their painted bowls with both geometric and abstract human forms. The painting of the Hohokam is especially repetitive. Geometric designs serve as a background for schematic and abstract human figures engaged in various activities, such as playing musical instruments or dancing. It is often difficult to distinguish males from females owing to lack of specific detail, but it is possible to guess based on hairstyle or dress.

East of the Hohokam territory the Mogollon people occupied modern-day New Mexico beginning around 500. The Mogollon also had a compelling tradition of pottery; archaeologists have found bowls in burial sites, placed over the faces of the deceased. The meaning of this practice is mostly a mystery, but one interesting detail is that most of these bowls have a hole punched out of the bottom. Scholars have suggested that the hole is the result of a ritualistic process of “killing” the bowl before it was buried, indicating that many Native

Americans believed the objects of their creation literally to be alive.

The Mogollon bowls are also painted and are more narrative and detailed than those of the Hohokam. These bowls, produced by a part of the Mogollon culture called the Mimbres, often include geometric designs around the rim of the bowl, with a scene featuring humans or animals in the center. These images are abstract, but less so than those of the Hohokam, and the content of the narrative is easier to decipher. For instance, one bowl shows two birds (decorated with a checkerboard pattern) with hatching eggs, another displays a person trapping crows in a garden, and yet another is painted with a figure between whose splayed legs seemingly emerges a baby.

The Anasazi (ca. 900–1300) occupied the area where Colorado, Utah, Arizona, and New Mexico now meet. Their habitations are distinguished by kivas, ceremonial pits in which private rituals occurred. The walls of the kiva were plastered over, and murals were then painted in detailed but abstract forms. The murals are narrative, showing various scenes about whose meaning we can make only educated guesses. Figures are painted in a blocky style but are adorned with clothing and headdresses, and they are shown holding such items as bows and arrows. These murals depict humans, plants, animals, and deities in various scenarios, many of which pertain to agriculture and fertility.

MISSISSIPPIAN CULTURE

The Mississippian people (ca. 7500–1500) inhabited territories in the midwestern, eastern, and southeastern parts of the modern-day United States. Much Mississippian art is characterized by incised tablets and carved figural sculptures. Many of these sculptures represent seated figures that seem to be either nude or clad in extremely indistinct articles of clothing, though some are adorned with earpools. The figures have varying facial expressions that can be animated, if schematic. These may have functioned as generalized portraits of ancestors.

The Mississippian people made shell gorgets, or pieces of armor worn at the throat, which were incised with images of human figures and supernatural or other symbolic images. One gorget resembles Mesoamerican art of the era, both in style and content: A warrior whose body is depicted frontally—but whose face is in profile—holds a human head in one hand and a weapon in the other. His body is contorted to fit the shape of the gorget. The carving is simple and elegant, and includes simple clothing draping the figure as well as jewelry around his neck, wrists, and legs; he also wears a headdress. Objects with such carvings suggest important details about the culture, such as the practice of beheading,

the importance of military superiority, and the use of certain tools and articles of clothing.

THE CARIBBEAN

The native people of the pre-Columbian Caribbean have a long, multimillennial history and probably migrated thousands of years ago from South America. The artwork of the period between 600 and 1200 was influenced by the Saladoid people, who distinguished themselves by living in rooted communities and using agriculture (rather than living transiently and eating from the wild). They established themselves from the Lesser Antilles to the eastern coast of the island of Hispaniola. Succeeding the Saladoid were the Ostionoid, who archaeologists believe are descended from the Saladoid and Archaic people. It is from the Ostionoid people that the roots of Taíno art is found. The Taíno (1200–1500) are the society who first came into contact with Christopher Columbus and also whose culture is the most studied in pre-Columbian Caribbean art.

There are several types of objects that the Taíno people made beautifully and prolifically. One of these is the *duho*, or ritual seat. *Duhos* were made out of wood and often had a high back and a simple, sloping shape. (Others had no back and more closely resembled a footstool). Often the *duhos* were carved or incised with anthropomorphic, zoomorphic, and geometric shapes, which would have been ritualistically symbolic. *Duhos* were not simply a place to sit but were used in ceremony, such as hallucinogenic or spiritual and supernatural rituals. Most *duhos* come from Hispaniola (the island on which Haiti and the Dominican Republic are located), Puerto Rico, the Bahamas, and the Turks and Caicos Islands. *Duhos* from Hispaniola tend to be made of wood, while those from Puerto Rico are generally made of stone. Bahamian *duhos* are stylistically the most complex and ornate.

The Taíno are also known for *zemis*, which are ritualistic idols or objects that the Taíno considered literally to be alive. *Zemis* generally took three different forms: stone collars, elbow stones, and three-pointers. Three-pointers are a particularly interesting type of Taíno art, as their shape is so unusual. These carved, stone objects range from 1 to 12 inches long, are roughly triangle shaped, and can stand upright on a surface. Three-pointers are carved or incised, often with one or two anthropomorphic faces, animals, or supernatural beings. The elbow stones and stone collars served as bases for the three-pointers.

SOUTH AMERICA

The northeastern region of South America, encompassing modern-day Peru, Bolivia, and parts of Chile, has offered archaeologists a great wealth of pre-Columbian artifacts. The

region occupied by these peoples ranged from extraordinarily mountainous to sea-level, coastal territories. The best-known civilization of this region is the Inca, who, in addition to the Aztec, had the largest, most powerful empire in pre-Columbian history and who were in power when the Spanish arrived. The Inca were ultimately conquered (in 1532) by the Spanish invaders, led by Francisco Pizarro (ca. 1475–1541). However, many great civilizations produced art objects before the time of the Inca.

The Huari (of Peru) and the Tiwanaku (of Bolivia) were contemporaries whose societies were active during the Middle Horizon Period (ca. 500–ca. 1000). One of the most spectacular archaeological finds from Tihuanaco is the Sun Gate, a monolithic sculpture that archaeologists believe functioned primarily as a calendar. It is no longer at its original site, so its purpose as a gate is less apparent. The square, blocklike gate is carved in relief, with a face projecting from the top-center. The face is abstract and not easily identifiable. However, it is believed to be a deity. In addition to the projecting deity, there are low-relief carvings of dozens of birds and humans. The carvings on the Sun Gate are impressively ordered and organized, yielding an almost gridlike surface design.

South America is particularly well known in the pre-Columbian and the current era for production of spectacular textiles. These were used for everything from clothing to burial wraps to ceremonial tapestries. Textiles from the Huari were an important part of their artistic production, and the motifs found therein have similar symbolic significance to the motifs found on the Sun Gate. Before the arrival of the Spanish, South Americans wove in fibers from local animals, such as the llama and the alpaca, or plant fibers, such as cotton. Textiles are colorful and complex, with abstract representations of animals and deities (but not humans). Often the figures are difficult to “read” (interpret) because they have been expanded or contracted, rendering them quite abstract. In general, textiles were not necessarily made for personal use, so the subject matter was not a choice of the artist. Subject matter would have been determined by the government, but the means of representation were the artist’s choice.

The means of representation changed around the turn of the millennium, and designs became more geometric and less politically or religiously symbolic. These changes may have been the continuation of an evolutionary process in which images became increasingly abstract. Although animals—especially small birds—continued to be represented, the depiction of deities (in any form) seems to have ceased.

As in Mesoamerica, the working of metals was also a significant aspect of artistic production. This metalworking (especially in gold) took the form of jewelry, tools (such as ceremonial knives), headdresses, and cups. Gold was abun-

dant in this area, a fact whose importance to the invading Spanish in the 16th century cannot be overemphasized. Gold was often intricately hammered in repoussé; had attached dangling, delicate parts; and also contained inlaid materials, such as turquoise. Many of these pieces depict a deity figure with raised arms, a tunic, and an elaborate headdress.

The Inca were a powerful empire whose artistic production did not end at the time of the conquest but rather became enmeshed with Spanish traditions to create a new, colonial style. Textile production continued with the Inca, to whom textiles were extraordinarily important. The Inca did not have an economy founded upon currency but rather used cloth as economic capital. Incan society was conducted around a strong belief in production for the common good. This practice tended to yield a surplus in product; Spanish conquerors were shocked to find warehouses full of textiles at the time of the conquest. Textiles took the place of monetary currency in a complex system of tribute, taxation, organization of labor, and sacrifice. Production was strictly regulated by the government.

Incan textiles demonstrate that the civilization was exceptionally proficient in the realm of abstract thinking: Complex designs were plotted in advance and sometimes required the weaver to hold the loom sideways or upside down. As in earlier periods, many Incan textiles were highly abstract and geometric, often depicting zigzags, stripes, and color blocks. Also, many Incan textiles are divided geometrically into a grid of abstracted designs called *tocapu*, which convey symbolic, sociocultural meaning. Much of Incan textile production was devoted to tunics and tapestries.

ASIA AND THE PACIFIC

BY CARYN E. NEUMANN

The medieval art of Asia and the Pacific is characterized by complexity, unity, duality, and diversity. Although the region is so large that it is difficult to summarize its artistic output, some commonalities exist. Buddhism and Hinduism shaped much of the art across national boundaries. Trade and conquest brought Chinese styles into Southeast Asia, influencing the art of that region. Only a few fragile pieces of Asian art have survived, and many paintings, fabrics, and pottery samples have been lost to the ravages of time. Many of the surviving pieces have been discovered in tombs or remained as part of aristocratic collections.

CHINA

Influenced by Confucian thought, China valued function more than the individual. This thought is reflected in Chinese art in that styles are well known but individual artists

had relatively little importance. Only a few Chinese painters gained a reputation as masters. Gu Kaizhi (ca. 344–ca. 406) authored a guide to painting, *Hua yuntaishan ji* (On Painting the Cloud Terrace Mountain). Xie He (ca. 500–ca. 535) focused more on analysis than art in his *Zhongguo huihua shang de liufa lun* (Six Canons of Painting). The book explained the principles of art as expression through heavenly spirit, sympathetic responsiveness of the spirit, method in the use of the brush, faithfulness to the forms portrayed, conformity to reality in the application of colors, proper planning in the placing of elements, and transmission of experience of the past in making copies. Little remains of painting from the early medieval period in China, despite the evident interest in this art form. Much of the surviving work includes tomb murals by provincial painters or copies of paintings engraved on stone or other hard materials. Paintings of the first rank in their original form are extremely rare. The copies show impressive linear mastery, particularly in the handling of drapery, where the effect is one of swirling and fluttering movement. The people have square skulls, slightly pointed chins, and noses with sloping shoulders.

Most of what we know of Chinese art in the time of the Six Dynasties, specifically the period of the last three of these dynasties (479–589) comes from more durable forms. The continuity of earlier traditions remained strong in sculpture. Dragons, lions, chimeras, and birds retained the formation and lines of the earlier Zhou (1045–256 B.C.E.) and Han (202 B.C.E.–220 C.E.) eras. A chimera sculpture found in a Buddhist cave at Xiangtangshan is a squatting figure, with square mouth, buck teeth, large potbelly, and forepaws planted on haunches. It possesses the vigor and humor of the animals of the earlier periods. Such animals, serving as honor guards and site protectors, flanked the so-called Spirit Paths that led to the tombs of rulers, princes, and high-ranking nobles.

Chinese mythology features heavily in the art of the Sui Dynasty (589–618). The four mystical animals or the 12 animals of the zodiac appeared in paintings, engravings, sculptures, and other works of art. The four mythical animals are the green dragon, white tiger, scarlet bird, and tortoise snake. The 12 animals of the zodiac are the rat, ox, tiger, rabbit, dragon, snake, horse, sheep, monkey, rooster, dog, and pig.

The Tang Dynasty (618–907) created an especially rich environment for the arts. Politically stable, Tang China showed an openness to new ideas that created an especially rich environment for the arts. The Tang artistic style mirrored the power and vigor of the empire. Sculptures had ample proportions in three dimensions, while paintings also reflected fewer strictures. It is possible that highly calligraphic painting styles, including the extreme forms of “splashed ink,” developed in this era. Surviving Tang paintings include wall

paintings from tombs, among them, hunting scenes in landscape settings and sophisticated figural compositions of court ladies and attendants. All of these works reveal a noticeable lack of interest in the placement of figures in an environment beyond a very shallow space.

One of the great masterpieces of Tang China is the seventh-century *Scroll of the Thirteen Emperors* of Yan Liben (ca. 600–ca. 673). The painting, by a court artist, represents 13 emperors with their attendants. The first part of the scroll—the part that would have been most damaged by frequent unrolling—is a copy, but the last seven emperors are originals. The scroll contains brushwork that exhibits firm, even lines with strong composition. Secondary figures are alert, and all of the figures suggest mass and volume. Only the depiction of the faces still relies primarily on line. Shades of red, probably reflecting Indian influence, illuminates the costumes. The setting is still abstract, with the figures shown in relationship only to their immediate environment.

While Yan Liben dominated the seventh century, the greatest name in Tang painting was Wu Daozi (ca. 720–ca. 760). Acclaimed as a figure painter, he specialized in Buddhist and Daoist subjects yet left no works that survive. He is recorded as creating wall paintings of unusual power and movement, stress, and strain. Wu is credited with introducing one of the most unrealistic elements of Chinese painting: a calligraphic line of varying thickness to express the movement and power of the brush as well as to model drapery.

In addition to Tang artists who specialized in figure painting, painters who concentrated on still life subjects appeared for the first time. Painters who focused on horses were particularly popular, since horses were exceedingly important to Tang military strength. The greatest horse painter, Han Gan (ca. 706–ca. 783), showed notable realism of detail in his painting of two horses, with a central Asian groom riding one and leading the other. He used a typical abstract setting. Huang Quan (ca. 903–ca. 968) gained fame with his fur and feathers paintings. These works realistically depicted birds, insects, tortoises, and other creatures.

One of China’s most significant contributions to world art is landscape painting. It developed rapidly in the Tang Dynasty and reached fruition by the early Song Dynasty (960–1279). With decorative use of green and blue, sketchily differentiated trees, the depiction of distant foliage only along the contours of hills and mountains, and the repetitive, unvaried shape of mountains, Tang landscapes often suggested a miniature landscape rather than the grander images of the later era. An impression of space was created by placing some mountains in echelon from right to left and by overlapping others from front to back. The blue-and-green color palette became especially associated with Tang China. No ink mono-



Album leaf: Pomegranate; ink and color on silk, China, ca. 1200–ca. 1340 (Los Angeles County Museum of Art, gift of Caroline and Jarred Morse, Photograph © 2006 Museum Associates/LACMA)

chrome landscapes of Tang now exist, though some monochrome figure paintings do survive.

During the brief period of the Five Dynasties and Ten Kingdoms of the 10th century, the economy of the middle and lower reaches of the Yellow River was devastated by warfare. However, there was less warfare among the kingdoms of the south, and the political situation there was relatively stable. The Southern Tang ruled the whole province of Jiangxi and a part of present-day Anhui, Jiangsu, Fujian, and Hubei provinces. As a relatively powerful kingdom, it encouraged the arts to flourish. The Southern Tang considered itself to be the successor of the Tang Dynasty. It imitated Tang China to a great extent, including the style of realism begun during that dynasty.

JAPAN

Japanese art began to emerge from the shadows of China during the Heian Period (737–1185). Sculptures in the Jogan style were carved from a single block of wood in a style known as *ichiboku-zukuri* to give the impression of a columnar and massive image. A typical figure of a Buddha stands erect, evenly balanced on both feet in a perfectly symmetrical and rigid pose, facing the worshipper with no sway and no bending of the head. The expression on the face is forbidding: Jogan figures rarely seem gracious or approachable. No attempt is made to smooth over the cuts of the knife as Jogan sculpture emphasizes both the material and the tool used to work

it. Portrait sculpture is rare, and religious themes are most common. Sculptured Shinto icons began to appear in the eighth century, some in forms borrowed directly from Buddhist imagery. Others have the characteristic features and wear the dress of contemporary aristocrats. Jogan paintings, now extremely rare, included the mandala, a graphic representation of the cosmos used for meditation.

Later in the Heian Period art became more refined and decorative. In sculpture Fujiwara style images were assembled from many separate pieces of wood. These blocks were first hollowed and rough-hewn and then glued or pegged together, the finishing details carved, and paint or ornament applied. This technique, known as *yosegi-zukuri*, permitted greater undercutting and ease of pose while preventing warping and checking. Surviving Jogan sculptures have large splits because the surface of the wood dried and contracted earlier than the interior. The portrayal of Buddhist icons in painting continued. Iconic art is traditionally conservative because the magic that resides in the image may not work if the image is not accurate. One of the most important Buddhist paintings in East Asia, the *Parinirvana of the Buddha* from 1086, does show some changes. The figures evidence realistically portrayed emotion, with even animals displaying emotional states. The combination of space, color, and pattern with a unified emotional progression from calm to paroxysms of grief produces a masterpiece of Japanese art.

VIETNAM

Triumphant in China until the middle of the ninth century, Buddhism continued to flourish in other countries of eastern Asia for several more centuries. The first sign of Buddhist artistic influence in Vietnam dates to the eighth century. Baked-earth, scale-model towers have been found by archaeologists throughout the country. These towers have sides decorated with niches in which enthroned Buddhas sit. The roofs are tile, capped with a tall parasol. The Ly Dynasty (1009–1225) made Buddhism the state religion of Vietnam. The Ly rulers ensured themselves of the clergy's support by covering the country with monuments. Only a few statues remain intact in the Traces of Buddha Pagoda built in 1057 on the slope of Mount Lan Kan. In addition to a nine-foot Buddha surrounded by dragons, flowers, and light-relief flowers, the pagoda houses works depicting animals, secondary gods, half-avian half-woman spirits holding musical instruments, and sentries. Clay sculptures of birds, dragons, and ficus leaves are stereotypical of medieval Vietnam.

INDIA

In India the Gandhara school of art dominated from the first century B.C.E. to the ninth century C.E. It shows Hellenistic

influence in the way that clothing is draped on statuary as well as in the design of faces. Gandhara art is divided into two phases, the second phase beginning in the third century. This second phase relied heavily on stucco, blending the realistic forms of the Greeks with the rigid, frontal patterns that have ties to Indian mysticism. Stucco art was essentially a narrative of the life of the Buddha. It was the first to show the history of the Buddha on a large scale and the first to depict him as a human being. The Buddha typically has only a simple circular halo without decoration. Vivid colors of gold, black, and red were used to enliven statues on standardized architectural structures. The Gandhara style influenced the portrayal of figures throughout the Buddhist world from China to Korea and Japan.

There are too few surviving examples of painting from the Gandhara school or the Gupta Period (320–650) to make generalizations. Cave paintings found near the river Bagh show a princess in great grief being consoled by her companions, a group of princely figures, monks and female lay devotees, and dancers performing a folk dance. A few other surviving paintings depict Buddhas.

After the Gupta Period in India, the Gurjara-Pratiharas came to power in the eighth century. Hindu deities were frequently featured in sculpture and paintings, but Buddhism remained a powerful influence. Ivory carvings recovered from this period show Buddha resisting the offerings of Mara, the devil. Pieces that depict the four faces of tortoise, lion, boar, and fish were common. Surviving sculptures have elegant designs, with clouds in the background, dreamy eyes, elaborate jewelry, and naturalistic bodies. The figures tend to be thick-set, often corpulent. The sculptors were equally at home working in stone or clay. Terra-cotta sculptures survive in temples, as do examples of metalwork. Large bronzes from Kurkikar show the Buddha's descent from heaven on a jeweled ladder flanked by Indra and Brahman, his turning of the Wheel of Law, and his overcoming of Mara. The paintings from the period were strong in portraiture and reflect a love of nature.

THAILAND

Thai art of the fifth to eighth centuries shows the strong influence of India. Sculptures of Buddhas in the so-called Gupta style have flat curls, thick lips, and a pronounced pleating of the robe; the right shoulder is bare, and the left hand grasps the end of the robe. Influence from Amaravati, India, is detected in standing Buddhas that have narrow waists, the barest hint of a robe, square heads, very large hair curls, and narrow eyes. A Thai style, Dvaravati, began to emerge in the sixth century with Buddhas who look like real people, with heavy, thick features. The style of the Srivijaya Kingdom of the eighth to 13th centuries brought lightness and grace, as

all surfaces of sandstone sculptures were carved. From the seventh to 12th centuries art showed a lack of ornamentation. Figures, usually of Vishnu, stood long and thin with short loincloths and effeminate, slightly puffy faces.

CAMBODIA

The Cham people of present-day Cambodia excelled in architecture and statuary from the 600s until the collapse of the Champa Kingdom in 1471. Most Cham statues were made of clay, with a handful of exceptions in brick, terra-cotta, or metal. The sculptors worked mostly on subjects drawn from Hinduism and Buddhism. Among Hindu subjects, Shiva was most often represented. The god of creation and destruction, Shiva is represented in human form with an elaborate bun below a crescent-shaped tiara. He has a third eye on his forehead along with two to 28 arms. The Cham generally portrayed Shiva seated on a lotus. The Cham also made statues of dancing elephants, lions, and a lion-dragon hybrid.

NEPAL

Simplicity of form and content are the major characteristics of Nepali art. Most of the surviving sculptures are of small size and exquisitely crafted. The Nepali artists of the Lichhavi Period (ca. 400–ca. 750) followed the same iconographic principles and artistic norms that prevailed in northern India during the Gupta Period. However, the smooth quality of the modeling and the whimsy in the posture and attitude of some of the figures are typically Nepali. Vasudhara, the Buddhist goddess of abundance and fertility, was especially popular from the ninth to the 13th centuries. The Nepali people used a technique called repoussé in architectural embellishments on buildings, making gilded copper plaques, panels, spouts, and sheaths. The principal form of painting in Nepal consisted of images of deities. Typically, a group of divinities is arranged in a rectangular composition or in a mandala, a configuration of squares and circles. In Nepal, as in its Himalayan neighbor Tibet, a primary function of a sculpture was to serve as an aid to meditation.

TIBET

Unlike Nepalese art, which was created within the confined area of the Kathmandu valley, Tibetan art was made in a much wider geographic area and with different artistic influences. Western Tibet was shaped by influences from central Asia and Kashmir, whereas eastern Tibet exhibited more influences from China. India influenced the entire region. Buddhism came to Tibet in the seventh century and soon became the focus of Tibetan art.

As in Nepal and India, Tibetan painting is highly figurative. While the principal themes are divine, as in Nepali

and Indian work, Tibetan paintings differ by including representations of divine and mortal teachers. The teachers are always heavily robed in monastic attire and usually seated on a lotus in the classic posture of meditation. In sculpture the teacher is always oriented frontally with his hands making one of the five gestures characteristic of Buddha figures. In addition, he may hold lotuses supporting such attributes as a bell, a thunderbolt, a book, or a sword. The use of silver ritual objects appears to have been particularly popular in Tibetan shrines. In both sculpture and painting the representation of terrifying deities remains one of the most distinctive features of the Tibetan aesthetic. Another artistic form that plays an important role is the mandala. It is so frequently encountered in Tibetan arts, particularly painting, that it has come to be regarded as the very symbol of Tibetan culture. In both form and content, medieval Tibetan mandalas are more diverse than the ones in Nepali medieval art.

INDONESIA

During the eighth and ninth centuries a genuine Indonesian style of art developed in Java, partly because the area enjoyed an economic boom that created a surplus labor force that could focus on art. A number of large-scale religious structures, or *candis*, were created that still stand. The Buddhist Candi Borobudur is noteworthy for its examples of narrative relief, an art genre rare everywhere except central Java. The reliefs, which depict religious or mythological themes, portray humans naturalistically. They appear to have been created to guide the pilgrim on the way to enlightenment.

Javanese sculpture from this era reflects Indian influence. Stone sculptures represent Hindu gods and Buddhist deities. However, statues of Ganesha, the elephant-headed Hindu god, sit with the soles of their feet pressed together, a style rare in India. He typically has a long trunk which bends toward his lower left hand, in which he holds a small, round cup of candy. He clasps a broken tusk in his lower right hand. In his upper hands he carries a rosary and fly whisk. Javanese representations of the Hindu god Shiva show him with a crown of plaited hair, the third eye on the forehead, and four hands, with the upper two carrying a rosary and a fly whisk and the lower two carrying a trident and a water jar. Sometimes the fly whisk is replaced by an ax. Most metal Javanese images are in bronze, but a few are in silver and gold. The statuettes represent Hindu and Buddhist divinities.

AUSTRALIA

The Aborigines of medieval Australia painted the walls of caves and carved the ground, trees, and rocky surfaces of the continent. To paint, they used strips of bark, chewed at one

end for the broader lines and with a single feather mounted on a nodule of wax for finer lines. A thin, burred stick was used to make dots. Engraving tools were equally simple. For decorating objects, artists used the incisor tooth of a small animal, still in its skull. Evidence suggests that rock engravers made designs by striking the surface of the rock with a sharp-edged boulder. The colors are earthy pigments, ground with water on a rough stone.

Aboriginal bark paintings are typical of medieval Australian art in that they served as link between the people and their spiritual beliefs. Many of the brightly colored sheets of bark, with vivid color contrasts, illustrate the activities of the great creator and other spirits as well as places associated with them. The bark appears to have come chiefly from the stringybark tree, a type of eucalyptus. With its first branches located well up the tree, the stringybark offers many feet of firm, knot-free bark. The bark was removed in the wet season, when the sap is flowing and the bark was both supple and easy to strip. One or two slivers of the outer bark were pulled away to test the core beneath. Two cuts were run around the trunk, with the lowest beginning about a foot from the ground. With the aid of a stick, the artist then pulled the curled sheet of bark from the tree. The sheet was cured over fire and then left to dry in the open for days of seasoning. To prevent curling, the bark was often fitted with stretchers of two straight sticks that were bound across both ends. The artists relied on a palette of red, yellow, black, and white with occasional forays into blue, pink, orange, and gray.

In northwestern Australia, Aboriginal cave art consisted chiefly of *wandjinas*, or large, human, mouthless figures with halo designs around their heads. In the northern part of the continent Aborigines painted so-called X-ray and Mimi art. X-ray art attempted to show the dimensions of living creatures. These were large paintings in red, yellow, black, and white that depicted animals, birds, fish, and reptiles but rarely human beings. In these paintings the artists drew not only the external form of the subjects but also their internal details, such as the skeleton and internal organs. The Mimi figures, located in the same caves as the X-ray figures, exclusively depict human beings in action—running, fighting, and throwing spears. These red-ochre drawings are only a few inches tall.

The art of ground painting was apparently confined to central Australia. The simple designs referenced Aboriginal myths. The ground was prepared by sprinkling it with water and then brushing it smooth with the hands. An abstract design was joined by representations of reptiles, animals, and humans. The artists drew in black paint made from powdered charcoal supplemented by dots made of white pigment.

EUROPE

BY KIRK H. BEETZ

For the artists of medieval Europe the history of the world was a spiritual history, divided into two eras: one spanning from the Creation to the birth of Christ and the other from the birth of Christ to the present. Not until the late medieval era did writers and artists begin seeing themselves as living in a new world in which time was measured by the history of human achievement. This marked the beginning of Renaissance thought. Artists of the Renaissance considered the approximately 1,000 years before them as part of a different age, one in which the art of the classical world had been forgotten. This was mistaken, because medieval artists not only borrowed from classical examples but also often used the techniques of ancient artists for their own purposes.

AGE OF FAITH

The period between the fall of the Western Roman Empire in 476 and approximately 1400 became known as the Dark Ages, supposedly a period in which ignorant artists lost or abandoned ancient artistic techniques. The reality was different, and research over the past 100 years has revealed that the art of medieval Europe is dynamic, colorful, and innovative, yielding great works amid a dense complexity of styles. As the Dark Ages became ever less dark to historians, the name Age of Faith became preferable because the art that survives from medieval Europe has primarily religious subjects. It is the emphasis on spirituality that sets medieval European artists apart from their Greek and Roman predecessors. Whereas classical artists focused on realistic depictions of their subjects, medieval European artists created an artistic language composed of symbols to express spiritual truths, and the symbols were often more important than realistic portrayals of people or the world. For instance, a painting or sculpture might depict the Virgin Mary, Christ, and the prophets as towering like giants over the figures of more ordinary people, as is the case in the painting *Enthroned Madonna and Child* (ca. 1280–1290) by Giovanni Cimabue, in which Mary and the infant Christ are surrounded by much smaller figures. The symbolic point is that the Virgin Mary and Christ are towering figures whose spirituality is far more immense than that of ordinary people or even of angels.

One way in which most medieval European art differed from most classical art was in a devotion to depicting ideas rather than emphasizing physical realism, although some paintings from the Carolingian era (ca. 751–987 in France) were reminiscent of the naturalism of Roman art. Another factor that shaped medieval art was the religious differences between east and west. When the Western Roman Empire's

last emperor abdicated in 476, the eastern part of the empire continued and, over the next few hundred years, actually recovered some southern European territories, if only briefly. During the 500s a religious controversy helped separate European art from the art of the Eastern Roman Empire, often called the Byzantine Empire. The most significant break between eastern and western religious art developed out of the iconoclasts of the Byzantine Empire. An iconoclast was someone who believed that religious art should never depict human images because to do so was a transgression of the biblical commandment that people should not worship graven images. This restriction did not necessarily apply to purely secular art, such as portraits of living people. By the 700s the iconoclasts had developed a great deal of political power, resulting in 726 in the Byzantine government's outlawing religious images of people, which then resulted in the destruction of many works of art. By contrast, in Europe, to the north and west of the Byzantine Empire, images of prophets and saints were regarded as important tools in teaching Christianity to people, and the western Christian church rejected the views of the iconoclasts, with its religious buildings featuring statues, paintings, and mosaics of biblical figures. This difference of opinion was one of the most important factors in creating the division between the Eastern Orthodox and Roman Catholic churches.

The iconoclasts' destruction of artworks deemed heretical highlights another problem that researchers encounter when studying medieval art: the anonymity of many artists. This is often explained by pointing out that most medieval art was religious in nature and that artists, who were considered even by themselves as less important than their religious subject matter, were too humble to sign their creations. The matter is actually more complex than that. Many medieval religious works are signed, suggesting that a custom of not signing artworks was not universal. Artists' signatures have been lost to erosion of their outdoor statues, to deliberate destruction in war or religious upheavals, and to decay caused over time by perishable materials.

Ancient Romans who could afford to do so collected art to decorate their homes. After the fall of the western empire, southern Europeans continued the practice of collecting art for display in their homes, but by the 600s the popularity of collecting art was fading. Artists had to find new markets for their works. Money tended to flow toward churches, and artists gravitated to where they could earn livings. In southern Europe the result was that churches preserved the decorative arts of mosaics and murals. Also preserved was the attitude not only in southern Europe but in northern Europe as well that artists were skilled laborers, on the same level as stonemasons and carpenters. Indeed, stonemasons and carpenters

often carved images to decorate public buildings and private homes. It was a natural step to go from carving statues for government buildings to carving statues for religious buildings. Further, the attitude that artists were craftspeople helps explain why some painters and sculptors devoted several years to a single piece that would be displayed in a public place. For them such work was not a matter of crushing their artistic spirits or losing their freedom to create art. Instead, they had families to house, feed, and clothe, and a project that would take several years to complete for a prosperous church meant financial security for the artist and his family. A long-term project was not a burden but an opportunity.

North of the Alps, European artists of the Age of Faith were working in the artistic traditions of the Celts and Germans. The tastes of both artists and their patrons tended toward intricate interweaving of lines, influenced by goldsmiths and silversmiths and their jewelry, which tended to feature animal or plant images enveloped in mazes of lines. The lines usually could be traced back to the contours of the animal or plant images, making the lines elaborate extensions of the legs, tails, stems, or other parts of the images. From Scandinavia to central Europe, from Ireland to Ukraine, the intricate interweaving of lines based on natural forms dominated art until about 1050. This form of art may have reached its greatest height in illuminated manuscripts. An illuminated manuscript is a text that has been individually illustrated by a painter. Elaborately illustrating texts may have begun in the monasteries of Ireland; Irish monastic orders established new monasteries from Ireland to eastern Europe, bringing their skills at illuminating books with them.

Medieval book illustrations often seem marvelously abstract to the modern viewer. For instance, the Cross Page from the Lindisfarne Gospels (ca. 700) displays a cross filled with and surrounded by very detailed patterns of loops; close inspection of the page reveals that the swooping lines outside the cross can be traced back to the bodies of stylized eagles with their eyes seeming to peer from the page. The intention of the artist seems to be to show how the cross places limits on savage creatures and by inference on human passions—particularly the desire to make war, because eagles were common symbols of war.

THE AGE OF CHARLEMAGNE

Karl der Grosse (r. 768–814) was the name of the greatest of the Carolingian kings, today best known as Charlemagne, which is French for “Karl the Great.” He managed to reunite much of what had been Roman Europe into a new empire, the art of which was influenced by his restless spirit and persistently inquisitive mind. He visited Italy at least three times, and his impressions of the grandeur of Roman art inspired him to try

to establish a great artistic tradition in northern Europe. In his capital city of Aachen, he had monumental structures built, mostly of wood, which have been lost to decay, fire, and war, but the Palace Chapel was made of stone, and it survives. For its construction, columns and bronze works were imported from Italy, and Italian artisans were very likely imported as well. Thus, Charlemagne stirred the pot of European art, mixing southern and northern European traditions. Much of the Carolingian achievement survives in stone monasteries and churches, but for the fine arts, book illustration perhaps provides the best window to Carolingian style, because little of the mosaics, sculpture, and murals of the era survive. The *Gospel Book of Charlemagne* features human figures that are reminiscent of Roman art in modeling.

ROMANESQUE ERA

Southern Europeans were much less interested in the intricacies of art of northern and central Europe, preferring to focus on the human figure. For instance, the Beatus Apocalypse manuscript (early 1000s) features human and animal figures set against background blocks of color. Symbolism rules what the artist has depicted. One illustration presents a multi-headed beast, perhaps a dragon. It represents Satan being cast out of heaven. In the upper-left corner is a woman with an image of the sun in front of her. She represents the Christian Church, illuminating the world. About the time this illustration was made, the art of southern Europe was beginning a new phase. This was the Romanesque era, which lasted from 1050 to 1200 and spread through Europe. Although Romanesque art has been given its own era, during which it was the dominant style in much of Europe, it did not entirely die out until the end of the medieval era. Romanesque artists copied only the form of classical art, not the ideas behind it. Instead, artists adopted Roman styles because the Roman emphasis on realism was useful: Realistic figures appealed to laypeople and were easier to use to bring biblical passages to life. The ideas of the ancient Roman artists were replaced by medieval spiritual concerns.

Sculpture seems to have been affected by the Romanesque movement more than other art forms, because the Romanesque era brought with it a revival of monumental sculpture. After the 400s European sculpture focused on small, shallow reliefs and statuettes, but the Romanesque era focused on large structures for churches, monasteries, and convents and with those came demand for decorative carvings, murals, and sculptures, helping to expand the number of experienced artists who would help fuel the Gothic era to come. Not only did architecture influence the fine arts, but the reverse was sometimes also true. For example, the typical reinforcing arches for the vault of Saint-Savin-sur-Gartempe in

France were left out of the architectural plan in order to make room for a continuous mural. During the Romanesque era tall, three-dimensional statues became common; even reliefs were carved deeply enough that the figures in them almost stood free of the background. A good example is found at the eastern side of the abbey in Moissac, France, depicting the Annunciation and the Adoration of the Magi (early 1100s). The figures in these works are stiff and awkward, but they are also large, and in three-quarters view they seem to exist in three-dimensional space. Further, the sculptors have made them appear free of two-dimensional space, as if they might step away from their walls and move freely as three-dimensional beings. The sculptor moved beyond merely decorating a wall to making a statement about biblical figures being real people with true spiritual presences in the world.

The foremost sculptor of the Romanesque era may have been Benedetto Antelami, whose *King David* (ca. 1180–90) is a landmark in the development of medieval sculpture. The statue stands nearly free, on its own, and the figure's clothing drapes as if on a real body; the artist adopted a style that was his alone, much as a classical sculptor might have done.

Sculptures served to draw people to the buildings that displayed them. Visitors often brought money to donate to the church, monastery, or convent, making it worthwhile for religious groups to finance large, impressive statues. Yet not all clergy were happy with the development of lifelike statuary. One problem was that it smacked of paganism, because the sculptors were imitating realistic forms developed in classical times. Further, some clergy believed that people would use the statues to teach themselves about the Bible rather than making a proper study of their faith by actually reading the Bible. In an era when many Europeans could not read their own languages, much less the Latin of the Bible, this objection was overwhelmed by pragmatism: The sculptures were useful tools in teaching the faithful.

One of the most significant painters of the Romanesque era is Nicholas of Verdun, who painted enamel plaques. His greatest work is probably the Klostersburg altar (1181), which consists of painted panels. His figures are loose, not stiff, and even their clothing seems to flow over their bodies, suggesting movement. In addition, Nicholas of Verdun gave his human figures personalities: They have emotions recognizable to any observer.

GOthic ERA

Gothic art began with Gothic architecture, which spread from the region of Paris around 1150. The huge spaces of Gothic buildings spoke of the immensity of God's spirit, and they seemed to cry out for monumental works to inhabit the great spaces provided by the architecture. For sculptors and

painters the Gothic movement presented grand opportunities for artistic expression and great challenges to create art that could make the immensity of Gothic style accessible to their audiences. It was during the Gothic era, from about 1200 to about 1550, that medieval artistic sensibilities realized their fullest expression. That these dates overlap the Romanesque era on one end and the Renaissance on the other is part of the complexity of medieval European art, in which some parts of Europe moved on to a new movement while other parts remained in an earlier movement. In the case of the Gothic era and the Renaissance, parts of Italy were moving into the Renaissance in the 1400s, while northern and western Europe continued in the Gothic era until about 1550.

Medieval Europeans called the Gothic movement in the arts *opus modernum*, meaning "modern work," because



Virgin and Child with Saints Louis of Toulouse and Michael by Lucca di Tomme; *tempera on panel*, Italy, before 1362 (Los Angeles County Museum of Art, anonymous gift, Photograph © 2006 Museum Associates/LACMA)

Gothic art seemed to them to be a new phenomenon. The effort to convey the spiritual reality of their subjects led artists to depict facial expressions and poses that slightly exaggerated some features to create an impression of emotional movement as well as physical movement. An outstanding example of this is a wooden sculpture from the early 1300s called *Pietà*. The name *Pietà* was given to many sculptures, all depicting the dead body of Christ being held by his mother, Mary. The *Pietà* was invented to serve as a contrast to images of the infant Christ and his mother. The wooden example by an unnamed sculptor features heads that seem too big for the bodies of Christ and Mary, and Christ's body is preternaturally thin, looking wasted. The details are realistic, with Christ's bone structure and musculature carefully rendered. By making the heads slightly outsized, the sculptor emphasized the expressions on their faces, and Mary has a profoundly moving expression that displays sorrow and misery. Her eyes stare at her tortured son. Beneath the body of Christ the folds of Mary's dress ripple, as if in motion as she shifts her legs to maintain support of her Son's body, lending a sense of movement to the whole sculpture. The figures were painted, enhancing their realism.

Stone sculptures were highly valued, probably because of their durability. Churches, monasteries, and convents had outdoor sculptures that needed to endure weather that would quickly ruin wooden sculptures. Throughout the medieval era in Europe sculptors in stone used techniques passed down from the Roman Empire. For smaller statues a sculptor would sit on a stool or armless chair; for larger ones he would need to stand. The stone he intended to sculpt would be directly before him, resting on a low table, with its lower end nearest him. The top of the statue was raised 22 to 33 degrees above the table. With charcoal the sculptor would sketch on the stone the image he wished to create. Sometimes the sculptor would make a clay version of what he hoped to sculpt, either in miniature or at full size. He would first use a pointed iron pick to chip away the stone, later using a chisel to refine the features of the sculpture. Files were used to remove the marks left by the chisel, and then the sculpture was smoothed by rubbing it with pumice and straw.

Using this approach to sculpting, Gothic sculptors in stone created the greatest monumental pieces since the fall of the Western Roman Empire. Artists from northern Europe, including Scandinavia, often carved their works to be independent of their architectural settings, especially when carving for the interiors of churches and cathedrals. Their works came close to being totally free standing, calling more attention to themselves than to their settings. Among the finest sculptors was the Naumburg Master, so called because of his series of sculptures for the Naumburg Cathedral, carved

about 1250 to 1260. Gothic artists were trying to meld abstract Christian ideas with the immediacy of strong emotional appeal, and the Naumburg Master was among the most successful at doing so.

For the choir screen in the cathedral, he carved images of biblical characters, and, as was customary for the era, he carved portraits of benefactors of the church into his scenes, including people he had never actually met because they had died before his time. Still, each figure seems to have a personality of his or her own, as if each was carved from life. Part of the screen depicts Judas kissing Jesus. It is a scene of furious action, with figures in turmoil, yet Jesus is quiet, his expression one of pain and sorrow as Judas kisses him. Although some figures are in front of Christ, he stands out because he remains a center of peace amid frantic emotions. The main part of the choir screen features the crucified Christ. The image of Christ is heavy, sagging into space and giving the Crucifixion a physical reality. To either side are Mary and Joseph, who seem to gaze at their audience as if aware of the presence of worshipers, their intense sorrow enhancing the sadness of the scene.

Gothic architecture created new opportunities for painters as well as sculptors, most notably when working with colored glass. During the 1100s glassmakers began adding various metals to glass to create colors. The technological innovations of Gothic architecture meant that walls of large buildings could be much thinner than before, because the walls no longer had to bear the full weight of themselves and their roofs. Thinner walls meant more opportunities to include windows to illuminate interior spaces. A love of bright colors emerged in the Gothic era, and making windows out of colored glass to illuminate church interiors quickly became popular.

To create a colored-glass window, the artist would first whitewash a tabletop or bench. Then he would use charcoal to sketch on the tabletop or bench the image he wished to create. Glassmakers would mix ash and fine sand with traces of various metals to give the glass color. For instance, a bit of iron would tint glass green. They would blow molten glass at the end of pipes and then spin the pipes, causing the glass to flatten and form a disk. The disk was set on a table and allowed to cool. Then the glass was cut into the shapes the artist wanted with a grozing iron, a sharply pointed iron rod. The artist would fit the pieces of colored glass together by using molten lead to bind them. The trick was to organize the glass in such a way that observers from a distance would recognize the image the artist wished to create. For details such as eyes, the artist painted directly on the glass. A spectacular example of medieval colored-glass windows is the northern Rose Window of the Notre Dame Cathedral in Paris.

During much of the medieval era sculpture had been preferred over painting, probably because it was more durable and better suited to decorating the outsides of buildings. During the Gothic era painters improved their techniques for creating durable paintings, and in the 1300s paintings gained favor, especially in southern Europe. Murals were popular in southern Europe but were uncommon north of the Alps; murals in northern Europe tended to be painted by artists from Italy. The most popular form of mural was the fresco, meaning “fresh.” Creating a fresco involved spreading fresh plaster on a wall and then applying paint on the wet plaster. During the 1200s artists tended to paint freely on the plaster, without preparation. In the 1300s they chose to sketch their images in charcoal on the wall before plastering it. This helped the artist better visualize how the painting would fill the space on the wall, and it allowed a master artist to have an apprentice paint some of the images. Painting frescos required a sure hand and patience, because the plaster could be applied only a little at a time so that it would not dry before pigment was applied.

More popular in the north was painting on wooden panels. The wood was usually poplar and was sanded smooth. Sometimes a painting would require several planks held together by crossbeams in the back. A mixture of plaster and glue, called gesso, would be applied to the surface and allowed to dry. Then it was sanded smooth. Sometimes a layer of linen soaked in gesso would be set over the surface, allowed to dry, and then covered by another layer of gesso that was smoothed after it dried. The extra layer resulted in a stable surface that held paint well. The artist would draw on the surface with charcoal or graphite and then cover the drawing with paint. Haloes tended to be done in gold leaf.

EARLY RENAISSANCE

Some art historians classify northern European art from about 1400 to 1550 as Late Gothic art, whereas others believe the art of the north as well as the art of the south was at this time part of the early Renaissance. The Renaissance had its origins in Italy. The crucial figure in the development of the new style was Giotto di Bondone (ca. 1276–1337), a Florentine who, like many artists of his era in Italy, was not only a painter but also a sculptor and architect. Giotto was an innovator who seemed restlessly searching for ways to make his work stand out. An example of what he tried to do is a fresco in the Arena Chapel in Padua, Italy, titled *Christ Entering Jerusalem* (1305–06). The fresco presents a simple background, without the profusion of symbols common in medieval European art. The emphasis is on the figures in the painting. One of Giotto’s innovations was to remove the impression of observing something painted on a surface. Instead, he made

ATTAINING A SENSE OF PERSPECTIVE LEONBATTISTA ALBERTI’S WAY

Most medieval artists were interested in how to give their images proportions that would seem authentic to their audiences. To create proportions that would please the eye, many artists applied geometry, but they had trouble reconciling their images with a sense of perspective. Images meant to be in the distance behind other figures did not look like they were at a distance. The notion of a vanishing point helped solve the problem, but only imperfectly. A horizontal line would be drawn across a painting and would serve as the horizon. On it was placed a point, the vanishing point, to which lines could be drawn that would dictate the shrinking of images into the distance. One problem with the technique was that although images shrank according to distance, they looked like two-dimensional images in a three-dimensional world; individual figures lacked depth.

An Italian painter and architect, Leonbattista Alberti (1404–72) came up with a solution to the problems of perspective and depth, which he published in a scholarly book in Latin, *Della pittura* (1435), which he rewrote in Italian as *De pictura* (1436) and is known in English as *On Painting*. The book covers the practicalities of painting and includes Alberti’s technique for creating three-dimensional figures with a sense of perspective that fools the eye. He began by establishing a human figure in the foreground and then drawing a horizon line from the top of the figure’s head. The vanishing point is placed on the line. Then, to one side of the painting, he established a distance point, to which he drew lines from evenly spaced points on the base line—a horizontal line extending from the bottom of the painting to a point outside of it to the left or right of the painting. He drew a vertical line from the middle of the base line and then drew horizontal lines across the surface of the painting from where the vertical line intersected the slanting lines to the base line. The result was a series of spaces becoming ever narrower as they approached the vanishing point. These spaces could then be filled with images that would fill the spaces, thus having depth, and would shrink toward the horizon, thus having perspective. Many artists followed Alberti’s geometrical approach.

observers feel that they could step through the surface and walk among the figures.

Northern Europe had its innovators, too. One of the greatest of these was the Master of Flémalle, who flourished in Flanders in the 1400s. Although the true identity of the master is uncertain, he was probably Robert Campin (fl. 1406–44), whose career paralleled the creation of works known to be those of the Master of Flémalle, so called for a large altarpiece in Flémalle. The artist's masterwork is the Merode altarpiece (ca. 1425–28), which reveals how he helped shape the art that would follow the medieval era. He experimented with oil paints, which not only held colors well but also allowed him to give the surfaces of his paintings three dimensions, because oil would hold shape. In the Merode altarpiece, he included indoor scenes in which well-rounded people moved about performing everyday tasks. He took his viewers a step further than the Italians had by humanizing his figures, making them look like ordinary people. Instead of just giving the impression that a viewer could step through a window to be among the figures of his painting, the Master of Flémalle brought his viewers into the same space as his figures, as if there were no surface to step through. He achieved this partly by applying mathematical perspective to his images.

LATE GOTHIC

Three artists may serve to illustrate where medieval art culminated before the Renaissance in northern Europe: Hubert van Eyck (died 1426), Jan van Eyck (ca. 1390–1441), and Geertgen tot Sint Jans (fl. late 1400s). Hubert van Eyck was working on the Ghent altarpiece (ca. 1420s–32) when he died, leaving its completion to his brother Jan. In the piece the Van Eycks experimented with the use of degrees of brightness and darkness to highlight figures and to convey a sense of perspective, making objects in the foreground brighter than those in the background. Jan van Eyck's painting *Giovanni Arnolfini and His Bride* (1434) may be seen as the culmination of medieval art, with its figures surrounded by symbols. For instance, a single burning candle represents Christ, and a dog represents marital fidelity. The artist placed a mirror behind the scene, and in it are reflected the married couple and Jan himself. To ensure that his audience did not miss the point, he wrote above the mirror, "Johannes de eyck fuit hic," meaning "Jan van Eyck was here." He not only created a painting in which viewers can envision themselves standing but also invited viewers to look over his shoulder while he painted the portrait.

After the Van Eycks medieval artists continued their experiments with light and dark. For example, Geertgen's *The Nativity* (ca. 1490) is illuminated by divine light from the infant Christ. The careful depiction of light and shadow makes

the image magical, with Christ's light illuminating the simple, solemn faces of those around him. Even a far-off angel shines in the dark of night, reflected in Christ's light. Thus, at the end of the medieval era, artists were still trying to capture spirituality in their works, finding even in human characters reflections of the divine.

THE ISLAMIC WORLD

BY ROBERTA MARIN

Islam began in the early seventh century in the Arabian Peninsula. Within a few decades the new religion had spread rapidly beyond Arabian borders, attracting a large number of adherents. The dramatic expansion has continued uninterrupted for centuries, and today Islam is established in a very wide area, stretching from the Atlantic Ocean to the China Sea and Indonesia.

In its initial expressions (seventh century to eighth century), Islamic art was deeply influenced by the style of the Byzantines and the Sasanids, two dynasties founded long before the advent of Islam. By the ninth century, however, Islamic art had formulated its own vocabulary. The most significant element involves the rejection of human and animal representations in the decoration of mosques and Koran books. Geometric and vegetal motifs and arabesques have thus been substituted for living beings. This restriction was not extended to architecture, vessels for private use, and miniature paintings, however. In these cases, ample figural scenes are featured. Another important characteristic of Islamic art consists in the broad use of calligraphy in all media. Calligraphy has always featured prominently in the arts of Islamic lands for its irreplaceable role in bearing the Koran message to worshippers.

THE BEGINNING OF ISLAMIC ART (SEVENTH CENTURY TO 10TH CENTURY)

The distinctive traits of Islamic art are exemplified in the glass mosaics of two impressive buildings erected during the rule of the Umayyad Dynasty (661–750): the Dome of the Rock in Jerusalem, Israel (691–92) and the Great Mosque of Damascus, Syria (706–14). In the Dome of the Rock lavish mosaics show a great variety of vegetal patterns, alternated with the depiction of precious jewels. Along the frieze at the base of the cupola, the first monumental golden inscription is still visible. In the Great Mosque of Damascus, on the other hand, clusters of buildings are inserted in a large panoramic scene with rivers and huge trees. The superb mosaics were completed with the motif of pearls suspended on golden chains. Mosaics also were used to embellish the pavements of the Umayyad castles in the deserts of Syria, Palestine, and Jor-

dan. Since the castles did not have any religious functions but had been built for the pleasure of the caliphs and the courts, mosaists felt free to decorate the floors with animal imagery. The most representative floor mosaic, with a lion hunting a group of gazelles, was discovered in the bath area of Khirbat al-Mafgiar in Palestine (ca. 720).

In Umayyad castles archaeologists have found a series of interesting ceiling and pavement frescoes. The wider group was discovered on the ceiling of Qasr Amra in Jordan and dates to the beginning of the eighth century. The so-called Painting of the Six Kings is the best-known fresco of the complex. The caliph is set in the middle of the scene, while six emperors and kings approach him to pay homage. On the pavement of Qasr al-Hair al-Gharbi in Syria (750), two frescoes have been brought to light, representing respectively a hunting scene and a goddess of fertility with a snake around the neck. Some desert castles were decorated with stone lion sculptures, symbols of strength and power, and stucco painted statues, portraying the Umayyad caliphs. Stucco was also widely used during the reign of the Abbassids (749–1258). In Samarra (present-day Iraq) the great majority of buildings were erected using unbaked brick, a poor material with a homogeneous color. For brightening up the monotonous walls, panels of colored stucco were applied on the surfaces.

During the first centuries of Islamic art, important media, such as textiles, metalwork, ceramic, glass, and ivory, were developed. The most stunning pieces, now held in major museums and collections around the world, were ordered by the wealthiest members of society. Caliphs and bold aristocrats loved wearing beautiful jewels, long dresses in silk and linen, and finely made turbans. They also furnished palaces and houses with richly embroidered textiles. Metalworkers created for them vessels in copper, bronze, and brass and sometimes in precious metals like gold and silver. Pieces in ceramic and glass were produced for daily use and special occasions. Carved animal-shaped figurines in ivory and chess pieces made of bone reflect the high skill level reached by the masters and the exquisite taste of the patrons.

ISLAMIC ART IN EUROPE: SPAIN (EIGHTH CENTURY TO 13TH CENTURY)

The south of Spain was the only land in Europe to be under the rule of Muslim dynasties for seven centuries (710–1492). Abd ar-Rahman I (731–88), the survivor of the massacre of the Umayyad Dynasty in Syria, fled to Spain and founded the emirate of al-Andalus (now Andalusia), which became a caliphate in 929. In 1238 the Nasrids, the last Arab dynasty to dominate in Spain, came to power and ruled al-Andalus until the end of the 15th century. In 1492 the Catholic kings

conquered Granada, the capital of the Nasrid Empire, and the regaining of Spain from the Muslims was completed.

During the centuries in which Andalusia was under the control of Arab dynasties, the arts flourished. The emirs and caliphs, longing to show their supremacy to Catholic Spain and the rest of the Muslim world, decorated their buildings lavishly, regardless of the costs of artisans and materials. The interior of the Great Mosque of Córdoba (785–988) was thus enriched with a profusion of gold mosaics and stucco with vegetal motifs. In some areas of the mosque the craftsmen embellished the walls, applying large, polished marble slabs with trees of life, reminiscent of pre-Islamic art. An example of pavement mosaic is still visible in the interior of the caliph palace in the complex of Madinat az-Zahra, the city-palace built outside Córdoba by Abd ar-Rahman III an-Nasir (891–961). The wall decoration includes a series of marble and stucco panels with vegetal patterns. The Nasrids (1232–1492) erected the complex of Alhambra (the Red), whose name derived from the color of the stone with which the complex was made. The lower part of the interior walls is covered with *alicatado*, a faience (glazed) mosaic, while the upper part is covered with carved stucco panels. The two areas are separated by inscription friezes. In some rooms of Alhambra the ceilings are hidden by wooden coffers with geometric interlacings of stars. The ceiling of the Kings Room, on the other hand, is painted with three scenes of courtly life. The central one, the most controversial, portrays 10 high-ranking figures in conversation. There are several interpretations of the identity of the subjects. The most credible seems to be the theory that the kings are the rulers of the Muslim world. The peculiarity of these paintings lies in the panels, which are made in leather and hang from the ceiling vault.

Members of the court commissioned artisans to create magnificent objects, made in the most precious materials. Ivory was one of the most appreciated for its natural beauty and the difficulty in acquiring it. It was imported from North Africa and was employed to create especially luxurious boxes and pyxes (small containers). Boxes could contain table games, while pyxes held scented essences, like musk and camphor. The pieces addressed to women were decorated with arabesque, which might suggest fertility, while those produced for men were embellished with heraldic eagles and lions, symbols of the royal family supremacy.

In al-Andalus metalworkers created several beautiful objects, but the bronze animal figurines occupy a special place. The figurines reproduce common and mythological animals, like lions, deer, oxen, peacocks, and griffons, whose surfaces are lightly carved with spirals, vegetal motifs, and inscriptions. Some of them have a hole that corresponds to the mouth so that they can be used as aquamaniles (water



Tile; stone-paste painted overglaze with luster, China, Seljuk Dynasty, 13th century (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)

pourers). Goldsmiths and silversmiths produced beautiful jewels, reflecting the wealth of the court. Not many pieces have survived, but existing examples include gold, crescent-shaped earrings (12th century), a set of gold filigree and pearl buttons once decorated with enamels (13th or 14th century), and a gilded bronze belt fitting with cloisonné enamels (15th century). Among the typical Andalusian ceramic objects are the so-called Alhambra or winged vases. These unique amphora vessels derived their name from the two large and flat handles, which recall a pair of wings. They were made beginning in the 11th century and had large dimensions, and the exterior was decorated with inscriptions, animals, and vegetal patterns.

Only a few folios of the first Koran books have survived. They were written on parchment and had a horizontal page format. The script was accompanied by vegetal and geometric ornaments. The parchment was sometimes colored, as in the case of the celebrated Blue Koran, which seems to have been produced in Spain in the ninth century. In Koran production, parchment was replaced during the 11th century by paper, but not in Spain, where a series of beautiful Koran manuscripts on parchment dating to the 12th and 13th centuries has been found. Most are decorated at the beginning and at the end of the manuscript with star-shaped motifs on a background of

polygonal forms. At the end of the manuscripts the copyists inserted the colophon, which contains the date and the place of production. The major centers were Córdoba, Málaga, Valencia, and Seville. Since wall painting was not largely used in the Islamic lands, the ability of the painters is evident from the miniatures that adorn the manuscripts. One of the first examples of an Islamic book with miniature painting is the *Tale of Bayad and Riyad*, probably copied in Seville in the 13th century.

THE ARTS IN NORTH AFRICA (10TH CENTURY TO 14TH CENTURY)

In the 10th century the Fatimids (909–1171) established their power in the area today known as Tunisia, in North Africa. Since the Fatimids wished to enlarge the borders of the empire, they fought with neighboring countries and gained control of Egypt, Sicily (Italy), Syria, and Palestine. The Fatimids constitute one of the most famous dynasties in Islamic history. They were powerful and wealthy, and their artistic expressions reveal this status. In the caliph palace in al-Mahdiyya, the first capital, archaeologists discovered a handsome pavement mosaic with geometric patterns. In al-Mansuriyah, which became the second capital of the empire, the walls of the royal palace were decorated with colored stucco panels with geometric and floral motifs. Large sections of the walls were enriched with ceramic tiles. The palace ornamentation was completed with the insertion of plaster sculptures of animals and human beings.

Artisans were able masters in carving wood and ivory. A few pieces have survived, and those held in museums and collections attest to the skill level reached by the craftsmen in these media. They created beautiful wooden ceilings for mosques and palaces. Wooden panels of mihrabs (prayer niches), *minbars* (pulpits), and boxes became more precious with the addition of bones and ivory. Wooden panels as well as ivory boxes were decorated with scenes of courtly life and animal and vegetal patterns. The figural groups were completed with complex interlacings of arabesques.

Fatimid artisans were also known for their production of rock crystal and gold pieces. Fatimid craftsmen are still unsurpassed in the production of flasks, ewers (pitchers), bowls, and chess pieces made in cut glass and rock crystal (pure quartz). Although the raw material was particularly hard to carve, these craftsmen were able to create fine objects decorated with animals and courtly scenes and rarely with inscriptions. A large number of them are kept in the treasures of Italian churches. Gold jewelry was also made during Fatimid rule. The jewelers were experts in filigree and granulation techniques, in particular, and sometimes added pearls, semiprecious stones, and cloisonné enamels. Rings were typi-

cally stirrup shaped, while the most common shape for pendants and earrings was the crescent. On some jewels animal images were used.

The artistic traditions of the Fatimids were adopted in part by the Marinids from the south of Morocco (1196–1465), who faced the North African political scene in the 13th century. In 1269 they became the new rulers and chose the city of Fès as the center of their power. The Merinids built numerous mosques and madrasas, whose internal and external walls were richly decorated. Mosaic tile work covered the lower part of the wall, while the upper part was embellished by intricately carved stucco panels with flowers and plants. The two areas were linked by a frieze with Koran inscriptions. The ceilings were hidden by beautifully carved wooden panels and the pavements by mosaic tile work.

In the Moroccan decorative arts the artistic influence from al-Andalus (Spain) is undeniable, but it was accomplished by the nomad Berbers, who still live in the Atlas Mountains. Their presence had an important impact on carpet and ceramic production as well as on jewelry production. Goldsmiths and silversmiths created beautiful bracelets, necklaces, earrings, and bent knives using the filigree technique with the application of semiprecious stones. The al-Andalus trend also emerges clearly in the Koran books. In southern Spain and North Africa the manuscripts were still copied on parchment and not on paper.

SYRIA AND EGYPT (12TH CENTURY TO 14TH CENTURY)

At the end of the 12th century Saladin (1137 or 1138–93), known for his role in the fights against the crusaders, founded the Ayyubid Dynasty (1169–1260). The kings ruled a huge empire that stretched from Syria and Egypt to Yemen and Arabia. In the decorative arts, artisans were particularly skilled in producing copper and bronze vessels, inlaid with silver and gold. Among the stunning pieces created with this technique, the celestial globes and the pilgrim flasks are particularly impressive. The celestial globes were carved with the boreal (northern) and austral (southern) hemispheres and the 12 signs of the zodiac, showing the interest of Muslim astrologists and astronomers in the sky and the stars. The flasks were used by Christians during their pilgrimages to the Holy Land, and the decoration recalls events from the life of Jesus. Ayyubid craftsmen excelled in the production of ivory boxes as well. Some of them reached Europe and were added to the church's treasures, as gifts of the crusaders.

A large group of extant manuscripts with miniature paintings belongs to the Ayyubid Period. The first examples are translations of famous books of antiquity. *The Book of Antidotes*, written by the Greek physician Galen (129–ca. 199),

describes a series of remedies for poisoning, and *De materia medica*, written by the Greek physician Dioscorides (ca. 40–ca. 190), is a work on the medicinal properties of plants. In the 13th century literary books became popular. For example, *Kalila and Dimma* includes animal characters and fairy tales with moral teachings, and *Maqamat* (Assemblies) by Hariri (1054–1122) offers anecdotes that mirror the society of that time.

In 1250, thanks to the marriage between the last queen of the Ayyubids, Shajar ad-Durr, and the chief of the army, Aybak, power passed to a new dynasty, the Bahri Mamluks (1250–1382), who were succeeded by the Burgi or Circassian Mamluks (1382–1517). Sultans, emirs, and high-ranking members of the court ordered luxurious objects because they loved being surrounded by beauty and boldness and wanted to hide their common origins.

Artisans created handsome pieces in all media, but probably the most representative are those made in glass, metal, and ivory. The ability of the glassmakers emerges, in particular, in mosque lamps, flasks, and bowls. The lamps were hung from the ceilings of religious buildings and usually bore the inscription “Verse of Light,” taken from sura 24 of the Koran. Flasks and bowls were decorated with scenes of courtly life as well as earth and marine animals. Among the metal pieces, the mirrors occupy a special place. The most sumptuous examples were made in steel, richly inlaid with gold and silver. The 12 signs of the zodiac were the common iconography, revealing the Mamluks' interest in magic and astrology. Craftsmen excelled in the production of ivory and wooden pieces. The most handsome objects are those created by the combination of two media. In these cases, doors of buildings, *minbars*, and Koran boxes were made in wood, enriched with carved geometric motifs in ivory.

The opulence in the Mamluk arts is reflected also in the production of Koran books and miniature paintings. The Koran books were lavishly decorated on the frontispieces and the chapter headings. Many frontispieces and finispieces have been enriched with star-shaped motifs on a background of polygonal forms. Some Koran books were decorated with gold and had monumental dimensions with pages even a yard in length. Together with Koran books, the Mamluks ordered literary and scientific works, such as the *Maqamat*, and bestiaries (works related to animals), medical texts, and books on horsemanship.

KHORASAN, AFGHANISTAN, AND INDIA (10TH CENTURY TO 13TH CENTURY)

At the end of the 10th century the Turkic tribe the Ghaznavids (977–1186) came to power. In a few decades their territories spread from Khorasan (in northeastern Iran) and Afghani-

stan to northern India. They chose as their capital Ghazni, in southeastern Afghanistan, which became an important center of culture. Persian was adopted by intellectuals as the official language. Persian books were written during the Ghaznavids' reign as well as a 273-yard Persian inscription with praises to the sultan carved on a marble panel in the walls of the royal palace courtyard. The Ghaznavids spent the cold winter months in al-Askar, a city in southern Afghanistan, chosen for its mild temperature. In the interior of the Winter Complex palace, a fresco with a depiction of the sultan's bodyguards, combined in the upper part with a stucco decoration, has been found.

During the rule of the Ghaznavids and the Ghurids, the following dynasty (1000–ca. 1215), the art of the book flourished. Abu Bakr (1165–1240), a famous copyist, is remembered particularly for two Koran books whose scripts were made in gold and inserted on a background of beautiful arabesques. The distinctive element of the miniature paintings of this era is the absence of figurative imagery and the presence arabesques.



Ceramic ewer; Iran, ca. 1200–ca. 1230 (Los Angeles County Museum of Art, the Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA)

A milestone in the history of Islamic art is represented by the Great Seljuks (1038–1194) and the Seljuks of Rum (1077–1307), who came from the steppes of central Asia. In the period of major expansion the Seljuk Empire ran from Anatolia to China. The Great Seljuks established their capital in Rayy (close to Tehran, Iran); the Seljuks of Rum chose Konya (Anatolia) as the principal center of their lands.

The Seljuks introduced new techniques in almost all media. Their contribution in pottery innovation is particularly noteworthy. The craftsmen employed the frit, a mix of quartz and soda flux, which permitted the creation of beautiful figurines and ewers with animal features in blue. The Seljuk ceramists also discovered the expensive technique called *minai*. It consists in the application of colored enamels under or over the colorless glaze of an object. The whole piece was put in an oven for a second time in order to fix the colors. By adopting this technique, artisans created luxurious bowls with hunting or princely scenes for the wealthy members of the court. Peculiar to this period also are star-shaped tiles with single figures, such as animals or birds, with which the walls of private residences were covered. Statues made in stucco with lively colors and faience in blue and green tones were very common in building decoration.

Something absolutely unique in the mosque interior was the use of columns in carved wood. The ability of the Seljuk woodcarvers is also revealed in the Koran stands. On a particularly special stand, the inner side is painted with lacquer. Metalworkers created handsome, dragon-shaped door knockers as well as mirrors. Among the most remarkable pieces are those in bronze or copper, enriched with a fine high-relief application of silver and gold.

The craftsmen were masters in stone and marble reliefs. Pairs of angels, seated princes, doubled-headed eagles, and hunting scenes were carved in 20 surviving large stone reliefs from Konya walls. One of the panels is especially impressive because it represents a rhino-unicorn running after an elephant and hitting the elephant with its horn. The scene came from a famous ancient fable, and it is rarely used to embellish art pieces. Among textiles, large carpets occupy a special place because they are the first examples of knotted carpets in the history of Islamic art. Seljuk craftsmen also reached high levels of skill in jewelry production, but the majority of the pieces have been lost.

Some surviving examples of Koran books are finely decorated on the initial and final pages with geometric motifs and arabesques. It is documented that both the Great Seljuks and the Seljuks of Rum ordered from the copyists manuscripts decorated with miniature paintings, but only a few copies survive. One of those is *Warqa Wa Gulshah* (Warqa

and Gulshah), copied in Konya around 1250, which gives an account of a tragic love story.

CENTRAL ASIA: THE MONGOL INVASION OF PERSIA AND THE ILKHANID DYNASTY (13TH CENTURY TO 14TH CENTURY)

The greatest Mongol conqueror was Genghis Khan (ca. 1162–1227). He was able to gather under a single banner the numerous Turk-Mongol tribes and dominate a territory from Europe to China. In 1258 one of his descendents, Hülegü (ca. 1217–65) conquered Baghdad, defeated the Abbasids, and founded the Ilkhanid Dynasty (1256–1353), whose capital was established in Tabriz (today in Azerbaijan, formerly part of the Soviet Union).

During the Ilkhanid reign, the economy and the arts developed significantly. The artisans were known in the Islamic world for the elegance of their pieces and the extensive use of Chinese art patterns. In pottery the so-called ceramic of Sultanabad technique and the *lajvardina* technique were employed to create tiles and everyday objects. Ceramic of Sultanabad pieces were characterized by the depiction of animals, birds, and human beings on a background of lotus flowers, typical of Chinese art. The colors chosen were black and brown. *Lajvardina* (from Persian, meaning “blue” or “of lapis lazuli”) ware is distinguished by a series of geometric patterns in red, black, white, and gold colors on a blue background. In the summer residence at Takht-i-Sulaiman the northern wing is enriched with *lajvardina* star-shaped and cross-shaped tiles, decorated with enameled and golden dragons, taken again from the iconography of Chinese art.

Ilkhanid artisans embellished the interiors of buildings with stucco. The beautiful mihrab in the Winter Mosque in Isfahan (Iran) and the colored stucco decoration of the vault in the Mausoleum of Öljeitü at Sultaniya, the second capital of the Ilkhanid Empire, are especially distinctive. The cupola exterior of the same mausoleum is trimmed with both faience mosaic and the *banna-i*, with which the craftsmen created holy names and sentences by alternating bricks and enamels.

The Ilkhanids were masters in the production of Koran books and miniature paintings. The most famous calligrapher was Yaqut al-Mustasimi (1242–98), who copied a series of beautiful one-volume Koran books. Although the manuscripts were small, they were extremely precious because of the skill of the artist, who inserted on the pages fine rosettes and marginal ornamentations in gold. Yaqut’s successors, on the other hand, produced 30-volume Koran books of large dimensions. The most celebrated book, decorated with miniature paintings, is the *Shahnameh* (Book of Kings) by Firdawsi (ca. 935–ca. 1020 or 26). The *Shahnameh* is the epic national poem and was discovered in Tabriz around 1335. It was pro-

duced in two volumes and is decorated with 300 miniatures. Since the pages have been removed from the volumes and sold for public and private collections all over the world, it is difficult to conceive of the work in its complexity. The beauty of the single page, however, reveals the high level of expertise reached by the painter.

See also ADORNMENT; AGRICULTURE; ALCHEMY AND MAGIC; ARCHITECTURE; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CRAFTS; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; HOUSEHOLD GOODS; INVENTIONS; LITERATURE; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; RELIGION AND COSMOLOGY; SACRED SITES; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WAR AND CONQUEST; WRITING.

FURTHER READING

- Esin Atil, *Renaissance of Islam: Art of the Mamluks* (Washington, D.C.: Smithsonian Institution Press, 1981).
- Fatima Bercht et al., eds., *Taíno: Pre-Columbian Art and Culture from the Caribbean* (New York: Monacelli Press, 1997).
- Jean M. Borgatti and Richard Brilliant, *Likeness and Beyond: Portraits from Africa and the World* (New York: Center for African Art, 1990).
- Martyn Bramwell, ed., *The International Book of Wood* (New York: Crescent Books, 1987).
- Jerrilynn D. Dodds, ed., *Al-Andalus: The Art of Islamic Spain* (New York: Metropolitan Museum of Art, 1992).
- Henry John Drewal, John Pemberton III, and Rowland Abiodun, *Yoruba: Nine Centuries of African Art and Thought* (New York: Center for African Art, 1989).
- Robert Edwards and Bruce Guerin, *Aboriginal Bark Paintings* (London: Robert Hale, 1973).
- Ekpo Eyo and Frank Willett, *Treasures of Ancient Nigeria* (New York: Knopf, 1980).
- Gabriele Fahr-Becker, ed., *The Art of East Asia* (Cologne, Germany: Konemann, 1999).
- Peter Garlake, *Early Art and Architecture of Africa* (Oxford, U.K.: Oxford University Press, 2002).
- Maud Girard-Geslan, Marijke J. Klokke, Albert le Bonheur, et al., *Art of Southeast Asia* (New York: Harry N. Abrams, 1998).
- Rachel Hasson, *Early Islamic Jewellery* (Jerusalem: L. A. Mayer Memorial Institute for Islamic Art, 1987).
- Herbert L. Kessler, *Seeing Medieval Art* (Peterborough, Canada: Broadview Press, 2004).
- Henry Luttikhuisen and Dorothy Verkerk, *Medieval Art: Painting, Sculpture, Architecture, 4th–14th Century*, rev. ed. (New York: Prentice Hall, 2005).
- Mary Ellen Miller, *The Art of Mesoamerica: From Olmec to Aztec*, 4th ed. (London: Thames and Hudson, 2006).
- Catherine Noppe and Jean-François Hubert, *Art of Vietnam* (New York: Parkstone Press, 2003).
- Pratapaditya Pal, *Art of the Himalayas: Treasures from Nepal and Tibet* (New York: Hudson Hills Press, 1991).

- Esther Pasztory, *Pre-Columbian Art* (New York: Cambridge University Press, 1998).
- Pierre Riché, *Daily Life in the World of Charlemagne*, trans. Jo Ann McNamara (Philadelphia: University of Pennsylvania Press, 1989).
- Marilyn Stokstad, *Medieval Art*, 2nd ed. (Boulder, Colo.: Westview Press, 2004).
- Steve Van Beek and Luca Invernizzi Tettoni, *An Introduction to the Arts of Thailand* (Hong Kong: Travel Publishing, 1985).
- Monica Blackmun Visoná, Robin Pyner, Herbert M. Cole, et al., *A History of Art in Africa* (New York: Abrams, 2001).
- Anthony Welch, *Calligraphy in the Arts of the Muslim World* (Austin: University of Texas Press, 1979).

► astronomy

INTRODUCTION

In the medieval world astronomy was inextricably bound up with the pseudoscience of astrology. No words existed to distinguish a scientific astronomy from a magical astrology. The reason that people looked at the sky was to determine the right time to do things. No distinction was made between, for instance, deciding to plant crops after the rising of the constellation of the Pleiades in a particular position and deciding to wait to begin medical treatment until the planet Mars had entered a particular zodiacal sign.

All cultures considered the movement and appearance of celestial objects as omens, that is, signs of the divine will. This kind of belief was forged into the more formal doctrines of astrology by the ancient Greeks, relying to a large extent on the Babylonian tradition of astronomy. Hellenistic astrology, together with a very sophisticated system of astronomy, was borrowed by the cultures of ancient India and then, in the Middle Ages, was eagerly adopted by the Islamic world. It was introduced by the Arabs to western Europe and China (though in China, in particular, it was heavily modified by traditional beliefs). The social function of astrological prediction was to give advice in uncertain matters: Is this a good time for me to open a branch of my business in a foreign city? When is a lucky day for me to hold my wedding? Other cultures, such as those in the Americas that had no contact with Greek astronomy/astrology, also sought the divine will and signs of future events in the sky, but by quite different sets of rules.

Astronomical observation was important everywhere in the Middle Ages for many practical purposes. Crops were usually planted after a particular astronomical event that would start a season of suitable weather for a given area. Sailors began to utilize the sighting of stars to aid navigation out of the sight of land (something that was rare in antiquity). Religious institutions used astronomy widely. For instance, Christians

had to make a complicated astronomical calculation to ensure that Easter was celebrated on the proper day (and from that the rest of the church calendar of rituals), while Muslims needed to know the specific direction in which to face Mecca for their prayers.

A more complicated problem is astronomy among cultures that left no or very few written records. The study of astronomy in such cultures (including many in the Americas, southern Africa, and the Australia and the Pacific region) is known as archaeoastronomy because it must rely on the interpretation of archaeological remains to conjecture about astronomical knowledge and practice. There is no question that, for instance, many cultures aligned important buildings in relation to the cardinal directions (north, south, east, and west). But beyond that, assigning astronomical meanings to archaeological remains is highly speculative. A group of seven dots in a rock carving, for instance, might be the seven stars of the Pleiades or the seven planets (premodern peoples usually counted the sun, the moon, and the planets visible to the naked eye—Mercury, Venus, Mars, Jupiter, and Saturn—as planets), but it might just as well mean that the person making the carving had seven children. Without a written text to tell us about the creator's intention there is no way to know.

Archaeoastronomy usually takes a great interest in alignments with celestial bodies. For example, a building that has some feature that can be aligned between the eye of a person standing in an arbitrarily chosen position and some event on the horizon, such as the rising or the setting of a star or planet on a particular day of the year, might be interpreted as a sort of calculating device to determine when that day occurs each year. The problem with this method is that such alignments are easy to find if any astrological event and any viewing position can be used. Also, in medieval cultures for which we have written records of astronomical procedures, observations are generally carried out on rooftops so as to have an unobstructed view of the sky and the horizon (telescopes did not yet exist in the Middle Ages), not from interior rooms with only one small portion of the sky visible or from the ground with the event in question blocked from the observer's vision by a stone stela or some other object.

AFRICA

BY BRADLEY SKEEN

The civilizations of the upper Nile Valley (modern-day Sudan and Ethiopia) are distinct from the rest of the African continent in having received an astronomical tradition from ancient Egypt and the Mediterranean world that was not mediated through Islamic culture. The Nubian kingdoms (immediately south of Egypt) converted to Christianity in the sixth century

and added such calendrical matters as the Easter calculation to an astronomical tradition essentially taken over from Egypt and devoted to the regulation of agriculture in the Nile Valley. Any technical astronomy beyond this was strictly the concern of monks of the Ethiopian Orthodox church.

The only influence Ethiopian astronomy received from Greek astronomy is the relatively trivial idea of the shadow table, by which time can be measured through looking at the length of the observer's own shadow adjusted for the seasons. This highly approximate technique was developed in Athens in the fifth century B.C.E. and became part of the astronomical learning of Alexandria. In Egypt texts on the subject were eventually translated into Coptic (the ancient Egyptian language written in a modified Greek alphabet) and these later into Ethiopic. Any more sophisticated astronomical ideas, such as the signs of the zodiac or the names of the planets, seem to have been introduced late into Ethiopian astronomical thought and through the mediation of Islamic civilization since such terms are always given in transliteration from the Arabic. Astrology seems never to have made any impact on Ethiopian culture.

By far, however, the most important astronomical text in the Ethiopian tradition is the book known to scholars as *I Enoch*, or the *Ethiopic Book of Enoch*. This was composed by Jewish authors in Judaea beginning in the second century B.C.E. and completed by the first century C.E. It consists of several distinct parts that were edited together sometime before 70 C.E. Enoch is mentioned as an Israelite patriarch in the biblical book of *Genesis* who, instead of dying like an ordinary mortal, was said to walk with God. In later Jewish tradition this was taken to mean that he was transported bodily to heaven. In *I Enoch* he is given an extensive tour of the heavenly regions and eventually transformed into an angel. This book was very important as a sacred text in Second Temple Judaism and continued to be read in antiquity and during the Middle Ages.

Some early fathers of the Christian church wished to include *I Enoch* in the canon of the Old Testament. However, it never became a canonical text in antiquity. A few small fragments of a Greek translation of *I Enoch* are known from Egypt, and more extensive fragments of the Aramaic version have been found among the Dead Sea Scrolls. Part, or even all of the text, may originally have been written in Hebrew, but the full book survives only in the medieval translation used by the Ethiopian Orthodox church, which did incorporate it into its canon of scripture. This book, along with much Christian literature, was translated into Ethiopic (Geez) at the beginning of the medieval period (between 350 and 660) and survives in several manuscripts dating between the 16th and 19th centuries.

In chapters 72–82 of *I Enoch*, known as the book of the *Itinerary of the Luminaries of Heaven*, Enoch's angelic guide describes for him the heavenly bodies and their motions, the subject matter of astronomy. The author of this book shows little or no knowledge of Babylonian or Hellenistic scientific astronomy. But, like the Hebrew Bible, *I Enoch* envisions the sky as a solid dome covering the earth. The sun enters the sky by passing through one of six gates in the eastern part of the dome and then passes out through a corresponding gate in the west. These gates are simply 10-degree arc sections on the portion of the horizon on which dawn and sunset occur; however, once Islamic astronomy made an impact in the later Middle Ages, they were wrongly identified with the zodiacal signs. The sun, as well as the moon and planets, travel in a chariot driven by the winds. The length of day and night varies according to the height of the gate used at particular times. During the night the sun journeys around the outside of the dome to return to the eastern gates. On the equinoxes the days and night are said to each have nine hours, changing to a seven/eleven split at the solstices (at best an approximate figure). The moon is said to follow the same paths and use the same gates as the sun.

In line with the biblical "host of heaven," the stars are marshaled as an army under the command of an archangel, here named Uriel (Enoch's guide). Under him are the captains of the gates through which the sun and moon pass—these are five in number and are presumably the five planets visible to the naked eye. The captain of the second gate in this scheme, not specifically mentioned in the text, is most likely the moon. These officers are in command of the body of fixed stars. Together with the captains of the four seasons they are also in control of weather, particularly the amount of heat and precipitation that reach the earth, determining agricultural productivity. In addition, winds enter the world through 12 more gates located at the cardinal directions (north, south, east, and west), at the quarter points (northeast, southeast, southwest, and northwest), and through two openings each at the top and bottom of the world. Each wind carries with it either a different beneficial or destructive influence, such as heat or cold or dew or drought, but also elements more removed from weather, such as blessings or locusts. Enoch is shown that the earth (conceived of as a flat disk) is surrounded by mountains, seas, and rivers unknown to the human beings living at the disk's center and on a far vaster scale than any familiar topographic features.

The sun and moon are given a series of secret names; scholars dispute what Hebrew words the extant Ethiopic transliterations might go back to. The moon is known to shine with reflected sunlight and is said to be the same size as the sun (because of the nearly identical apparent size of the two bod-

ies), and the moon is described as one-seventh as bright as the sun. The moon is said to have the appearance of a man; that is, under certain lighting conditions the irregular features of the moon's surface suggest a human face. Compare this to the modern idea of the "man in the moon." Throughout the text various computations to reconcile the 354 period of 12 lunar months with the 365-day solar year are presented as though these were great secrets. But these sections are greatly lacking in precision compared with ancient Greek or medieval Islamic computations; they do not take into account, for instance, the extra quarter day of the solar year. In fact, many of these passages, along with those dealing with the phases of the moon, are highly corrupt in the manuscript tradition, suggesting that these concepts were not well understood by the Ethiopian monastic scribes responsible for the tradition.

Uriel's instructions to Enoch end with a prophecy of the end of the world when the stars will not obey the fixed laws ordained by God that have been explained to Enoch but will wander across the sky as they see fit, causing variations in the weather and plagues and famines. This is compared to the erring of human sinners and related to the non-Jewish and Christian practice of worshipping the stars and planets as gods. Although formal astrology is not referred to in the text, when Enoch is shown the "tablets of heaven" (presumably the pattern of the stars and luminaries and their motions), he is able to understand from it all of human history past and future.

In a second, briefer heavenly vision, Enoch is again shown something of the regular progress of the year measured by the sun and moon and told that many human beings sin by using astronomical calendrical reckonings different from those he has been shown and hence hold religious festivals on the wrong days. He is then told the names of the 16 stars/angels that rule over the four seasons. These are not related to any known system of astral religion from the ancient world, but they are merely names of features typical of each season such as "Wheat Harvest" for summer (reflecting Judaeon rather than Ethiopian seasons). But these names have also been badly garbled in the Ethiopic transliteration.

Very little is known with certainty about traditional beliefs concerning astronomy among the cultures of sub-Saharan Africa. Because the peoples in this area did not read or write, information about them comes only from the reports of others and from much later times. In particular, our first information often comes from Christian missionaries (18th century) and early anthropologists (19th century) who were likely to impose their own ideas on African beliefs. It is clear, however, that we cannot speak about scientific astronomy in this region but only about cosmological and astral myths. For instance, the sky was believed to be a solid dome over

the earth, so that if one walked to the edge of the world it would become impossible to stand up straight as the dome bent down to meet the earth.

Just as Semitic culture explained the relationship between the earth and heaven by the metaphor of a ladder and Greeks by the flight of birds, Africans tended to represent this idea though the hanging silken string of the spider. The spider was the messenger of the gods and often a trickster. Other gods would travel between the two realms on the spider's thread. The idea that the stars are organized into constellations seems to have been known, and not from Mediterranean sources, since the limits and characters of the constellations varied widely. Use of a solar 365-day calendar was unknown; time was commonly reckoned in lunar months and by seasons; agricultural planting was governed by weather conditions rather than by date.

The most sophisticated civilization in southern Africa, the Empire of Great Zimbabwe (ca. 1000–ca. 1500), may well have had a more sophisticated astronomy, but information about such a body of knowledge or its possible origin in Islamic civilization is lacking since Zimbabwean cultures left behind no written records. Highly speculative attempts have been made by archaeoastronomers to reconstruct the Zimbabwean calendar by finding alignments between architectural features in surviving ruins and astronomical events such as solstices and equinoxes, but, as with the more famous case of Stonehenge in England, it is possible to find some significance for almost any line of sight extending to the horizon. So it remains unknowable whether the buildings in question were constructed with a particular alignment in mind or whether such alignments are the result of coincidence. Hence, reconstructions of this kind are highly speculative.

THE AMERICAS

BY J. J. GEORGE

Astronomy has preoccupied human curiosity since ancient times. Deep concern with the heavenly bodies and the passage of time as marked by these bodies is known from carved stone monuments, petroglyphs, surviving native books, and statements from native sources written down after the Spanish conquest. Uses of astronomical knowledge helped define and order agriculture, royal power, site orientation, religion, astrology, myth, shamanism, divination, and even the time when a society should go to war. Astronomy in the period from 500 to 1500 built on and perfected already established principles and practices, such as site alignment and the calendar, while focusing on horizon and zenith events of the rising and setting sun, moon, planet Venus, and star cluster Pleiades as well as on the four sacred cardinal directions.

In most of the Americas the study of astronomy and archaeoastronomy is enhanced by the ability to question historic descendants of pre-Columbian peoples and then work backward in time in the attempt to set historical analogues. Solar, celestial, or directional symbolism is encoded in many historic period, or post-European contact, Native American practices, including ceremony, myth, and architecture, with antecedents probably reaching back many hundreds if not thousands of years. Navajo sand paintings depicting the cosmos, Pawnee star maps painted on buckskin containing hundreds of four-pointed star symbols, notched Winnebago sticks tracking months by integrating solar and lunar periods, and the dome shape of the Skidi Pawnee lodge representing the structure of the heavens are historic period examples that, combined with astronomical data inferred from sources such as prehistoric petroglyphs, suggest a long tradition of stargazing and horizon dwelling.

Native North American tribes share a belief in the essential oneness of the cosmos wherein all things are interrelated, including plants, rocks, trees, animals, and even the sun, moon, and stars. Anasazi (ca. 900–ca. 1300) petroglyphs found at Chaco, New Mexico, seem to depict an unusually bright star beside a crescent moon. It has been proposed that this is a record of a great supernova that became visible on July 5, 1054. Written records from China record the same event, noting that it was as bright as Venus and that it lasted 23 days. Similarly, a ceramic bowl from the Mimbres Valley of the Mogollon people (ca. 500–ca. 1400) in southern New Mexico also may be a recording of the supernova. The bowl shows a rabbit, associated with the moon, bent into a crescent position with its back foot touching a round disk with 23 linear spokes radiating outward, the same as the number of days of visibility of the star recorded in the Far East record.

Other North American examples of astronomical use include the 13th-century settlement of Cahokia, located near the confluence of the Missouri and Mississippi rivers, where earth mounds were organized along the cardinal directions and a sophisticated solar calendar was developed. Mound alignments there imply that the sun was the principal object of attention. It has also been proposed that the Pleiades, along with other star groups, served as celestial templates for clusters of conical mounds at other sites in the Midwest, as first seen in the earlier Hopewell culture (ca. 200 B.C.E.–ca. 400 C.E.) mounds at Newark, Ohio. It has also been proposed that the Pleiades celestial schedule helped set the agricultural timetable for communities as diverse as southwestern Pueblo agrarians and northeastern Algonquians and Iroquois.

For the Mayan inhabitants of Mesoamerica, perhaps the keenest stargazers, time was a princely concern and controlling time meant deep knowledge of celestial cycles. Court

specialists schooled in celestial workings and the calendar advised Mayan rulers on armed conflict, marriage, royal accession, and ritual payment to the gods for agricultural good fortune and for healthy children. The Maya inscribed their astronomical knowledge in written documents, architecture, and carved monuments. The finest document is called the Dresden Codex and is believed to be copied from Late Classic (ca. 650–ca. 900). The Madrid Codex and the Paris Codex, though of poorer quality, also offer astronomical data; for instance, the Paris Codex shows a pictorial zodiac containing a host of sky animals, which demonstrates a concern with following the movement of the planets relative to the stars.

The Dresden Codex contains tables of computed positions of Venus and Mars, along with an eclipse-warning table and a season-reckoning table. The lunar table used to predict eclipses covers 405 lunations, or lunar months, arranged day by day for 11,958 days. In the Venus table, set up like the lunar table, pictures mark events, and numbered intervals record the length of time between the appearance and disappearance of Venus. The table is accurate to within one day over 500 years. Venus was often associated with the war god, and specialists could have used the table to determine providential times for warring.

Astronomical evidence also is encoded in Mayan architecture. After the collapse of Mayan settlements in Mexico's southern Yucatán and Guatemala at the end of the Classic Period (ca. 150–650), Chichén Itzá grew into a major Postclassic (ca. 900–1521) power by the 10th century. The Caracol Tower at Chichén Itzá is conspicuously out of line with other buildings at the site, leading researchers to speculate that astronomical observations account for its peculiarities. The large front stairway of the platform, atop which the tower rests, faces 27.5 degrees north of west; this puts it to within 2 degrees of sunset at the summer solstice and even closer to the northern standstill of Venus. In the tower itself two more Venus observations have been noted through thin rectangular windows whose purpose seems to be limited to making specific observations of Venus at its northerly and southerly standstills along the horizon.

At Bonampak in the central Mayan territory near what is today the Guatemala–Mexico border in Chiapas, murals dated to shortly before 800 in the so-called Great Palace (also called Temple of the Murals) are decorated with zodiacal symbols associated with Venus and star glyphs—the same ones from the Dresden Codex—filling a band surmounting a scene that shows the aftermath of a battle. The murals commemorate the victories of the eighth-century king Chaan Muan, who is pictured with a group of captives in supplication at his feet. Four constellations depicted above him suggest a celestial context for the war scenes. Carved dates on

stelae at the site suggest that battles were timed to the first and last appearances of Venus.

Iconographic and alignment evidence of Venus watching also has been found at the House of the Governor at Uxmal (also called the Governor's Palace), a Classic Period Mayan settlement in northern Mayan territory. The main doorway of the structure, probably a royal building, is markedly skewed from the principal site axis to align with Venus rising at its southerly standstill, reached every eight years. In the same structure more than 300 carvings of the Venus hieroglyphic symbol appear, again the same one that appears in the Dresden Codex. The House deviates in a clockwise direction 15 degrees from the main axis of the site. Moreover, its central doorway faces outward toward the horizon instead of inward toward the main axis of the site, as is customary. Observational measurements reveal that the central doorway of the House aligns precisely with the largest structure at a distant neighboring site as well as coinciding with the southernmost standstill of Venus rising.

The Aztec (ca. 1200–1521) of central Mexico tied myth, dynastic history, architecture, urban planning, and ritual to astronomical and celestial events. The Templo Mayor, the most sacred structure in the empire, was oriented to mark the sun at the equinox. Alignment studies suggest that the temple was oriented to permit the equinox sun, just before the rainy season, to rise between temples at its summit. Ritual sacrifices also took place there, and the procession of sacrificial victims was designed to mimic the eastern ascent and western descent of the sun. Another seminal event in Aztec culture was the New Fire Ceremony, also called the Binding of the Years, which occurred every 52 years and was tied to when the star group Pleiades crossed overhead at midnight. On the appointed day Aztec priests ordered the empire into darkness, all fires extinguished. When the Pleiades passed the zenith position, the priests knew that the movement of the heavens had not ceased, and another 52-year cycle commenced. The priests lit a new fire in the heart cavity of a sacrificial victim, and from this all new fire began.

In Andean South America the Inca (ca. 1450–1532) consolidated an enormous stretch of territory of more than 3,400 miles from Quito, Ecuador, to central Chile—reason enough to create a calendar based on celestial events, which they employed in regulating civil, agricultural, and religious dates on a national basis. Cuzco, the capital of the empire, was organized around a system of imaginary lines called *ceques* radiating from the political and religious center—a temple called the Qorikancha (also spelled Corikancha). Each line corresponded with a *huaca*, literally a sacred place, spread across the landscape. Overall, the system was a giant “cosmogram,” a kind of map built into the natural and man-

made topography that functioned as a directional scheme incorporating significant astronomical events, a seasonal calendar, a means to divining water rights, and a system to divide social classes.

One of the most intriguing specialized buildings that incorporates Incan astronomical orientations is the Torreón at Machu Picchu. Viewed from above, the Torreón is a P-shaped building atop a natural rock outcrop. Three trapezoidal windows overlook spectacular vistas, with the northeast window centering on the June solstice. Modifications to a carved rock on the floor of the structure, combined with the way shadows fall from a window, suggest a marking device to register solstice events. A similar structure was found at the Incan site of Pisac, suggesting that the Torreón was not unique to Machu Picchu and may have been one of a number of observatories throughout the empire.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

Medieval astronomers from Asia and the Pacific hoped that the knowledge they gained from studying celestial bodies would help them in practical ways. They studied the heavens to discover when seasons would come and go, when to plant crops, and when to move from one hunting area to another. Many astronomers believed that their studies would reveal information about future events.

Medieval India was probably the most advanced Asian culture in astronomical studies. As early as the Vedic Period (ca. 1500–600 B.C.E.), Indian astronomers realized that the earth orbited the sun, a deduction they may have reached from studying the movements of stars across the sky throughout the year. Around the seventh or eighth century B.C.E. they posited that the earth was a sphere and that the sun was the center of the universe, around which all else orbited. Vedic astronomers probably based their theory on the fact that the sun appeared much larger than the planets and therefore was the logical body around which others orbited. By the end of the Vedic Period, Indian astronomers had concluded that the rising and setting of the sun were illusions, noting instead that when one part of the earth went dark, the sun continued to shine on another part. This suggests that they knew that the earth rotated. It is possible that by the fourth century B.C.E. Indian astronomers understood the notion of gravity. The discoveries of ancient Indian astronomers enabled their medieval descendants to advance beyond the astronomers of other Asian cultures.

An additional advantage was a general openness among Indians toward publishing their research, but they tended to write their scientific works in Sanskrit, which was difficult

to read without extensive instruction. However, those who studied the language could access the best of Indian learning, as many Islamic scholars discovered. A fairly free flow of information allowed Indian scholars to build on one another's work.

Another advantage for Indian astronomers was the revolution in mathematics in India during the medieval era. By 600 C.E. Indian mathematicians had created the decimal system. By 876 the zero had been invented, often appearing as a dot in Indian writings. Indian astronomers applied the concepts of sines and cosines as well as square roots and cube roots to their calculations, much as modern researchers do. Further, they developed trigonometry, which helped them make precise calculations for the movements of stars and planets. Much of this work was applied to the creation of calendars and was used by astrologers to determine the best days for kings to be crowned, couples to be married, and construction projects to begin.

Most astronomical research in medieval India required the support of patrons, usually monarchs who would pay the astronomers and provide them with places to work. The fickleness of royal patronage could result in work starting, stopping, and then starting again, with some monarchs losing interest in their observatories as others gained interest and set up their own observatories.

One early medieval astronomer, Aryabhata (476–550), showed that the light of the moon was a reflection of light from the sun. Further, he discovered that the earth and other planets had elliptical orbits around the sun, and he was able to calculate the dimensions of the orbits and how long each planet took to move around the sun. Aryabhata also developed a process for determining when solar and lunar eclipses would occur. The notion of *gruhtvaakarshan*, meaning “attraction,” as a force in the universe was well developed by the sixth century, when the astronomer Brahmagupta asserted that *gruhtvaakarshan* accounted for the fact that the earth is held in orbit around the sun. He argued that all things on earth fall toward the center of the earth.

During the medieval era Indian astronomers did much of their best work in other countries. China was one of those countries. The Chinese had a long history of studying the heavens, and their first observatory was probably established during the Shang Dynasty (1500–1045 B.C.E.) by shamans reading portents in the sky. Prophesying remained the principal motivation among the Chinese for studying the heavens. They believed that the gods used the movements of heavenly bodies to communicate with human beings about making choices, both mundane (such as when to build a home) and extraordinary (such as when to wage war). The Chinese practiced what anthropologists call portent astrol-



Rahu, lord of the planets; gilt copper alloy inlaid with colored glass ornaments, Tibet, ca. 1400 (Los Angeles County Museum of Art, gift of the 1999 Collectors Committee, Photograph © 2006 Museum Associates/LACMA)

ogy, looking to the sky for guidance and advice. By contrast, the astrology practiced in Europe and the Islamic world at the time is called fate astrology, reading the unalterable future written in the heavens.

During the Han Dynasty (202 B.C.E.–220 C.E.) astronomy was made the exclusive property of royalty. Monarchs were expected to communicate with the gods on behalf of China, so it was an easy and logical step for monarchs to employ astronomers to observe the skies on their behalf for messages from the gods. Further, understanding how the bodies in the heavens moved was deemed a source of power, because the gods gave guidance through the heavens. Chinese monarchs attempted to prevent their enemies from using this power by forbidding anyone but certain government employees from owning star charts or astronomical instruments.

One of the major accomplishments of Chinese astronomy was keeping careful records of ordinary movements in the sky and unusual ones such as “broom stars,” or comets. By the Tang Dynasty (618–907) Indians managed all Chinese observatories. The Astronomical Bureau had two di-

rectors with eight professors directly under them. Six of the professors supervised 37 technicians, 440 clerks responsible for signaling the passage of time with drums and bells, and 360 students, who would join the clerks on graduation. The other two professors oversaw a team of five observers and 150 students responsible for recording the raw facts of astronomical movements.

The Divination Bureau was responsible for interpreting the data recorded by the Astronomical Bureau. The bureau had one director who supervised two assistants and four professors. The professors managed 37 clerks and 45 students, none of whom could aspire to the directorship because the post was filled by Indians early in the medieval era and by Arabs starting in the Song Dynasty (960–1279). As a result of the limitations placed on the potential careers of Chinese students, government-sponsored astronomical studies were controlled by a handful of outsiders, even after the Song Dynasty began encouraging greater freedom in the exchange of ideas in the sciences.

The Chinese divided the sky into nine fields, 12 Jupiter stations, and 28 lunar mansions. One of the nine fields was the polar region to the north, which was thought to be immutable. The 12 Jupiter stations were based on the 12 years required for Jupiter to orbit the sun, and they were used to divide the plane of earth's orbit around the sun (the ecliptic) into 12 sections. Astronomers used the lunar mansions to break down the period it took the earth to complete an orbit around the sun. The number 28 was chosen because it takes about that many days for the moon to go through all its phases.

Japanese astronomers focused on portent astrology. Only a few families were allowed to advise the government on astronomical matters, and their primary job was to keep their patrons alerted to messages the gods wrote in the heavens. They took many of their astronomical practices from the Chinese, although their bureaucracy was not as complex. Even so, their observatories had directors, professors, and students who aspired to become technicians. Astronomers had long apprenticeships during which they learned how to identify planets and stars and how to use instruments like the astrolabe, which measures the height of heavenly bodies in the sky.

The most famous of Korea's astronomical achievements is Che'omseongdae in Kyongju, the capital of the Silla Kingdom. *Che'omseongdae* means "stargazing tower." The tower, which still exists, is about 31 feet tall and 17 feet wide. Built in about 634 during the reign of Queen Seondeok, Che'omseongdae has 27 layers of stones to represent the queen's position as the 27th Sillan monarch. The tower probably had a staircase on the side and a ladder in the center. Astronomers sat or stood

on a platform at the top. Korean astronomers were open to outside ideas, and they added Chinese and Islamic discoveries to their research. During the medieval era Korean astrologers practiced both fate astrology and portent astrology, using their observations to make predictions about future events and to offer monarchs advice on what to do.

The North Vietnamese seem to have mostly followed Chinese-style astronomy, although the people of South Vietnam probably followed India's lead. Little is known of the Khmer's astronomy, but it is likely that scientists from that country took their astrological principles from India. Indonesians may have had their own approach to astronomy or perhaps shared ideas in common with Polynesians. Indian ideas were very influential in the early medieval era, and Islamic principles became influential near the end of the era, in the 1400s.

The Polynesians traveled most of the Pacific region during the medieval era. Their astronomy was pragmatic, focusing on what they needed to know about the heavens to guide their boats on long voyages. Polynesian navigators memorized the locations of numerous celestial objects, their movements, and where they should be in the sky at different times of the year. To remember this information, navigators invented stories about stars or groups of stars. Their knowledge of the night sky enabled them to identify longitudes and latitudes accurately enough to sail across miles of ocean to previously discovered islands. When they discovered islands, they were able to use their knowledge to fix the locations of the islands in their memories so that they could tell others how to voyage to them.

The peoples of medieval Australia had long been divided into several cultural groups, making it challenging to generalize about their astronomy. It is clear, however, that they did a great deal of stargazing. They looked to the night sky for hints about the changing seasons, and being primarily hunter-gatherers, they studied the night sky to see when they should move from one hunting area to another. Annual changes in the night sky could be tied to specific activities. For example, the Boorongs of modern Victoria knew that when the Mallee fowl constellation, their name for Lyra, sank out of sight in October, it was time for them to gather the eggs of the earthly Mallee fowl.

EUROPE

BY BRADLEY A. SKEEN

In the two centuries following the sack of Rome by the Goths in 410 C.E. the administrative and economic structure of the Western Roman Empire collapsed amid successive waves of barbarian invaders. The effect on scientific knowledge was

devastating. The chief intellectual language of the Roman Empire had been Greek, and in the Western world all knowledge of the Greek language as well as of the information in Greek books was lost (except for the little that had been translated into Latin or summarized or excerpted in Latin encyclopedic works). Detailed knowledge of ancient astronomy was often replaced by opinion offered by such Christian Latin authors as Lactantius (ca. 240–ca. 320 C.E.), who in his *Divinae institutiones* (Divine Institutions) reverted to a prescientific astronomy based on the Old Testament, according to which the earth was a flat circle surrounded by a single dome containing the heavenly bodies. Practically the only concern of the Catholic Church (the most sophisticated institution in western Europe) with astronomy was to regulate the calendar and especially to reckon the date of Easter each year.

In the Eastern Roman Empire, Greek astronomical learning was never lost, but it was not advanced either. Nor did much communication between the Latin and Byzantine spheres exist on intellectual matters until the early Renaissance (after 1400 in Italy). As such, Western Europe's reacquaintance with ancient astronomy came instead from contact with the Islamic world. In 11th-century Spain, numerous books of Greek philosophy and science as well as treatises in which Arab scholars had synthesized and advanced Greek ideas, began to be translated from Arabic into Latin. The most important Greek work on astronomy was the *Almagest* (Great Treatise), by Ptolemy (ca. 90–ca. 168 C.E.). Western languages still refer to this book by its Arabic title, *Almagest*. This encyclopedic work was translated into Arabic only around 900 C.E., and this translation was further rendered into Latin by Gerard of Cremona (ca. 1114–87) at Toledo, in Spain, after 1144.

The intellectual framework of all Arabic work in astronomy, however, was the science of the Greek philosopher Aristotle (384–322 B.C.E.), and this held true for European medieval culture as well, which received Greco-Arab astronomy as part of the general body of Aristotelian science in the 12th century. Science at this level was the concern solely of university professors, who in medieval Europe were necessarily members of the Catholic clergy. The Roman Catholic Church, however, had some inclination to view the philosophical learning received from Arab culture as a threat, not only because it was foreign and not Christian but also because it seemed to set up a new body of knowledge based on human reason that stood apart from the divine wisdom privileged by the church as an institution. These problems were soon solved by Thomas Aquinas (ca. 1225–74 C.E.), who in his *Summa theologiae* (Summary of Theology) and other works synthesized a new philosophical system incorporating Aristotelian science that withstood theological scrutiny.

In the system of astronomy that he worked out based on his limited knowledge of the work of Aristotle and Ptolemy, Aquinas conceived of the earth as a sphere. The earth sat motionless at the center of the universe and was surrounded by celestial spheres, to which were affixed the seven planets visible to the naked eye (from closest to farthest): the moon, Mercury, Venus, the sun, Mars, Jupiter, and Saturn. These celestial spheres were commonly referred to as crystal, but in fact they were held to be made of a perfect form of matter that could not exist in the fallen and imperfect physical world of the earth. Each planet was mounted on its sphere by an armature consisting of several smaller spheres whose movements were called epicycles. This geometrically complex arrangement was necessary because only by presupposing such a mechanism could an accurate mathematical model be worked out for predicting the motions of the planets, allowing for phenomena such as pausation and retrogradation, when planets seem to suddenly stop or reverse their direction of movement.



Zodiac sign of Aries the Ram (figure decorated with stars, suggesting constellation, against blue sky background); Italy, 1473 (Courtesy the Morgan Library and Museum)

Using this system, planetary motions could be predicted with something approaching the accuracy of modern astronomy. For example, eclipses of the sun and occultations (instances when a planet passes behind the moon) could generally be predicted years if not centuries in advance for any location on the earth. Beyond the spheres of the planets was held to be an eighth sphere containing all of the fixed stars. The equator of the earth can be mathematically projected onto this sphere as the celestial equator. The ecliptic is the path of the sun across this sphere and is tilted 23.5 degrees away from the celestial equator. Lines at the ecliptic's northern and southern extremes are the Tropic of Cancer and the Tropic of Capricorn, respectively. The constellations that lie along the ecliptic make up the zodiac.

In Aquinas's system, each of the planetary spheres was believed to be moved in the patterns perceived through observational astronomy by an angel. The angel did not move the sphere on his own but rather imparted to the sphere a force which he received from the sphere above. As such, the planetary motions ultimately came from a ninth sphere above that of the fixed stars, which was held to be occupied by the Christian god. Aristotle's own unmoved mover had been a god that was perfect in himself without requiring any further action; the created universe moved because it desired God's perfect condition. The Arab philosopher Avicenna (ca. 980–1037 C.E.) had, however, followed Neoplatonic interpretations of Aristotle and saw the existence of god as perpetually spilling out to impart motion to the universe. Aquinas followed this interpretation, and in his system, along with motion, god's will and judgment are passed down through the spheres and eventually reach the earth. This is one reason why the stars can be understood to control the course of events on earth.

Perched above the sublunary and purely physical world of the earth, this system of planetary spheres is spiritual. The human being, composed of both spiritual (soul) and physical (body) natures, forms the only link between the two worlds. Proof of this system was seen in phenomena like the tides of the ocean and the seasons of the year, which precisely follow various astronomical motions. Aquinas himself was not very interested in astrological predication, but later writers justified astrology through an appeal to the Thomistic idea of divine providence ruling the universe in accord with god's will.

Indeed, while the church used astronomy to regulate the calendar, the majority of people were more concerned with the potential practical value of astrological prediction than with an abstract understanding of celestial movements. In Latin, the principle language used in writing about and discussing astronomy in medieval Europe, *astronomia* and *astrologia* are synonyms; that is, no distinction was made between scientific astronomy and the astrology that in the

modern world is recognized as a pseudoscience. Generally, astronomical observations and advances in astronomical theory were performed by astrologers interested in making astrological predictions. The traditional criticism of astrology founded in academic skepticism grew embedded in medieval thought because of its prominence in the writings of Cicero and Augustine. These historical figures called into question the legitimacy of natal horoscopy—that is, the idea that a person's future may be known in detail from examining the positions of the planets at the instant of his or her birth—but this did not prevent astrology from gaining the greatest popularity in both learned and unlearned circles.

Astrology enjoyed the prestige of being reintroduced to western Europe in the 12th century along with other elements of ancient science and philosophy, and the pseudoscience also had the advantage of seeming rational and scientific at a time when no secure refutation of its principles of the kind furnished by modern scientific astronomy could be made. Astrology was used for the same reason divination was generally used in traditional cultures: to inquire whether an action (such as starting a business venture) whose outcome could not be determined rationally was a positive thing to do or not.

Most aristocratic households in medieval Europe would have possessed a book of hours, which served as both calendar and almanac for several years. Although unique in its importance as a medieval work of art with its many hand-rendered paintings, *Les Très riches heures du duc de Berry*, an illustrated book of hours, is typical in its presentation of astronomical material for use outside the learned debates of the university. Covering the years 1413–16, it gives for each day of the year such information as the saint whose feast is to be celebrated, the phase of the moon, and the times of sunrise and sunset. It also contains much information that modern historians would term astrological. For instance, the calendar for each month incorporated a detailed division of the month according to zodiacal signs. Each month is said to contain two “Egyptian Days” (a common term in medieval calendars whose origin is obscure), except January, which has three. These days were considered to be unfavorable for many activities, such as bloodletting, which was a common medical procedure at the time.

The book also contains a page that is essentially a reference guide for astrological calculation and medical prognosis. The page shows a painting of a man with the signs of the zodiac superimposed over his body, illustrating the principle of melothesia, the belief that the various parts of the body correspond to the zodiacal signs. Employing the tenets of melothesia, one might conclude that since, for instance, the constellation Leo “rules” the heart, if a “hostile” planet like Mars enters Leo, the result might be chest pain, heartbreak,

or some similar condition. The same reference page also contains information about other associations of the zodiacal signs in terms of the four humors (the substances that composed the body according to medieval medicine), as well as the gender and cardinal direction associated with each sign. In fact, astrology was intimately associated with medical practice in medieval Europe. University-trained physicians who professed to work in the Hippocratic tradition—which in antiquity had been highly skeptical of divination—used astrology to determine both the best treatment for an individual and the best times to apply a given treatment. Astrological methods had the advantage of seeming precise and “scientific” at a time when medical practitioners understood little about the treatment of disease.

THE ISLAMIC WORLD

BY S. M. GHAZANFAR

While the beginning of scientific explorations is identified with Islam’s Abbasid Caliphate (749–1258), usually called the Golden Age of Islam, such endeavors continued in Islamic Spain up to the fifteenth century. In Baghdad the caliph al-Mamoon established the Bait al-Hikma (House of Wisdom) in 813, where scholars from all faiths assimilated the rediscovered Greek heritage that had lain dormant in Alexandria since the early sixth century. They not only translated and absorbed that legacy but further built upon it in substantial ways; astronomy was one key area of exploration.

The Koran, Islam’s holy book, has many verses that relate to the celestial sphere. These include “In the creation of the heavens and the earth and in the alternation of the night and the day there are indeed Signs for men of understanding” (sura 3:190) and “It is He who created the Night and Day, and the sun and the moon; all (the celestial bodies) swim along, each in its orbit” (sura 21:33). Such exhortations not only affirm the creative will of God but also encourage astronomical explorations. Muslims use a lunar calendar, so the months change according to the appearance of the moon. The beginning of each month has special significance, particularly with the month of fasting, Ramadan. Early Muslims traveled long distances by land and sea—from Timbuktu to China—in their trading pursuits, and astronomical instruments served as navigational aids in such travels. Further, Muslims face toward the building of Kaaba, in Mecca, for daily prayers; as Islam spread to distant regions, Muslims needed orientational guidance in order to maintain this and other such Islamic practices. For example, astronomers determined the proper times for prayer using spherical triangles, solving for the unknown side or angle by using trigonometric functions. For all these reasons, astronomy became a main concern for Muslim scholars more

than a thousand years ago, and their scientific achievements influenced the subsequent Latin-European Renaissance.

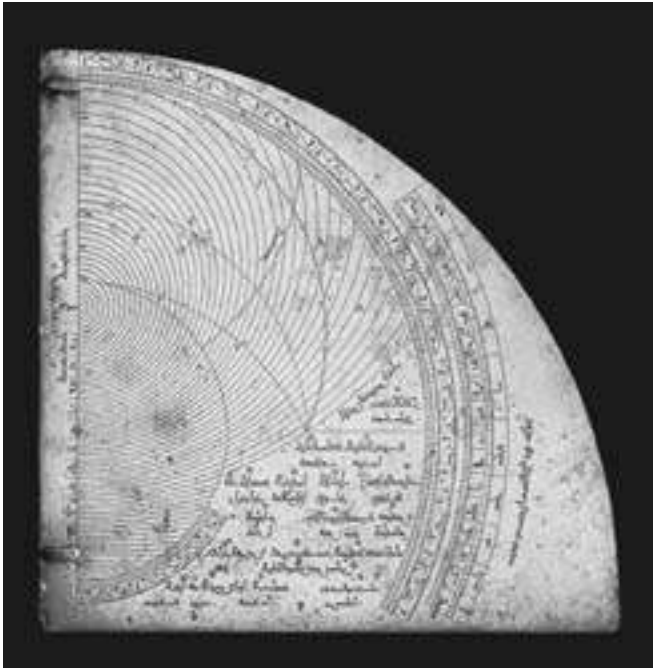
Some scholars-astronomers and their main contributions may be noted individually. Most early scholars approached knowledge holistically, such that their contributions often extended to several disciplines. Muhammad ibn Musa al-Khwarizmi (ca. 780–850) was a Persian scholar who wrote a renowned treatise on algebra (in Arabic, briefly, *al-Jabr*) and whose romanized name gave rise to the word *algorithm*. He was the first to use Arabic numerals to produce astronomical tables. Further, using an Arabic translation of Ptolemy’s *Almagest* (which means “The Great Work” in Arabic; the book was earlier known, in Greek, as *Mathematike syntaxis*), al-Khwarizmi wrote a book containing both stellar and terrestrial maps.

Said al-Farghani (d. ca. 850), an astronomer in Baghdad’s Bait al-Hikma, studied and wrote on the astrolabe, an instrument used to determine the positions of celestial bodies, explaining its mathematical validity and correcting faulty geometrical constructions of the central disc that were current then. His most famous work, known in English as the “Book on Sun and Movement and Encyclopedia of Star Science,” contains 30 chapters; its contents include a description of the inhabited part of the earth, an assessment of its size, and the distances from the earth and sizes of the heavenly bodies.

Abu Yusuf al-Kindi (ca. 801–73), better known as the founder of Islamic peripatetic (Greek) philosophy, wrote several books in disciplines other than astronomy. Relevant to astronomy were three of his main books, known in English as “Calculating the Azimuth on a Sphere: An Explanation of the Cause of the Retrogression of the Stars,” “Determination of the Hours on a Hemisphere by Means of Geometry,” and “Calculation and Making an Instrument to Determine the Distances of Heavenly Bodies.”

Muhammad ibn Jabir al-Battani (ca. 858–929), a mathematician and astronomer, wrote books whose titles in English are “The Movements of the Stars” and “Astronomical Work,” and he also wrote a commentary on Ptolemy’s astrological work *Tetrabiblos* (Four-Part Book). He revised Ptolemy’s star charts, and his values for the obliquity of the ecliptic and the precession of the equinoxes were more accurate than Ptolemy’s. When preparing tables for the sun and moon by comparing his own measurements with Ptolemy’s, he discovered that the shape of the earth’s elliptical orbit was changing, not fixed.

Abd al-Rahman al-Sufi (ca. 903–86), a Persian scholar who worked in Baghdad and Persia, revised the Greek astronomer Hipparchus’s work in his “Book on the Constellations of Fixed Stars,” assigning magnitudes to stars based on his own observations. A genuine stargazer, he described the



Astrolabic quadrant, made by Muhammad ibn Ahmad al-Mizzi, the timekeeper of the Great Mosque of Damascus; Damascus, Syria, 1333–1334 (© The Trustees of the British Museum)

Andromeda galaxy, the Milky Way's closest neighbor, offering the first record of another star system. He recorded his findings constellation by constellation, discussing the stars' positions, sizes, and colors. He also wrote on the astrolabe and its various uses.

Hassan ibn al-Haytham (ca. 965–1038), another astronomer and mathematician, was described by the Harvard science history professor George Sarton as "the greatest Muslim physicist and one of the greatest students of optics of all times." He refuted the conclusions of Euclid and Ptolemy in arguing that light comes from the visual object through the lens to be perceived by the eye; his advances in optics led to the subsequent development of the telescope. Elsewhere, he produced an accurate analysis of the focusing, inversion, and magnification of an image, and he offered the first description of the camera obscura, which would be used to observe solar eclipses. Also, he designed a new system using concentric spheres and shells to describe the simple motions of the celestial bodies. His scholarship was profoundly influential in Latin Europe, as seen in the works of Roger Bacon (ca. 1214–94) in particular and also of Nicolas Copernicus (1473–1543) and Johannes Kepler (1571–1630), among others.

Abdul Rahman al-Biruni (ca. 973–1048) formed linkages between the scholarly traditions of Baghdad and India and wrote 150 books on various subjects, including 35 treatises on astronomy, only six of which have survived. He stated that

the earth rotated around its own axis, calculated the earth's circumference, and, after determining the latitude and longitude of the world's major cities, scientifically established the direction of Mecca from any point on the globe.

Nasir al-Din al-Tusi (1201–74) wrote numerous volumes on various subjects, including mathematics and astronomy. He constructed a major observatory at Maragha, in Persia. He developed a model of the solar system in which he added two small epicycles to Ptolemy's to describe the nonuniform motions of the planets using only uniformly rotating circles. Copernicus later used the same mechanism to eliminate the equant, a concept originally developed by Ptolemy, and to calculate changes in his heliocentric orbits in his *Commentariolus*.

Ulugh Beg (1394–1449), the grandson of the Mongol conqueror Tamerlane, was another well-known scholar-astronomer, regarded as the last representative of the School of Baghdad. He established an academy of science and built an observatory in Samarqand, in modern-day Uzbekistan, featuring a quadrant with a 200-foot radius. He compiled a catalog of a thousand stars, using coordinates from his own observations rather than Ptolemy's observations. He also compiled tables of the movements of the sun and planets and observed the obliquity of the ecliptic.

Astronomical explorations were also undertaken in Islamic Spain (al-Andalus). While most manuscripts were destroyed during the reconquest and the Spanish Inquisition, some survived. Andalusian scholars who investigated various aspects of astronomy included Abbas ibn Firnas (810–87), who explored the mechanics of flying and also built a popular planetarium; Masalama al-Majriti (d. ca. 1008), who wrote books on mathematics and astronomy and extended the astronomical tables; and al-Zarqali (ca. 1028–87), who constructed astronomical instruments and produced a water clock that could tell the hours of the day and night and the days of the month, particularly useful for Islamic prayers.

Muslim astronomers built observatories in various parts of the Islamic world. The first observatory in Europe was built by Muslims in Seville, Spain; however, more renowned at the time were those in Toledo and Córdoba. While most of the great astronomical discoveries happened in observatories in the East, Toledo was the center of world astronomy during 50 years of Islamic rule. The first systematic observatory is associated with Baghdad's Bait al-Hikma. Also, many private observatories could be found in Baghdad and Damascus. Other observatories were located in Cairo, Samarqand, Bukhara (in western Asia), Esfahan (Persia), and Istanbul, with the most influential observatory being found in Maragha (Persia). In addition, lookout towers were built in various places to allow for greater study of the motions of the stars; the minarets of mosques also served that purpose.

THE MAGNIFICENT OBSERVATORY OF ULUGH BEG

When the conqueror Tamerlane (also known as Timur Lenk, 1336–1405) died, his son Shah Rukh (d. 1447), noted for his peaceful ways, emerged as Tamerlane's successor, and he devoted his reign to promoting scholarship and trade. In 1407 his son Muhammad Taragi, better known as Ulugh Beg, was made ruler of Samarqand, within Shah Rukh's empire. Ulugh Beg was one of the leading intellectuals of his time, writing extensively about mathematics and astronomy and making star charts that remained in use until the modern age. He sponsored many building projects, but the observatory he built north of Samarqand in 1428–1429 may have been closest to his heart. During its short existence, it may have been the greatest observatory in the Islamic world.

Cut vertically into the ground on which the observatory stood was a segment of a circle lined with polished stone. Notches were cut into this circle to mark the degrees of the zodiac. It was part of an enormous sextant, an instrument used to measure the angular altitude of celestial bodies. The structure atop this stone paving was a cylinder 157 feet in diameter and three stories high. The ground floor was decorated on the outside with geometrical patterns. The upper two floors were surrounded by arcades. Around the huge sextant were storerooms for astronomical instruments and probably for the keeping of records of observations. Some rooms were workplaces for the astronomers who manned the observatory. Observations made from the Samarqand observatory served as aids in navigation for ocean traders and to determine the direction to Mecca more precisely than had ever been possible.

When Shah Rukh died, there was conflict over who would succeed him, but scholarly Ulugh Beg emerged as the new leader. He was beset by armies led by the grandchildren of Tamerlane and was forced into leading his empire in continual wars. Eventually, his son Abd al-Latif (d. 1450) overthrew him but granted him permission to make a pilgrimage to Mecca. He had his father murdered during the journey. The observatory was soon destroyed for being too secular.

The precise astronomical knowledge of the Muslims permitted them to make perfected astrolabes, which would be a vital contribution to the later voyages of European expansion. Indeed, the preeminence of Muslims in astronomy gave them advantages in navigation; thus, Prince Henry the Navigator established a school of navigation in Portugal, staffed with Muslim astronomers and navigators, and several Muslim navigators guided the Portuguese and Spanish explorers—including Vasco da Gama and Christopher Columbus—in their voyages.

While Muslims improved upon astronomical instruments already in existence, they also pioneered in the development of others. Celestial globes and armillary spheres were used primarily for solving problems in celestial astronomy. The astrolabe, described by some as the most important calculating device before the invention of digital computers, dates back to the Greeks, but the spherical astrolabe was an Islamic development, originally employed to aid in finding the direction of Mecca. Sundials were inherited from the Greeks and Indians, but Muslims made several improvements, considerably shortening the time needed to make specific calculations; sundials were often used in mosques to determine the time of prayer. Several forms of quadrants were invented by Muslims, such as the sine quadrant, used for astronomical calculations, and the horary quadrant, used to determine time through observation of the sun or stars. The equatorium, an Islamic invention

from Spain, was used to find the positions of the moon, sun, and planets; this mechanical device employed a geometrical model that represented positions of the celestial body.

The overall prominence of Islamic astronomy is indicated by the inclusion of words of Arabic origin in the modern astronomical vocabulary. Among others, the terms *zenith*, *azimuth*, and *nadir* and the names of the stars in the Summer Triangle—Vega, Altair, and Deneb—are all words of Arabic origin. In summary, early Muslim astronomers left behind an impressive legacy. They refined certain astronomical calculations, prepared tables showing the motions of stars, determined the obliquity of the ecliptic and its progressive decline, and precisely estimated the precession of the equinoxes and the length of the year. Their achievements are written not only in the textbooks of astronomy but also across the sky in the names of the stars themselves.

See also AGRICULTURE; ARCHITECTURE; ART; CALENDARS AND CLOCKS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EXPLORATION; FESTIVALS; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; INVENTIONS; LITERATURE; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SEAFARING AND NAVIGATION; SHIPS AND SHIPBUILDING; SOCIAL ORGANIZATION; WAR AND CONQUEST; WRITING.

Africa

~ The Book of Enoch, *excerpt (second century B.C.E.)* ~

LXXII THE SUN

1. The book of the courses of the luminaries of the heaven, the relations of each, according to their classes, their dominion and their seasons, according to their names and places of origin, and according to their months, which Uriel, the holy angel, who was with me, who is their guide, showed me; and he showed me all their laws exactly as they are, and how it is with regard to all the years of the world and unto eternity, till the new creation is accomplished which dureth till eternity. 2. And this is the first law of the luminaries: the luminary the Sun has its rising in the eastern portals of the heaven, and its setting in the western portals of the heaven. 3. And I saw six portals in which the sun rises, and six portals in which the sun sets and the moon rises and sets in these portals, and the leaders of the stars and those whom they lead: six in the east and six in the west, and all following each other in accurately corresponding order: also many windows to the right and left of these portals. 4. And first there goes forth the great luminary, named the Sun, and his circumference is like the circumference of the heaven, and he is quite filled with illuminating and heating fire. 5. The chariot on which he ascends, the wind drives, and the sun goes down from the heaven and returns through the north in order to reach the east, and is so guided that he comes to the appropriate portal and shines in

the face of the heaven. 6. In this way he rises in the first month in the great portal, which is the fourth. . . . 7. And in that fourth portal from which the sun rises in the first month are twelve window-openings, from which proceeds a flame when they are opened in their season. 8. When the sun rises in the heaven, he comes forth through that fourth portal thirty mornings in succession, and sets accurately in the fourth portal in the west of the heaven. . . .

LXXIII THE MOON

1. And after this law I saw another law dealing with the smaller luminary, which is named the Moon. 2. And her circumference is like the circumference of the heaven, and her chariot in which she rides is driven by the wind, and light is given to her in (definite) measure. 3. And her rising and setting change every month: and her days are like the days of the sun, and when her light is uniform (i.e. full) it amounts to the seventh part of the light of the sun. 4. And thus she rises. And her first phase in the east comes forth on the thirtieth morning; and on that day she becomes visible, and constitutes for you the first phase of the moon on the thirtieth day together with the sun in the portal where the sun rises.

From: R. H. Charles, trans., *The Book of Enoch* (London: Society For Promoting Christian Knowledge, 1917).

Europe

~ Thomas Aquinas: *Summa theologiae*,
First Part, Question 68 (1265–74) ~

ARTICLE 4. WHETHER THERE IS ONLY ONE HEAVEN?

Objection 1. It would seem that there is only one heaven. For the heaven is contrasted with the earth in the words "In the beginning God created heaven and earth." But there is only one earth. Therefore there is only one heaven.

Objection 2. Further, that which consists of the entire sum of its own matter, must be one; and such is the

heaven, as the Philosopher proves. . . . Therefore there is but one heaven.

Objection 3. Further, whatever is predicated of many things univocally is predicated of them according to some common notion. But if there are more heavens than one, they are so called univocally, for if equivocally only, they could not properly be called many. If, then, they are many, there must be some common notion by reason of which each is called heaven, but this common

(continued)

(continues)

notion cannot be assigned. Therefore there cannot be more than one heaven.

On the contrary, it is said (Psalm 148:4): "Praise Him, ye heavens of heavens."

I answer that, On this point there seems to be a diversity of opinion between Basil and Chrysostom. The latter says that there is only one heaven . . . and that the words "heavens of heavens" are merely the translation of the Hebrew idiom according to which the word is always used in the plural, just as in Latin there are many nouns that are wanting in the singular. On the other hand, Basil . . . whom Damascene follows . . . says that there are many heavens. The difference, however, is more nominal than real. For Chrysostom means by the one heaven the whole body that is above the earth and the water, for which reason the birds that fly in the air are called birds of heaven [Psalm 8:9.] But since in this body there are many distinct parts, Basil said that there are more heavens than one.

In order, then, to understand the distinction of heavens, it must be borne in mind that Scripture speaks of heaven in a threefold sense. Sometimes it uses the word in its proper and natural meaning, when it denotes that body on high which is luminous actually or potentially and incorruptible by nature. In this body there are three heavens; the first is the empyrean, which is wholly luminous; the second is the aqueous or crystalline, wholly transparent; and the third is called the starry heaven, in part transparent and in part actually luminous and divided into eight spheres. One of these is the sphere of the fixed stars; the other seven, which may be called the seven heavens, are the spheres of the planets.

In the second place, the name heaven is applied to a body that participates in any property of the heavenly body, as sublimity and luminosity, actual or potential. Thus Damascene . . . holds as one heaven all the space between the waters and the moon's orb, calling it the aerial. According to him, then, there are three heavens, the aerial, the starry, and one higher than both these, of which the Apostle is understood to speak when he says of himself that he was "rapt to the third heaven."

But since this space contains two elements, namely, fire and air, and in each of these there is what is called a higher and a lower region, Rabanus subdivides this space into four distinct heavens. The higher region of fire he calls the fiery heaven; the lower, the Olympian heaven from a lofty mountain of that name. The higher region of air he calls, from its brightness, the ethereal heaven; the lower, the aerial. When, therefore, these four heavens are added to the three enumerated above, there are seven corporeal heavens in all, in the opinion of Rabanus.

Thirdly, there are metaphorical uses of the word heaven, as when this name is applied to the Blessed Trinity, Who is the Light and the Most High Spirit. It is explained by some, as thus applied, in the words, "I will ascend into heaven"; whereby the evil spirit is represented as seeking to make himself equal with God. Sometimes also spiritual blessings, the recompense of the Saints, from being the highest of all good gifts, are signified by the word heaven, and, in fact, are so signified, according to Augustine . . . in the words "Your reward is very great in heaven" (Matthew 5:12).

Again, three kinds of supernatural visions, bodily, imaginative, and intellectual, are called sometimes so many heavens, in reference to which Augustine . . . expounds Paul's rapture "to the third heaven."

Reply to Objection 1. The earth stands in relation to the heaven as the centre of a circle to its circumference. But as one center may have many circumferences, so, though there is but one earth, there may be many heavens.

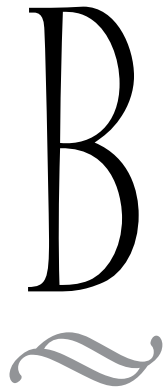
Reply to Objection 2. The argument holds good as to the heaven, in so far as it denotes the entire sum of corporeal creation, for in that sense it is one.

Reply to Objection 3. All the heavens have in common sublimity and some degree of luminosity, as appears from what has been said.

From: *The Summa Theologica* of St. Thomas Aquinas, 2nd rev. ed., trans. Fathers of the English Dominican Province (London: Burns, Oates and Washbourne, 1912-1936).

FURTHER READING

- Thomas Aquinas, *Summa Theologica*, 3 vols., trans. Fathers of the English Dominican Province (New York: Benziger Bros., 1947–1948).
- Anthony F. Aveni, *Stairways to the Stars: Skywatching in Three Great Ancient Cultures* (New York: John Wiley and Sons, 1997).
- Anthony F. Aveni, *Skywatchers: A Revised and Updated Version of Skywatchers of Ancient Mexico*, rev. ed. (Austin: University of Texas Press, 2001).
- Victoria Benedict, trans., *The Très Riches Heures of Jean, Duke of Berry* (New York: G. Braziller, 1969).
- J. L. E. Dreyer, *History of the Planetary Systems from Thales to Kepler* (Cambridge, U.K.: Cambridge University Press, 1906).
- Owen Gingerich, “Islamic Astronomy,” *Scientific American* 254, no. 4 (April 1986): 68–75.
- Michael Hoskin, ed., *The Cambridge Concise History of Astronomy* (Cambridge, U.K.: Cambridge University Press, 1999).
- E. Isaac, trans., “I (Ethiopic Apocalypse of) Enoch.” In *The Old Testament Pseudepigrapha*, ed. James H. Charlesworth (Garden City, N.Y.: Doubleday, 1983).
- David A. King, “Islamic Astronomy.” In *Astronomy before the Telescope*, ed. Christopher Walker (British Museum Press, 1999).
- Paul Lunde and Zayn Bilkadi, “Arabs and Astronomy,” *Saudi Aramco World* 37, no. 1, (January–February 1986): 4–7.
- Otto Neugebauer, “Notes on Ethiopic Astronomy,” In his *Astronomy and History: Selected Essays* (New York: Springer, 1983).
- Lewis Pyenson and Susan Sheets-Pyenson, “Watching: Observatories in the Middle East, China, Europe and America.” In *Servants of Nature: A History of Scientific Institutions, Enterprises, and Sensibilities* (New York: Norton, 1999).
- Roshdi Rashed, ed. (in collaboration with Régis Morelon), *Encyclopedia of the History of Arabic Science*, Vol. 1, *Astronomy* (London: Routledge Publishers, 1999).
- George Saliba, *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam* (New York: New York University Press, 1994).
- G. J. Toomer, trans., *Ptolemy’s Almagest* (Princeton, N.J.: Princeton University Press, 1998).
- Ray A. Williamson, *Archaeoastronomy in the Americas* (Los Altos, Calif.: Ballena Press, 1981).



► borders and frontiers

INTRODUCTION

In the ancient world the borders and frontiers of kingdoms and states were most often delineated by natural features such as rivers and mountain ranges. Many of these borders continued to be used in medieval times throughout much of the world, with Roman boundaries being retained in much of Europe, North Africa, and the Middle East. In parts of China provincial borders were maintained from the Han Dynasty (202 B.C.E.–220 C.E.). To some extent the main changes took place in areas where old civilizations had collapsed and totally new entities emerged during the period of formation of medieval states.

The rise in the population of the medieval world, as well as the decrease in nomadic tribes, produced more areas under cultivation; as a result, borders had to be formed and agreed upon. The delineation of boundaries in Europe, northern Africa, the Middle East, and large parts of mainland Asia grew in importance and were often defined by written treaties, drawn up mostly after conflicts, invasions, or incursions. Because the treaties set down exact borders, it became more necessary to have a way of defining these boundaries, often by natural boundaries but also increasingly by markers, walls, or forts.

Rivers served as useful divisions between states. The Danube, previously the boundary of the Roman Empire, became the northern border of the Byzantine Empire; the Indus

River defined, for a period, the boundary between the areas ruled by the Umayyads and that remaining under Hindu rule; and the Havel River separated Saxony in the eighth century from the lands ruled by the Abodrites, a confederation of Slavic tribes. Mountain ranges worked well in other parts of the world, such as between France and the kingdoms of northern Spain, between Spain and Portugal, along northern border of the kingdoms of Hindu India, and on the western extremes of the Tang Empire (608–907) of China. There were also frontiers defined by man-made objects such as walls—Hadrian's Wall and the Great Wall of China being the most famous of those surviving, both built in ancient times. Watling Street, a Roman road, was to mark the boundary between the Saxon realms and the “Danelaw” (northern and eastern England, where the Danes held sway) during ninth and 10th centuries, and Offa's Dyke delineated the frontier of England and Wales.

In other parts of the world, where there were no formally defined borders, many nomadic peoples in Africa, the Americas, and Australia tended to restrict themselves to particular parts of their respective continents, there being parts of those lands that were uninhabitable. With small populations, relative to the land area, and people moving with the seasons, these tribes rarely clashed, except in some parts of Africa such as the Sahara, where new kingdoms emerged and their rulers wanted to expand the land under their control. In the Americas the great empires of the Inca and the Maya and then the Aztec in Central America seem to have been

the only major civilizations to establish formal borders in the European sense.

In most cases the borders and frontiers in the medieval world, even in those instances where they were defined in writing, rarely lasted for long. With the fluctuating fortunes of rulers and their armies, the borders of their lands regularly changed. The few exceptions were small city-states or states based on islands, with Portugal being one of the few medieval kingdoms that has retained its frontiers for many centuries. Below the national level, the county system in Britain also remained largely untouched from medieval times until 1974. The Papal States, in central Italy, also managed to retain their size until 1860. For the most part borders changed as local rulers switched their loyalties or when their lands were invaded and captured. Although the medieval world would see some of the greatest empires in history (among them, those of the Mongols and the Arabs), the existence of confederations, especially in the Americas, allowed for the formation of many city-states with their borders often largely defined by the lands needed for the maintenance of the city or other population center.

AFRICA

BY MICHAEL J. O'NEAL

In the modern world the borders that define nation-states are generally (though not always) clear, fixed, and recognized by other nations. When travelers pass from one nation to another, they are likely to be greeted by signs, fences, border control posts, and in some cases armed soldiers or police that make it clear that they have left the territory of one country and are entering that of another.

During the medieval period in Africa territorial borders were not as clearly fixed. A community of people that can be identified as forming a "state" or "kingdom" lived and worked around a magnet city that formed the core of that community. The city was the site of governmental, administrative, and often religious activities. Surrounding the city was countryside peopled by farmers, herders, miners, and others who earned their living from the land. Trade took place between the central city and the outlying regions; people living outside the city supplied agricultural products, while city dwellers provided manufactured goods. As the distance from the city increased, the kingdom's hold over the territory was apt to weaken until eventually the territory came under the sway of another kingdom. Occupying the border regions were tributary states dominated by the central empire through conquest, payment of tribute, or alliance. The kingdom's borders were defined, in effect, by the extent of the territory it was willing to claim as its own and defend.

Borders, too, often were defined by geographical features. Certainly mountains and rivers presented barriers not easily bridged; in this sense borders in Africa were little different from those in other parts of the world. Contributing to this geographical differentiation were climate and resources. As it still does, Africa in the medieval period presented its inhabitants with a wide range of climatic conditions that in large part defined the terrain. Some Africans inhabited forests where gold could be a primary resource. Others lived on savannas, or immense open grasslands, where herders tended animals and miners extracted copper from the earth. Still others scratched out livings from the desert, where salt was extracted.

Because of differences in climate, terrain, and resources, the various kingdoms of medieval Africa were defined in large part by the nature of their trade. The kingdoms were linked by networks of trade that tended to run from east to west, although considerable trade to the north took place as well. People at the frontiers of a kingdom typically were members of caravans of traders who exchanged the goods of their own kingdom for those of another. In medieval Africa, therefore, traders were similar to the frontiersmen of the American West.

One of the most prominent medieval African kingdom was Mali, which dominated the region of the Upper Niger River in West Africa. Beginning in about 1100 Mali replaced Ghana as the major empire in the area. Ghana had been an important gold-trading empire, but beginning in the 11th century the mines became depleted. Further, the area was raided by Berbers from the north. These events led to the breakup of the kingdom of Ghana. In the resulting vacuum smaller states in the region vied for dominance. Chief among them were the Tekrur and the Soso, the latter under the leadership of Soumaoro Kanté. Kanté ruled over a federation of states, but he was challenged by a Mali prince named Sundiata Keita, who led a coalition of forces that defeated Kanté at the battle of Kirina in the 1230s.

Sundiata thus became head of a federation of states that surrounded the Upper Niger River. Under the leadership of Sundiata, his son and successor Ouali I, and eventually Sundiata's grandnephew Kankan Musa, Mali extended its frontiers by exerting political control over neighboring states. By the early 14th century Mali had become a major empire in West Africa, extending its borders primarily through military conquest, revitalizing the gold trade, and becoming immensely wealthy. But the kingdom began to weaken in the late 14th century. Mali was unable to defend its borders against incursions, notably the Berbers from the north. Additionally, a pastoralist society called the Fulani made inroads across Mali's borders. These events, combined with internal strife



Sandstone frieze from the first cathedral at Faras (Sudan, seventh century); in the sixth century the three Nubian kingdoms, known as the kingdoms of Nobatia, were converted to Christianity and were ruled from Faras, just inside the modern northern border. (© The Trustees of the British Museum)

and rebellion, led to the collapse of the Mali Empire by about the end of the 16th century.

One example of the inability of medieval African states to maintain stable borders is provided by the emergence of the Songhai. The history of the Songhai peoples is shrouded in mystery, and scholars continue to debate the details based on written and oral histories. One point of agreement, however, is that the Songhai coalesced as a society in roughly 1000. They were probably not indigenous to the Niger River region, but in time they came to occupy an area at the eastern edge of the Mali Empire and were, in fact, a part of that empire. Their capital city was Gao, but historians disagree about the city's location. In the early 1400s Songhai broke away from Mali and became an independent empire. Thus the emergence of Songhai illustrates the way that borders shifted and were redefined over time as a result of the ongoing movement of peoples throughout the African continent.

Mali and Songhai are examples of major states that were able to maintain relatively fixed and defined borders for at least some period. In this respect they stood in contrast to the nearby kingdom of Hausaland, which occupied the re-

gion between the far reaches of the Niger River to the west and Lake Chad to the east beginning in about 1000. Hausaland achieved prominence primarily because its hills were rich in iron ore, so it became a major player in trade that involved iron. However, unlike Mali and Songhai, it never developed into an ordered empire with fixed borders. Rather it remained a collection of loosely organized city-states, not unlike the city-states of ancient Greece. These city-states defended themselves primarily with walled towns. Power remained in the hands of local authorities, but the various cities of Hausaland were united by their trading activities. Because the kingdom had no fixed borders, its makeup shifted over time as new cities in the region came under the influence of Hausaland and others drifted away. This process lasted into the 1300s, when Hausaland's walled cities came under attack and fell to Islamic invaders.

The kingdom of Kanem-Bornu illustrates yet another trend in how medieval Africans defined and controlled their borders. These people occupied the region around Lake Chad. This lake was an immense body of water in the interior of Africa, between the Niger and Nile rivers. Although the lake remains one of the largest in the world, it was even

larger during the medieval period. Around its shores numerous peoples settled, each practicing a unique way of life. Some were farmers, others herders, and still others fishermen. The borders that divided these various peoples were ill defined. In time tensions emerged, and each community began to develop governmental and economic structures that perhaps conflicted with those of its neighbors. Because of their central locations as links in east–west and north–south trade routes, at least two of the Lake Chad peoples achieved dominance. These were the Kanem on the northeast side of the lake and the Bornu on the southwest.

Between roughly 750 and 1600 a complex series of political events took place that continually reshaped the region and redefined its borders. Some of these events involved the arrival of Islam. Others involved various power struggles between the peoples who lived in the vicinity of Lake Chad. The chief event, though, was the desire of the Kanem to expand their borders and introduce Islam to their neighbors. To do this, they had to forge a strong military. To fund military enterprises, the Kanem needed a stable source of wealth. To this end they allied themselves with farming societies such as the Bornu, rather than with nomadic pastoralists, who were less reliable as sources of wealth. However, the Kanem were never able to carry out fully their plans for dominating the region. Nearby rival dynasties of kings opposed them, and Kanem was never able to accumulate the wealth necessary to achieve dominance. In response to numerous crises the Kanem simply picked up and moved to Bornu in the late 13th century. By the middle of the 14th century and throughout the 15th, the kingdom of Bornu became yet another dominant empire in western central Africa after having entirely redefined its borders.

The kingdoms of Mali, Songhai, Hausaland, and Kanem-Bornu dominated from West Africa to the continent's interior. Throughout southern Africa the Bantu migration continued until roughly 1000. *Bantu*, which means “the people,” is a catchall word that refers to the many peoples who inhabited such regions as Nigeria and Zambia, eventually making their way to Zimbabwe and South Africa. The earliest Bantu peoples began to spread through Africa in phases beginning in about the second millennium B.C.E. Historians regard the third phase of the Bantu migration as having begun at the start of the Common Era and continuing to about 1000, when the Bantus reached the southernmost parts of Africa.

Bantu refers less to an empire or kingdom, however, than to an ethnic group, united primarily by descent from a common language group. The importance of the ongoing Bantu migration until well into the medieval period is that it demonstrates that the formation of nation-states was a continuing process, with new nations (for example, Zimba-

bwe) formed and borders adjusted in response to the mass movements of peoples, often in response to war and climatic change. It should be noted that although the Bantu still exist as an ethnic group, the term in South Africa is regarded as pejorative because it was the word used by the South African apartheid regime.

THE AMERICAS

BY J. J. GEORGE

The period from 500 to 1500 saw great change throughout the Americas with respect to borders and frontiers. Political boundaries in the modern sense of a negotiated contract indicating a fixed extent were rarely, if ever, noted; generally speaking, the literature talks about zones, spheres, and areas rather than strict borders and lines drawn from one point to another point. Many factors, including population growth and expanding cities, city-states, and empires, led to changing territorial demands that were reflected, in turn, by shifting borders and frontiers. The situation was somewhat different in the later years of the period, which saw the rise of dramatic new examples of empire with the Aztec in central Mexico and the Inca in Andean South America. With empires came new manners of social, political, and economic organization combined with thoroughness in warfare that again redefined what a border or frontier meant.

The term *frontier* often is reserved in the American lexicon for understanding the westward expansion of the United States as a manifest impulse through wide-open, uninhabited territory, even though long-established cultures had been in residence for many hundreds—in some cases, thousands—of years. As used by modern political geographers, *frontier* generally designates a physical margin, fringe, or outer boundary—more of a zone than a line—dividing peoples or cultures. It is also the division between settled and uninhabited parts of one nation, state, or culture area. The whole of the Americas provided many different examples of cultural patterns, from nomads to hunter-gatherers and from small early agrarian settlements to mammoth empire systems, though populations remained relatively small compared with the total landmass, especially in North America, and often a substantial frontier existed between contemporaneous cultures or peoples. Inevitably, however, those cultures came into contact. Conflict, warfare, tribute, or diplomacy were then common means of resolving or settling whatever political objective the parties held, and certainly this meant that thresholds, like borders, were challenged.

Border in a modernist sense symbolizes aspects of nationhood and identity construction that are linked to state building. Factors that ultimately define borders include natural

topographic limiters or barriers (mountains, rivers, forests, and so on); competition for space, resources, or power; the relationship of a dependent periphery to a central core; trade; tribute; migration; warring; and, on a broad scale, climate change. New technologies allowed for expansion into previously uninhabitable areas, thereby shifting, expanding, or challenging both borders and frontiers. Any combination of these factors contributed to the classification and continuous redefinition of borders throughout the Americas. Typically, however, the literature has had more to say about cultural and symbolic boundaries between groups than about the concrete, physical borders between them. Broadly speaking, because written documentation is unavailable, the exact nature of the political reality of borders is unclear, but it is certain that people understood the notion of territory as a thing to be defended or taken.

The North American landscape during the thousand-year period 500 to 1500 comprised vast swaths of variable terrain traversed by hunter-gatherer bands, entire regions such as the Arctic and the Pacific Northwest inhabited by semisedentary groups moving between summer hunting and fishing grounds and winter residences, and established agrarian communities in the southeastern and southwestern regions that depended on advanced irrigation techniques or plentiful hunting and fishing to maintain settled communities.

Various models have been suggested for understanding the relationships of peoples in the Southwest, including the Hohokam, Anasazi, and Mogollon in the period 500 to 1400. "Regional" and "macroregional" systems propose interaction spheres tied together by long-distance exchange routes. While they were clearly interacting, relationships were not always peaceful. The extraordinary physical locations of the 14th-century Anasazi cliff dwellings at Mesa Verde and the later Hopi mesa-top settlements are clearly defensive minded and indicate regular border infractions by raiding and warring parties.

Border definition in the southeastern areas between the 10th and 14th centuries is equally vague. Similar to the earlier Midwest-centered Hopewell culture (200 B.C.E.–400 C.E.) "sphere of influence," the southeastern region is often described as an "interaction sphere" or "interaction network" within which large and small independent polities existed. The largest of the Mississippian centers, Cahokia, settled near the confluence of the Missouri and Mississippi rivers. With an estimated population reaching 40,000, Cahokians directly controlled a large territory and had strong influence on groups a thousand miles away, perhaps as far as the Iroquois region in the Northeast, though direct administrative control was considerably less.

Similarly, the Mesoamerican situation varied greatly over time. The dissolution of the central Mexican empire centered

at Teotihuacán by the eighth century created a vacuum and melted previous affiliations and borders. Numerous Mayan polities existed independently, though extensive trade ties and even military affiliations were common. The late rise of the Aztec Empire in the 13th century reconsolidated disparate cultures and polities under a single authoritarian rule with genuinely adhesive borders.

In the Late Classic Period (650–900) Mayan power polities were divided among an increased number of centers, which suggests that the period was less centralized economically and politically. Tikal in the northern Guatemalan jungles of the Petén, Yaxchilan in the Usumacinta region, Palenque in the southwestern region of Chiapas, and Copán in the southeast just over the Honduran border with Guatemala were all major centers that existed independently, each with various spheres of influence and border affinities. Some evidence suggests that Yaxchilan was a military power that led an alliance of several primary centers, including possibly Tikal and Palenque.

Increased fortification indicates antagonistic relations that challenged the sovereignty of borders. Tikal occupied a strategic military position that offered natural defensive measures that effectively safeguarded it against attack. Swamps to the east and west greatly limited threats from those directions. The north and south were defended by a system of man-made earthworks, consisting of a shallow moat and an interior rubble wall, which may have been constructed during the Protoclassic Period (100–250) or early Classic Period (ca. 250–550) and used throughout Tikal's ascendancy until about 900. Trade contacts established earlier with Teotihuacán, the central Mexican empire from roughly the first to the seventh centuries, helped solidify its borders and frontiers.

Similarly, the Mayan site of Becán showed defensive motives. Situated in the heart of the Yucatán Peninsula roughly 150 miles north of Tikal, Becán was named after its most distinctive feature, an encircling moat and rampart (from *becán*, meaning "ditch filled with water"). Excavations revealed that the moat was originally some 16 feet deep and more than 52 feet wide, with its interior rampart rising another 16 feet. Ceramic evidence suggests Becán was settled around 550 in an area with promising agricultural potential as well as control of local trade routes. Subsequent fluctuations in population indicate shifting fortunes, and defensive facilities were built to maintain Becán's political and economic control over the region.

The central Mexican Aztec Empire founded at what is today Mexico City rose to prominence throughout the 14th and 15th centuries by overrunning one nearby city after the next, greatly extending their borders and eventually establishing a tribute empire encapsulating a wide swath of central Mexico.

After initial subjugation of an area the Aztec relied on local leaders to administer the territory and ensure worship of the Aztec god Huitzilopochtli. Overextended and loathed by their subjects, the Aztec fell quickly to the Spanish in 1521, whose conquest campaign was greatly facilitated by peoples previously subject to Aztec rule.

Moving south, each region in the Andes took on a particular social form, with characteristic linkages among valleys and river basins, different levels of complexity in social and economic organization, and unique ways of managing territory. The variability of the physical environment constituted an important factor in determining borders and frontiers. A series of serious climatic shifts in the sixth century in the Andes contributed to displacements of populations and the eradication of previous borders. At about the same time two other events also affected the identity of certain Andean inhabitants. The first was the development of the Wari state (fifth through eighth centuries) that extended from modern Ayacucho throughout the entire central Andes. The second was the expansion of Tiwanaku culture (fourth through 11th centuries) in the Lake Titicaca altiplano (high plain). These events had the effect of shifting or affiliating previously diverse communities into a statelike apparatus, consequently reengineering previous notions of borders.

Recent theories suggest that the Wari expansion was forcible, coinciding with other political movements in the same region and with Tiwanaku's growth to the south. It appears that Tiwanaku's expansion happened in some places as a form of colonization in agricultural zones, while in other territories the process suggests a stable network of traffic in merchandise, though it should be noted that some form of violence in the process of occupation cannot be discounted. It is possible that Tiwanakan influence would have spread farther north if it had not been interrupted by the expansion of the Wari state moving into those territories. In areas previously affiliated with Tiwanaku, culture shifts represented in ceramic styles and the breaking of previous settlement patterns suggest that the Wari presence altered the conditions of Tiwanakan existence, perhaps through war. One example comes from Cerro Baúl, which was strongly protected and fortified with ramparts to reinforce an already naturally inaccessible position, strongly implying that relations with adjacent populations were less than neighborly and some kind of border was defended.

At the time of the Spanish invasion (1532) the Inca ruled the largest empire in the world. In the early 15th century the Inca were one of several vast Andean societies scattered across the Andes. From their center in Cuzco they built administrative centers, way stations, storehouses, and religious shrines, and they connected them by a massive road-build-

ing campaign. As the Inca expanded by both diplomacy and force, they superimposed their solar religion and their administration onto older communities. At the same time, they encouraged ethnic diversity and adapted already existing institutions as a means to facilitate the consolidation of new territories. In the process all previous notions of borders and frontiers were reorganized under one single entity, a program the Andes had previously seen only in microcosm.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

A great deal of warfare in medieval Asia and the Pacific may be understood as conflicts over borders. At the outset of the medieval era nearly the whole of Asia had indeterminate borders and restive populations. The collapses of the Han Dynasty in China in 220 and the Gupta Dynasty in India in 550 meant that the borders of the two dominant cultures in eastern and southern Asia were open to invasion and dramatic revisions of the boundaries of national territories.

Much of China's medieval history is a story of trying to establish and maintain friendly frontiers. Four Chinese dynasties had some success at doing this: the Sui (589–618), the Tang (618–907), the Song (960–1279), and the Ming (1368–1644). Until its reunification under the Sui, China had been divided into several different nation-states since the fall of the Han Dynasty. Borders changed frequently, according to which ruler had just won a war or had submitted to the authority of a neighbor.

Building on the achievements of the Sui, the Tang rulers extended China's lands to the edge of the Himalayas far into central Asia, not just controlling the trade routes but also creating Chinese communities, and they established their authority over Korea and Vietnam. Further, they extended China's borders all the way to the South China Sea. In so doing, they made China Asia's largest unified nation. The Sui Dynasty had conscripted a million people to rebuild the Great Wall, and the Tang emperors did as the Han had done and extended the wall westward to help protect the trade routes.

In 751 the Tang lost control of the northwestern trade routes in central Asia to Turkic nomads, and in what is now the province of Yunnan, the kingdom of Nanzhao threw off Chinese rule. Further, the Khitan tribes in Manchuria pushed the Chinese back inside the Great Wall. With minor shifts during wars to defend them, China's borders remained stable until the fall of the Tang. In the 870s the Turks encroached on Chinese territory, and in 907 China disintegrated into numerous warring states.

The Song Dynasty managed to reunite most of China, although the far southwest, far northwest, and far north

remained out of reach. Indeed, the Khitans of Manchuria conquered the far northern regions of China and declared themselves the Liao Dynasty (907–1125). The Song emperors maintained their borders with military force and bribery: They paid their neighbors not to invade them. In 1125 the Jurchens from Manchuria drove the Khitans out of China and then seized the northern territories of the Song. In 1140 a new border between the Song and the Jurchens, who had established the Jin Dynasty in northern China (1115–1234), was defined south of the Yellow River.

The Mongols invaded the Jin territory repeatedly, ending the Jin Dynasty in 1234. The Song Dynasty proved to be a more formidable foe, and it took over 40 years of fighting for the Mongols to conquer that part of China. Thereafter, the Yuan Dynasty (1279–1368), as the Mongol rulers named their line, pressed southward and southwestward, eliminating the kingdom of Nanzhao. The borders of China became confused again when rebels established a new state with its capital at Nanjing.

In 1368 a rebel leader named Zhu Yuanzhang declared himself the founding emperor of a new dynasty, the Ming. By 1382 nearly all of China had been reunited by the Ming rulers. Ming armies ranged far north and forced the Mongols of eastern Asia into submission. The Ming emperors undertook the complete rebuilding of the Great Wall, constructing the wall as it can be seen today, adding impressive stone fortifications. They used the wall to separate farmlands in the south from pasture lands in the north. In the northwest the Turks and the Chinese had a hostile standoff that resulted in a remarkably stable border. China had difficulty extending its southern borders, but in the 1400s it managed briefly to control most of Indochina and force what is now Sri Lanka, south of India, and much of Sumatra to submit to Chinese authority.

In the early medieval era there were three kingdoms in Korea: Paekche, Silla, and Koguryo. In 936 the name of Koguryo was shortened to Koryo, the origin of the modern word *Korea*. The borders of these three kingdoms were poorly defined in the 600s, with frontiers between the kingdoms sometimes governed by no one. In 660 the kingdom of Silla allied with China to conquer Paekche. In 668 Silla defeated Koguryo to create Unified Silla. After invasions by the Khitans of Manchuria, the rulers of Korea built a wall in 1018 across the Korean Peninsula from the mouth of the Yalu River eastward to Ti-ryo-p'o on the eastern coast. This wall served as the northern border of Korea.

The peoples of India had some natural barriers that helped them develop their own culture apart from the rest of the world. To the north lay the Himalayas, a formidable range of mountains that not only discouraged invasions into India

but also restrained the efforts of Indian rulers to invade Tibet. Most of the rest of India was surrounded by the ocean, providing the land with a rugged coast that would have made invasions by sea very difficult. The vulnerable frontier for India was the valley of the Indus River in the northwest, through which Alexander the Great had led his armies in the fourth century B.C.E. and through which Muslim armies would attack during the medieval era.

The notion of what constituted frontiers for the Indians was unique. Monarchs would try to fulfill a *digvijaya*, or campaign in conquest of the four corners of the world. The *digvijaya* involved forcing neighbors to the north, east, south, and west to submit to their authority and pay them tribute. This process created a *raja-mandala*, the “circle of kings.” The *mandala* represented the cosmos, at the center of which was the mythological Mount Meru, surrounded by four lands, then seas, then lands, and then seas in rings. In a *raja-mandala* the king served as a human representation of Mount Meru, and the lands around his kingdom formed the pattern of the *mandala*. Thus, a medieval Indian map of a kingdom would show it as a *mandala* with concentric rings spreading out from its center—the king—into the lands of his subjects.

This way of thinking about frontiers had serious consequences. One is that borders and frontiers changed frequently according to who was powerful enough at any given time to force other rulers to submit to his or her authority. Thus, much of the history of the borders and frontiers of medieval India involves the expansion and contraction of numerous kingdoms but rarely their unification. Moreover, the medieval Indian attitude toward borders and frontiers helps explain why some of India’s mightiest conquerors, such as Rajendra Chola I (fl. 1040) of the kingdom of Chola in southeastern India, did not try to retain huge tracts of land. Instead, they looted lands hundreds or even thousands of miles away and returned home to the kingdom that served as an earthly representation of the sacred *mandala*. Once a king had completed his *digvijaya*, the acquisition of wealth from looting may have had more prestige than governing conquered lands.

Exactly what the borders of Japan were at the outset of the medieval era is a matter that leaves historians bitterly divided. Archaeological discoveries suggest that there were two main cultural groups on the islands, the Nihon or Japanese and the Ainu. Anthropologists believe the Ainu may be direct descendants of the first modern peoples to inhabit eastern Asia. They were fierce warriors who many times defeated Japanese armies in pitched battles. At the outset of the medieval era the Japanese were the only rulers of the Japanese archipelago who were officially recognized by the various governments of a divided China. They controlled Kyushu and most of Honshu and Shikoku, but the Ainu controlled much of northern

Honshu and all of Hokkaido. The frontier between the Japanese and Ainu in northern Honshu was disputed between the two cultures, and during the medieval era the Ainu resisted efforts of the Japanese government to incorporate their lands into Japan.

Of greater complexity was the feudalization of Japan. From about 1185 to 1867 Japan was usually ruled in practice by military governments headed by a shogun, a high-ranking military leader. There was also an emperor and an aristocratic court, but the emperors in this period were largely restricted to ceremonial functions. The feudal military leaders usually fought among one another for control of territory, and the borders of their lands fluctuated according to whose military fortunes were on the rise. This meant that within Japan the borders of the provinces were as uncertain as the outcome of the next battle.

Although the Khmer kingdom in Indochina is the best known of the medieval nations of Southeast Asia, the kingdom of Srivijaya may have been the most powerful. By 600 it was flourishing on the island of Sumatra. By patrolling the ocean between Sumatra and Malaysia, the rulers of Srivijaya forced merchants to pay for safe passage, and they helped keep the waters free of pirates. In 1292 another power, the Majapahit Empire on the island of Java, established colonies on the Asian mainland.

The geography of the Southeast Asian mainland made the establishment of well-defined borders very difficult. For instance, Burma (present-day Myanmar) was surrounded by mountains that discouraged efforts to bring them under a government's control. Thick forest had to be continually cut back and weeded out, or it would swiftly overwhelm human settlements. The Khmer had trouble maintaining their borders because the frontiers sometimes just vanished in the ever-encroaching forest.

The borders of central and northern Asia were uncertain most of the time. The nomads who occupied much of this territory claimed certain pastures as their own, but their frequent wars with one another meant that fixed borders were almost impossible to establish. The Mongols, for hundreds of years a collection of fractious tribes, were united by Temüjin (ca. 1162–1227), who became Genghis Khan, “Lord of the Earth.” The Mongols had a straightforward political ideology: that they were destined to rule the entire world. One consequence of this ideology was that they did not recognize borders; frontiers were only boundaries to be crossed and conquered. Their ruthless way of war resulted in their conquering most of Asia.

Among the lasting effects of the Mongol conquests was the halting of the Arab advance into central Asia. Motivated by their own ideology of conquest, Muslims began pushing

even mighty China out of what are now Afghanistan and the trade routes north of the Himalayas during the 700s. In the 13th century the Mongols pushed the Islamic world back deep into the Near East; Afghanistan had the protection of mountains to its north, however, which kept it under Muslim control.

The peoples of medieval Australia may have divided themselves into territories that had loosely defined frontiers. How these would have been defined is unclear, but at the time of European colonization the Australians had many different cultural groups who had traditional lands of their own. The tribal groups of New Guinea and New Zealand had ranges that belonged to them and were vigorously defended against interlopers.

The most extensive frontiers may have been those of the kingdom of Tonga. In the 1200s Tonga's territory extended about 3,000 miles to include the present-day Hawaiian Islands. The frontiers of Tonga were the islands it claimed in the Pacific. The history of the Hawaiian Islands before the arrival of Europeans is murky, but the islands and atolls that form the archipelago seem to have been divided into four principal chiefdoms during the medieval era, chiefdoms based on the larger islands of Hawaii, Maui, Oahu, and Kauai.

EUROPE

BY BRADLEY A. SKEEN

The borders of the Roman Empire had been secured by natural features such as rivers and mountains; continuous border fortifications, consisting of walls and chains of fortresses; and fortified cities immediately behind the borders. Enforcing border security was the responsibility of large numbers of troops. In the fifth and sixth centuries C.E. the cohesion of the western half of the empire fell apart as the costs of frontier defenses became too great for the local economy to bear. Throughout the Middle Ages the Byzantine Empire carried out the same Roman policies, retreating to and fortifying the Taurus Mountains in Asia Minor (modern-day Turkey) against the Arab invasion of the seventh century and defending the border with the Slavic tribes in the Balkans with a continuous belt of fortifications. The area of the Byzantine Empire continually diminished in the medieval period and finally consisted only of the heavily fortified capital Constantinople, which was captured by the Ottoman Turks in 1453.

In western Europe the successor state to Rome was the Carolingian or Holy Roman Empire, which by 800 controlled territories comprising modern-day France, the Low Countries, Germany, Switzerland, and most of Italy. This state and its immediate successors revived the Roman border strategy, depending on the Pyrenees on the border with Spain and

building a system of fortifications on the eastern frontier. But from 850 to 1000 this system, too, lost cohesion under the pressure of renewed invasions by Vikings and Magyars.

The Vikings, raiding by sea, were highly mobile and could strike any point on the coast as far as the Mediterranean (they established a kingdom on the island of Sicily after 1061) and deep inland up any river (for example, traveling up the Seine to lay siege to Paris from 885 to 886). The Magyars were able to conduct lightning cavalry raids from eastern Europe wherever they chose. No system of fixed fortification could have defended so vast a threatened area. Accordingly, castles were built in each local district where the population of the countryside could find shelter when necessary.

The western Europe that emerged from the last great invasions was feudal. This means that power and control of resources were highly decentralized after 1050. Border fortifications were no longer practical. The basic unit of political administration was the lord (military leader), who controlled a local castle and a small band of armed men (knights and men-at-arms). With the threat of invasion ended, the many lords and knights no longer served any military purpose but rather enhanced their own wealth and prestige by controlling the labor of the local farmers as serfs. In this system, ties of personal allegiance and dependency between the ruler and the ruled were what mattered, though lines of political power and administration generally fell within specific geographical boundaries. It also often happened, however, that such ties crossed dynastic boundaries, and many feudal lords controlled some lands under the nominal authority of the kings of England or France. In fact, throughout much of the late Middle Ages the king of England, even though he was an independent ruler in Britain, controlled lands for which he owed allegiance to the king of France. Those lands constituted nearly half of France, a greater domain than the French king personally controlled. Moreover, the two monarchies were most often at war with one another. Under those conditions national boundaries did not have much meaning.

Identity in western Europe was more bound up in the concept of Christendom than in national allegiance. Although language and social customs varied widely, even within a unit such as the kingdom of France, everyone in western Europe felt a connection with one another through their shared Christian faith and a marked difference from foreigners who were not Christian (generally called infidels).

The idea of the Crusades focused attention on the cultural and conceptual boundary that existed between Christendom and the Islamic world. A physical border was created through invasion in an attempt to “reclaim” the Holy Land (where the events of the New Testament had taken place but which had never been part of western Europe). An actual kingdom of

ANGLO-SCOTS BORDER REIVERS

In 1286 Edward I of England launched a devastating invasion of Scotland in an attempt to annex the country. This began three centuries of conflict between England and Scotland that resulted in frequent warfare and constant armed tension on the border. Because of this conflict, the fruits of a year of labor by peasants and noblemen alike—people who relied on agriculture for their livelihood—was liable to be destroyed in a few hours or seized if one of the armies passed through. Families and clans on both sides of the border (often with names later made famous in American history, such as Johnson, Nixon, and Armstrong) found they had to resort to reiving, or raiding, as a way of life. A local nobleman would lead as many as 3,000 armed men (called “steel bonnets” after their distinctive helmets) on raids to steal cattle, horses, and anything else to be had.

Both England and Scotland encouraged this kind of brigandage because each royal government hoped that the reiving would cause greater havoc on the other side of the frontier than on its own. This way of life produced some of the finest natural light cavalrymen in Europe, a vital resource that the crown could draw on whenever hostilities escalated to open war. Under the laws imposed on both sides of the border as zones of virtual military occupation, counterraids across the border carried out by clans to steal back the stolen cattle and other goods were not only legal but indeed obligatory. Blood feuds, betrayal, and treachery were an essential part of living and could well have led to the forming of alliances across the border and antipathies lasting generations between families of the same nation.

After the death of Elizabeth I in 1603 England and Scotland were joined under the first Stuart king, James I, and the border ceased to be a legitimate area of tension. The border reivers on both sides of the frontier were suppressed by legal means. In the 19th and 20th centuries the exploits of the border reivers became romanticized in the works of such authors as Sir Walter Scott and George MacDonald Fraser.

Jerusalem and other crusader states came into existence between 1099 and 1291. However, western Europe had nothing like the strategic resources or political will to maintain such a distant bridgehead, and the reclamation efforts eventually

failed. By focusing on that border, however, institutions such as the national monarchies and the Catholic Church tried to divert military resources and initiative away from warfare within Europe (between individual feudal lords) and toward a unifying enterprise. The church had traditionally imposed penance (rituals to forgive the sins involved in killing and intending to kill) on knights who fought even in a just war, but in the case of the crusaders granted indulgences (the free forgiveness of all sins). The church also organized military orders (such as the Hospitallers and Templars), groups of knights fighting in the Crusades who were not under the same rule as clerical monks but who nevertheless ultimately pledged obedience to the church hierarchy.

The Crusades also provided a model for Christian Europe's two physical borders, to the south in Spain and to the east beyond Germany. The intellectual framework for the Crusades was worked out by the Cistercian monk Bernard of Clairvaux in *De laude novae militiae* (*In Praise of the New Knighthood*). Written in 1128 the text declared that the war with the infidel was an outward expression of the inner war with the devil. The crusading knight's battle was as much a spiritual one as the monk's. Warfare became a sacred duty, one that could save the soul of the crusader as his ascetic discipline conquered Satan's influence in his own soul and simultaneously brought about military victory. The inner border between the human soul and sin, which was the chief concern of the church, was projected onto the geopolitical stage.

In the seventh century Spain was conquered by Islamic Moors from North Africa. Only a small fringe of Christian principalities clung to existence along the Pyrenees, resembling bands of brigands more than nations. Nevertheless, they made steady progress in the work of the reconquest of Spain from the Moors. After the initial impulse of the Crusades, this fight in Spain was also seen by Europeans as a crusade. As a result many crusading institutions were introduced there, including military orders and the granting of indulgences. Knights from throughout Europe were attracted to fighting in Spain against Islam.

But the situation that developed from the intermittent warfare between the various Islamic and Christian states in Spain produced classic "frontier conditions." The soldiers involved in the fighting were encouraged by their own rulers to act as brigands, raiding enemy states, and saw themselves as above the law because of the pressing needs of the conflicts in which they were involved. Feuds and revenge with rivals across the border (or even with allies) became important factors, but at the same time the enemy was seen as having more commonalities than countrymen further removed from the frontier. Loyalty was transferred to leaders who proved themselves in battle. Groups of Muslims and Christians might

have fought together against other mixed forces in constantly changing constellations of power. In Spain all of this was embodied in the figure of Rodrigo Díaz de Vivar (1044–99). A Christian knight, he was known as El Cid (Arabic for "chief"), a name his enemies awarded him as a sign of respect. He was a knight of the kingdom of Castile and participated in several campaigns under royal patronage against both Islamic and Christian enemies. El Cid finally conquered the city of Valencia for his own principality with a mercenary army composed of both Christian and Islamic soldiers. His exploits made him the Spanish national hero.

The territories to the east of the Holy Roman Empire were populated by Slavs organized into various kingdoms and tribes, some of whom were called *pagan* because they still practiced their traditional polytheist religion while others were Eastern Orthodox Christians. In general, because their technology and social system were less sophisticated than those of the western Europeans, the Slavs were not a serious military threat despite the devastating raids they occasionally launched. During the ninth century the Holy Roman emperors occupied a zone along their immediate eastern border to create "marches," or buffer areas, to protect their older holdings from any incursions. Throughout the High Middle Ages, German colonists spread across eastern Europe as far as the Volga but in a peaceful fashion, invited by local rulers who wanted to populate their undeveloped lands.

At about the same time as the Crusades in the Holy Land more serious military action was taken on Europe's eastern frontier. Under the influence of Bernard of Clairvaux wars in this area were declared crusades by the papacy in 1170 (and again in 1215), and knights fighting in them were given the same indulgences as crusaders in the Holy Land. Once the European adventure in the Middle East came to an end, the wars in northeastern Europe took on an increasingly religious character under the direction of the Teutonic knights. This military order had been founded in Jerusalem to assist German-speaking knights participating in the Crusades, but after the loss of the crusader states it returned to Europe and soon became the driving force in the northern crusade. It coordinated military action against the so-called pagan peoples beyond the borders of Christendom and under papal authority took direct control over the territories it conquered, including the modern states of Estonia, Latvia, Lithuania, and much of Poland.

Previous fighting between Christian states and tribes and kingdoms that practiced traditional religion had assumed many frontier characteristics and had not been conducted along strictly religious lines. However, the Teutonic knights became notorious for massacres and other atrocities that

seemed justified when committed against the “pagan other” and polarized the conflict. The knights tried to expand their crusade into Christian (but Orthodox rather than Catholic) Russia but were sharply defeated at Lake Peipus by the Russian Prince Alexander Nevsky in 1242. The Teutonic knights collapsed as a political entity after their defeat at the battle of Tannenberg in 1410, and their territories were gradually taken over by local monarchies.

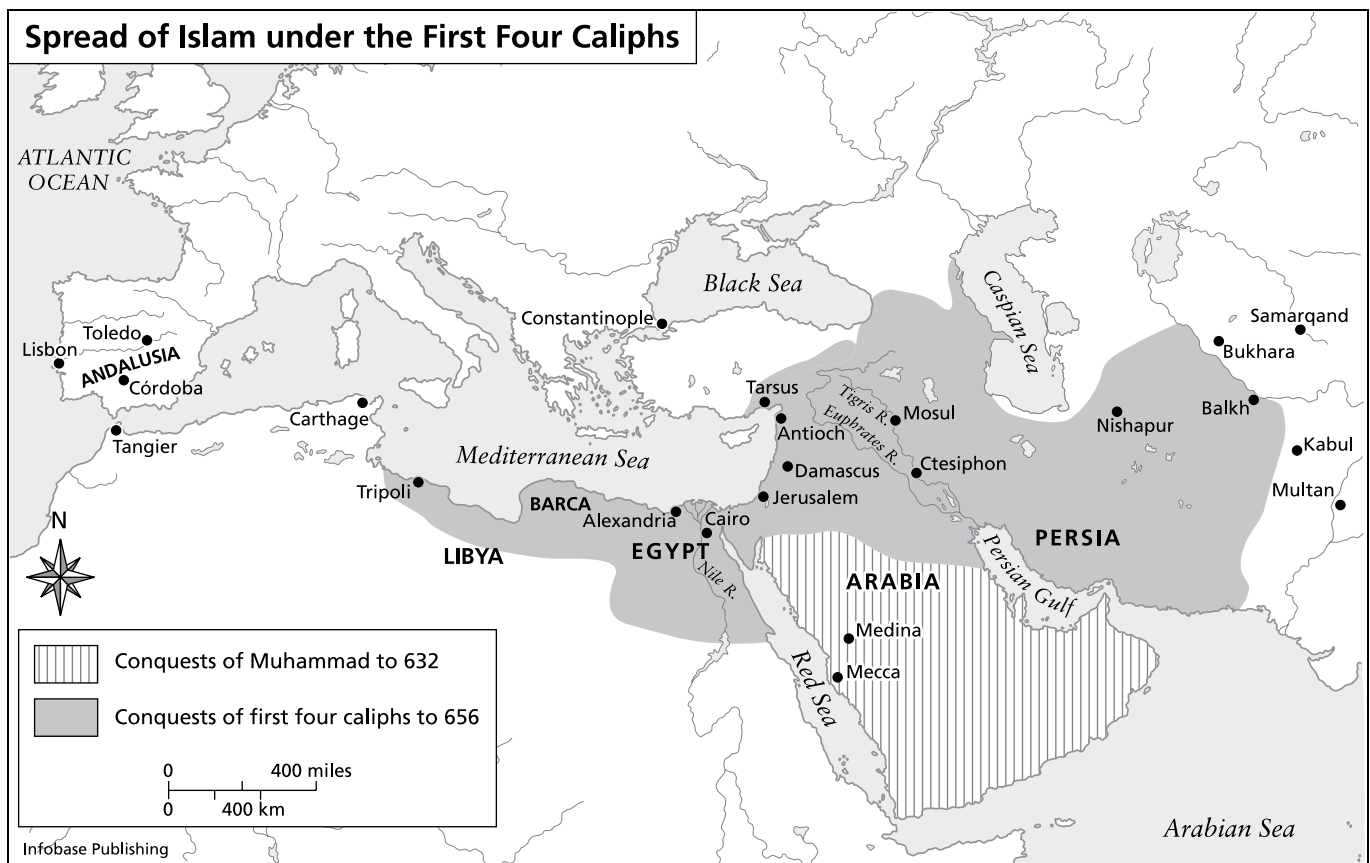
THE ISLAMIC WORLD

BY RASHEED HOSEIN

In the history of the Middle Ages very few polities can be said to match the stunning rise in power or to equal the longevity of the Islamic Empire. With the death of Muhammad, the Prophet of Islam, in 632 C.E., the lands under Islamic rule were subsequently governed by caliphs with close genealogical ties to him. Within a century of his death these lands, known as the Islamic caliphate, would stretch to southern France in the west, across North Africa, and through the Near East and into China in the Far East. In

this configuration the territory encompassed sizable shares of both the old Roman and Persian empires. Thus, the Islamic caliphate may rightly be considered a major successor state of both Persia and Rome. Historically, the delineation and defense of the borders of the caliphate can be divided into two discernible phases: expansion (622–750) and coexistence (750–1500).

The Islamic state was founded in 622 with the departure of Muhammad and about 70 followers from the trading entrepôt of Mecca to the oasis town of Yathrib, later renamed Medina, approximately 200 miles to the north. The Arab biographer Muhammad ibn Ishaq (ca. 704–68) noted in his *Sirat rasul Allah* (Biography of the Messenger of God) that the nascent Muslim community struck out from its base in Medina on some 80 raids against the city of Mecca. While the Muslims appeared to be grossly overmatched by Mecca, the conflict began turning in favor of the Muslims, and peoples once aligned with Mecca started to side with Muhammad. Ultimately, with only minimal resistance Mecca fell in 630, and the boundaries of Islamic power, centered in Medina, would encompass the entire Arabian Peninsula.



The 25 years following Muhammad's death in 632 saw a dramatic expansion of Muslim territories in the Arabian peninsula and beyond.

Muhammad's death in 632 inaugurated the era of the *rashidun*, or "rightly guided," caliphs (632–61). As word of the Prophet's death spread, many societies abrogated their allegiance to the Islamic state. The first caliph, Abu Bakr (r. 632–34), challenged these groups to restore their financial obligations in a series of campaigns known as the *hurub al-riddah* (the wars of apostasy). The fighting culminated with the battle of Aqraba in 633. Although they were costly in terms of human life, the wars would forever secure the position of Islam in the Arabian Peninsula.

Under the second of the *rashidun* caliphs, Umar (634–44), the caliphate saw its most rapid growth. Launching campaigns against the Byzantine Empire (ca. 330–1453) to the west and against the Sassanid Empire (226–651) to the east, the Arabs directed the momentum gained during the *riddah* campaigns outward against the great polities of the age. While the Arabs had often raided border regions in the past, the idea of empire building was definitely new. This tactical shift can be partly ascribed to the relative weakness of the Byzantines and Sassanids. Both empires had spent considerable resources, in terms of money and manpower alike, in a series of conflicts, leaving both vulnerable. Not to be discounted was the influence of Islam on the Arab armies. As raiders, they attacked in small, independent units, but Islam provided an inclusive framework that allowed for the unification of disparate peoples into a larger community.

As Arab armies pushed out of the peninsula, they began to establish military centers in the newly opened territories. These garrison towns were located on the fringes between the desert and the settled land, near to preexisting urban areas. Cities such as Basra and al-Kufa (both founded in 638) and al-Fustat (established in Egypt in 641 and known as "old Cairo") were the most successful of these garrison centers. According to practice, a region conquered by armies from a garrison center would be administered from and remit taxes to that garrison town. Thus, these cities became wealthy administrative centers and were critical in expanding, maintaining, and defending the integrity of the burgeoning borders of the Islamic caliphate.

The natures of Islamic conquests largely determined the way the land was administered—and by extension the nature of the growth of the Islamic polity. If the conquest of a territory was accomplished under the force of arms, it was referred to as *ard al-unwah* (land taken by force or violence). Lands conquered in this manner were placed under the direct administration of the state. However, if a territory capitulated to Arab armies without contest, it carried the legal status of *ard al-sulh* (land taken by treaty), and its lands would remain in the hands of the conquered in return for the payment of taxes, the demobilization of any military forces, and acknowl-

edgment of the rule of the caliph. Little evidence supports the contention that forcible conversion accompanied conquest outside the Arabian Peninsula.

Arab forces made impressive inroads into Syria in 636, securing Damascus and Jerusalem from the Byzantines in the decisive battle of Yarmuk (a river in modern-day Jordan). With a victory over the Sassanids at Kadisiya (present-day Iraq), also in 636, Iraq, Iran, and central Asia were opened up for further Islamic expansion. To the west, the Muslims took control of the main agricultural and settled areas of Egypt with a victory in the battle of Heliopolis in 640. However, during the rule of the final two *rashidun* caliphs—Uthman (r. 644–56) and Ali (r. 656–61)—the inertia of the conquests largely ground to a halt in all theaters but North Africa, as domestic pressures led to the outbreak of civil war. During this period sporadic raiding occurred between the Arabs and their neighbors.



Carved stone inscription of Jalal al-Din Khwarazm-Shah, marking a military campaign (Tabriz, Iran, 1230); the Khwarazm shahs ruled Khwarazm, northwest of Transoxania, as provincial governors for the Seljuk emperors from the late 11th century. (© The Trustees of the British Museum)

The final stages of the initial expansion phase occurred under the Umayyad Dynasty (661–750). During the early portion of this period Arab forces began pushing to the borders of the Chinese Tang Dynasty (618–907) and raiding northern India. In North Africa the process of conquest was equally dynamic. Following the pattern that had opened Iraq and Egypt to Muslim rule, the Arabs founded the garrison town of Kairouan in central Tunisia in 670. From this base the rest of Byzantine North Africa would fall, ultimately leading to the Muslim crossing of the Strait of Gibraltar in 711 and the slow subjugation of the Iberian Peninsula by both force and treaty over the next eight years.

With the overthrow of Umayyad power and the rise of the Abbasid Dynasty (749–1258), the explosive nature of the conquest period was replaced by an era of general decentralization and transition. Regions began to pursue their own policies, at times acknowledging the caliph as a figurehead only. In demographic terms, as Islam became established and the armies of various peoples became fixtures in the regional garrison towns, the process of demilitarization as a result of absorption into the conqueror population began to occur. Also important in this period was the growing articulation of the Islamic world and its role in the wider world.

With the Abbasid revolution the wealth and associated power that had accumulated during the conquest era—and which had made the earliest Arab soldiers extremely wealthy—began to dry up. As the pace of conquest slackened, less money was available for military levies, forcing taxpayers in far-flung regions to begin paying for their regional standing armies. Likewise, as Arab soldiers began to raise families, their interests ceased to be purely martial. Thus, the caliphate came to face a defense crisis of huge proportions, as military assets for entire regions were alienated from the central authority, and the isolated garrisons began to demilitarize and integrate with the native population; as such, Islam spread to non-Arabs.

The situation became so acute by the ninth century that the Abbasid caliph al-Mutasim (r. 833–42) began a massive importation of slaves, referred to as *mamluks*, some of which would form the core of his personal bodyguard. This practice would prove to be an easy way for individuals to build loyal armies to protect and prosecute their agendas. As Islam forbids the enslaving of Muslims and as the non-Muslims inside the caliphate held the status of *dhimmi*, meaning that they were granted legal protection, the caliphs were forced to look beyond Islam's borders to build private armies. In time, the military commanders of such units would dominate the increasingly ineffectual caliph, becoming powerful arbiters within the caliphate.

The permeable nature of the caliphate's borders meant that Islam began to spread into regions not formally under Is-

lamic control. This trend led to the in-migration of the Oghuz Seljuk Turks in the 10th century—the first mass migration of an entire nomadic society, already Islamized, into the caliphate. This Turkic group would ultimately establish the Seljuk Dynasty (1038–1194), ruling as sultans in the name of the Sunni caliphs, and expand the borders of Islam into the Anatolian peninsula.

The Islamic world would receive two massive shocks during this period. In 1099 the First Crusade witnessed the establishment of a European bridgehead in the Levant: the kingdom of Jerusalem. Just as Muslim forces finally repelled these invaders, Mongol forces smashed into the Islamic world, sacking Baghdad in 1258 and effectively ending the Abbasid caliphate. Upon the demise of the caliphate, with the might of non-Muslim powers growing, the Islamic world was forced to redefine its relations with the other nations of the world. Chief within these processes was the articulation of key points of doctrine, such as the theoretical division of the world into discrete zones.

From a Muslim viewpoint the world that lay under Islamic suzerainty became known as *Dar al-Islam*—the abode of Islam. This category included the portion of the world that accepted Islamic law as the supreme law of the land. In essence, given this conceptualization, the rest of the world could be understood to fall under the category of *Dar al-Harb*—the abode of war. The expansion of *Dar al-Islam* was actually achieved through both the conversion of regions to Islam through peaceful means, such as among peoples attracted to the spiritual, material, and cultural wealth of the Islamic world, and through the waging of jihad, loosely meaning “struggle or effort undertaken for the sake of Islam.” While certain Koranic precepts discuss the idea of jihad, its complex rules gained articulation only in the mid-eighth century and would be revised as later historical events dictated.

Indeed, relations between the Islamic and non-Islamic worlds did not consist of constant and unremitting warfare. Recognizing that such a condition was undesirable in moral terms—and also represented a practical impossibility—the Islamic world conception allowed for a third general category: *Dar al-Sulh*—the abode of treaty. With this category, relationships between Islamic and non-Islamic states were normalized, thereby allowing for the peaceful movement of trade and peoples. These conceptions were largely rendered obsolete with the decline of Islamic power and prestige in the 17th and 18th centuries.

See also AGRICULTURE; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; FOREIGNERS AND BARBARIANS; FORESTS

AND FORESTRY; GOVERNMENT ORGANIZATION; LANGUAGE; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NOMADIC AND PASTORAL SOCIETIES; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT;

ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WAR AND CONQUEST; WEAPONRY AND ARMOR.

Europe

~ Alfred and Guthrum's Peace (ca. 878–890) ~

This is the peace that King Alfred and King Guthrum, and the witan of all the English nation, and all the people that are in East Anglia, have all ordained and with oaths confirmed, for themselves and for their descendants, as well for born as for unborn, who reckon of God's mercy or of ours.

1. Concerning our land boundaries: Up on the Thames, and then up on the Lea, and along the Lea unto its source, then straight to Bedford, then up on the Ouse unto Watling Street.
2. Then is this: If a man be slain, we estimate all equally dear, English and Danish, at viii half marks of pure gold; except the ceorl who resides on rented land and their [the Danes'] freedmen; they also are equally dear, either at cc shillings.
3. And if a king's thegn be accused of manslaying, if he dare clear himself on oath, let him do that with 12 king's thegns. If any one accuse that man who is of less degree than the king's thegn, let him clear himself

with xi of his equals and with one king's thegn. And so in every suit which may be more than iv mancuses. [A money of account representing thirty pence] And if he dare not, let him pay for it threefold, as it may be valued.

4. And that every man know his warrantor in acquiring slaves and horses and oxen.

5. And we all ordained on that day that the oaths were sworn, that neither bond nor free might go to the host without leave, no more than any of them to us. But if it happen that from necessity any of them will have traffic with us or we with them, with cattle and with goods, that is to be allowed in this wise: that hostages be given in pledge of peace, and as evidence whereby it may be known that the party has a clean back.

From: Albert Beebe White and
Wallace Notestein, eds., *Source Problems
in English History* (New York: Harper and
Brothers, 1915).

The Islamic World

~ Al-Baladhuri: "The Battle of the Yarmuk and After," excerpt from *Kitab futuh al-buldan (Book of the Conquests of Lands, ninth century)* ~

A description of the battle. Heraclius gathered large bodies of Greeks, Syrians, Mesopotamians and Armenians numbering about 200,000. This army he put under the command of one of his choice men and sent as a vanguard Jabalah ibn-al-Aiham al-Ghassani at the head of the "naturalized" Arabs of Syria of the tribes of Lakhm, Judham and others, resolving to fight the Moslems so that he might either win or withdraw to the land of the Greeks and live in Constantinople. The Muslims gathered together and

the Greek army marched against them. The battle they fought at al-Yarmuk was of the fiercest and bloodiest kind. Al-Yarmuk [Hieromax] is a river. In this battle 24,000 Moslems took part. The Greeks and their followers in this battle tied themselves to each other by chains, so that no one might set his hope on flight. By Allah's help, some 70,000 of them were put to death, and their remnants took to flight, reaching as far as Palestine, Antioch, Aleppo, Mesopotamia and Armenia. . . .

Heraclius' adieu to Syria. When Heraclius received the news about the troops in al-Yarmuk and the destruction of his army by the Moslems, he fled from Antioch to Constantinople, and as he passed ad-D'arb he turned and said, "Peace unto thee, O Syria, and what an excellent country this is for the enemy!"—referring to the numerous pastures in Syria.

The battle of al-Yarmuk took place in Rajah, year 15. . . .

Christians and Jews prefer Moslem rule. Abu-Hafs ad-Dimashki from Sa'id ibn-'Abd-al-'Aziz:—When Heraclius massed his troops against the Moslems and the Moslems heard that they were coming to meet them at al-Yarmuk, the Moslems refunded to the inhabitants of Hims the *karaj* [tribute] they had taken from them saying, "We are too busy to support and protect you. Take care of yourselves." But the people of Hims replied, "We like your rule and justice far better than the state of oppression and tyranny in which we were. The army

of Heraclius we shall indeed, with your 'amil's' help, repulse from the city." The Jews rose and said, "We swear by the Torah, no governor of Heraclius shall enter the city of Hims unless we are first vanquished and exhausted!" Saving this, they closed the gates of the city and guarded them. The inhabitants of the other cities—Christian and Jew—that had capitulated to the Moslems, did the same, saying, "If Heraclius and his followers win over the Moslems we would return to our previous condition, otherwise we shall retain our present state so long as numbers are with the Moslems." When by Allah's help the "unbelievers" were defeated and the Moslems won, they opened the gates of their cities, went out with the singers and music players who began to play, and paid the *kharaj*.

From: of Ahmad ibn-Jabir al-Baladhuri,
The Origins of the Islamic State, trans.
by P. K. Hitti and F. C. Murgotten,
(New York, Columbia University Press,
1916–1924).

FURTHER READING

- Florin Curta, ed., *Borders, Barriers, and Ethnogenesis: Frontiers in Late Antiquity and the Middle Ages* (Turnhout, Belgium: Brepols, 2005).
- Hastings Donnan and Thomas M. Wilson, *Borders: Frontiers of Identity, Nation and State* (Oxford, U.K.: Berg Publishers, 1999).
- Keith Durham, *The Border Reivers: The Story of the Anglo-Scottish Borderlands* (Oxford, U.K.: Osprey, 1995).
- Ahmad ibn Yahya al-Baladhuri, *The Origins of the Islamic State*, trans. Phillip K. Hitti (Beirut, Lebanon: Khayats, 1966).
- Hugh Kennedy, *The Prophet and the Age of the Caliphates: The Islamic Near East from the Sixth to the Eleventh Century* (New York: Longman, 1986).
- Philip Koslow, *Centuries of Greatness: The West African Kingdoms, 750–1900* (New York: Chelsea House, 1995).
- Patricia McKissack and Fredrick McKissack, *The Royal Kingdoms of Ghana, Mali and Songhay: Life in Medieval Africa* (New York: Henry Holt, 1994).
- Ian V. Murray, ed., *Crusade and Conversion on the Baltic Frontier 1115–1500* (Aldershot, U.K.: Ashgate, 2001).
- David Nicolle, *The First Crusade 1096–1099: Conquest of the Holy Land* (Oxford, U.K.: Osprey, 2003).
- Willie F. Page, ed., *Encyclopedia of African Kingdoms* (New York: Facts On File, 2000).
- J. R. V. Prescott, *Political Frontiers and Borders* (London: Unwin Hyman, 1990).
- Malise Ruthven and Azim Nanji, *Historical Atlas of the Islamic World* (London: Oxford University Press, 2004).

► building techniques and materials

INTRODUCTION

The need for shelter varied with the environment in which people lived and was met according to the building materials available in a particular region. People were very clever in finding ways to house themselves in demanding climates that offered few materials with which to work. For instance, the Inuit of North America lived in a cold climate that often provided little material with which they could build. The northern forests supplied wood, but food was to be found only in the far north, where trees did not grow. To be able to both eat and survive in the cold, the Inuit built shelters made of ice. They learned what kind of ice (in thickness and shape) worked best for building shelters, allowing them to survive in severe weather and temperatures that would otherwise kill them.

This situation can be compared to that of medieval Australians, most of whom lived in a spare environment that required them to move about the landscape in search of food. They learned to take branches and use roots to strap them together for shelters. In rain forests, where there was an abundance of wood, lean-tos sometimes were favored, because the rain forests provide enough natural shelter for lean-tos to have been all that people needed.

The preferred building material in the Near East was mud brick. Trees were scarce, the heat was sometimes oppressive, and mud was available. Brick houses offered shelter from the sun as well as the rain. Good stone for building could be hard to find, but human behavior motivated Near Eastern societies to find stone for building—not as shelter against the climate but as shelter against each other. War often made medieval builders look for the strongest building material available, and the vulnerability of wood, in particular, was perhaps best illustrated by the wooden cities of India that were lost when they were burned by invaders.

Human societies had other building needs besides shelter from the elements and from each other: They wanted places where they could gather together, places where business could be fostered, places for government institutions, and places for worship. In southern Florida medieval peoples found large stones in the ground and drilled holes into those stones into which they inserted logs; these logs supported wooden floors and tall, curving roofs framed by timbers and covered by thatch. Such structures required maintenance and occasional rebuilding, and their use for hundreds of years at a time suggests that they were very important to their societies. They were used as meeting places. Similar structures were built in such faraway places as Samoa and New Guinea, indicating a broad desire among human beings to gather in one place in shelter.

Places for business and trade seem to have been universally valued. Most cities and towns had market areas, which were sources of wealth for local economies and which provided opportunities for learning from visitors about developments in the larger world. In India and China societies found it worthwhile to set aside areas for marketplaces. In India marketplaces had permanent structures, usually wooden, that opened out into streets and housed merchants and their wares. In Europe marketplaces had temporary structures, set up for market day and taken down for the rest of the week. Light wooden frames that could be knocked together and taken down quickly were favored for such market stalls.

Government and religious buildings were built with an intention to impress people. Palaces were seen as visual declarations of a monarch's power. Temples and churches were expressions of religious belief and declarations of the power of the religious faith that fostered them. The great palaces of the Islamic world were often embodiments of grace in architecture, and their buildings often required thousands of workers and the importation of materials from far afield. In Europe huge logs from Scandinavia were transported into central Europe for use in great cathedrals. In most of southern and eastern Asia enormous towers were erected. In India these towers represented the creative power of the gods, the moun-

tain at the center of the universe, or Buddhism's path to enlightenment. Such buildings in China and Japan, the pagodas, have become cultural signatures. In India, China, and Africa caves were sometimes hewn out of solid rock to be filled with wondrous sculptures created with hammers and chisels and detailed with the fine tools of jewelers. It took much time and expense for cultures to build such structures, indicating the great value they had for the people who built them. They were testaments to the skill and intelligence of their builders.

AFRICA

BY KIRK H. BEETZ

Medieval African building techniques varied according to the available materials, the climate, and the culture. Information on medieval African building techniques and materials is sketchy for most of Africa, with a few areas only recently having been studied in depth by archaeologists. One reason for this is that sites in African forests and deserts have been hard for archaeologists to find and visit. Further, the attention of many archaeologists was captured and held by the large stone ruins found in eastern and southern Africa. As a result, a skewed picture of the development of African building techniques emerged. Stone construction was portrayed as a phenomenon separate from other African building, suggesting that people from outside Africa—Egyptians, Arabs, or Indians perhaps—brought it into the country.

In the final decades of the 1900s archaeologists made progress identifying the various kinds of African building techniques and dating them, and archaeologists of the 2000s are making careful efforts to accurately trace the derivation of African building techniques. One result of this work has been the identification of a traceable development of building techniques that shows that even the most magnificent medieval structures were built by Africans using African techniques developed over hundreds of years.

In the deserts of southern Africa the common building materials were grasses and wood. The nomadic peoples of the region often did not build permanent dwellings, but some medieval cultures did erect small homes consisting of tree branches covered with leaves or dried grass. Most of the hunter-gatherers who built these structures lived outdoors, so they used them primarily for sleeping. Built together in small groups, the homes served as anchors for the people who would range sometimes for days in search of food.

Many central African peoples, including the Bakas, Mbutis, and Twas (all often misnamed "pygmies"), built lean-tos for shelter. These structures were composed mostly of leaves laid over wooden frames and set against trees. During the medieval era most of these groups were pushed out



Cupboard door (wood, carved ivory, and marquetry); Egypt, second half of the 13th century (Los Angeles County Museum of Art, the Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA)

of their ranges by migrating Bantu-speaking peoples whose origins were in West Africa.

These immigrants built homes made of clay or wattle and daub. Wattle and daub is mud dried over intertwined strips of wood. The homes were almost universally round, with square structures appearing only after European intrusions. The clay houses required occasional rebuilding because of erosion caused by rain. In most of the central African Bantu-speaking communities, women were the house builders. They quarried the clay themselves, usually from pits near rivers, and transported the clay to their building sites. Walls were built in layers about 8 inches high and forming a circle except for an opening for a doorway. These layers would be laid one atop another and allowed to dry. Roofs varied according to custom and taste. Usually the roofs were somewhat flattened cones made of wooden frames overlaid with leaves or rushes. The edge of the roof extended beyond the outside of the wall, which kept rainwater away. The center was sometimes topped by a finial (a type of building ornament).

In West Africa the basic structures had a very ancient history. Evidence for ancient population movements is hard to find, but it appears that people who lived in the Sahara grasslands from 5095 to 2780 B.C.E. migrated south into much of West Africa, under pressure from the expanding Sahara Desert and raids from well-armed nomads. They brought with them an ancient form of house building. Their basic structures were made of wattle and daub, with the wattle consisting of wooden posts interlaced with branches or wicker and the daub consisting of mud. The roofs were thatched.

The Fulani in West Africa built their homes in small groups surrounded with barriers made of brush. They and other groups, such as the Mandinka, continued to build circular houses throughout the medieval era. At the beginning of the period in the city of Jenne-jeno, only round houses were built, but by the 1100s square structures were being erected. Inhabitants of Jenne-jeno also developed mud bricks, which were dried in the sun before being used in construction. There is evidence that this development occurred throughout the kingdom of Ghana, in particular. The floors of buildings were usually smoothed earth. As the threat of war grew during the later medieval era, the people of Jenne-jeno built a 12-foot-thick wall 1.2 miles in length around their city. It was made of mud. It is likely that more such walls will be found as archaeologists study West African cities more closely.

In eastern and southeastern Africa are found the spectacular stone structures that excite the most interest among outsiders and archaeologists, yet the most common structures in these areas were made of clay or wattle and daub. Until the 900s the clay was laid the way houses in central Africa were usually built, in circular layers. It is possible

that this shows the influence of Bantu-speaking migrants into the eastern and southeastern regions of Africa. By about 1000 mud-layered walls had been replaced by mud brick walls. At first, these seem to have been crude, sun-dried bricks, predating this development in West Africa by about 200 years. Archaeologists have found evidence that development of mud bricks progressed into the 1400s, when well-shaped fired clay bricks may have been used. Such bricks were much more durable than sun-dried bricks. On the Zimbabwe Plateau a particularly durable type of clay was mined. Called *daga* by present-day local people, it dried so hard and was so durable that early archaeologists thought it was some kind of cement.

For workers to be able to reach the bottom of the church easily, another trench was dug, slanting down underneath the rock that surrounded the church and opening where

THE CHURCHES OF LALIBELA

The small town of Lalibela is about 400 miles north of Addis Ababa in Ethiopia. It is home to about a dozen stone churches carved out of rock, with four of the churches being free standing in deep pits that were carved around them. Tradition says that 10 of them were carved on the orders of King Lalibela (fl. 1200), who was told either by Saint George or God to erect them at the town of Roha, now called Lalibela. It is said that the churches were built quickly, with angels carrying on the work at night while human workers slept.

Archeologists have found much evidence for the skills of the medieval Ethiopians; in fact, local peoples had been carving structures in rock for more than a thousand years before the most famous of the churches, Saint George's Church, was built in about 1200. Ethiopia had sophisticated metalworking techniques that allowed for the fashioning of hard iron tools. For Saint George's Church, four large trenches were dug into a huge volcanic stone. Wood and iron wedges would have been used for splitting the rock. The trenches were dug about 33 feet down and were connected at their ends to form a square. Then Ethiopian engineers needed to calculate the weight of the structure they were to build and to lay out its interior so that it could bear that weight even before carving the interior began. Even a small mistake in their mathematics could result in a misshapen structure or one that could not stand.

the main entrance to the church was carved. Using iron chisels, workers smoothed the outer surface. Getting inside the stone probably required the same technique for removing stone that Ethiopian quarry workers used—hammering wood and iron wedges into the sides to separate the rock to be removed from the rock that was to remain. Once interiors were opened, chiseling would have created the pillars and the vaulted ceilings. The result for Saint George's Church was a multistory building shaped like a cross, with doors and windows like those of many other medieval churches but carved completely from one stone. Perhaps the most prolific builders of public structures in medieval Africa were the Axumites. Their kingdom and the Ethiopian kingdom that followed it were famous in medieval times for their great cities and impressive monuments. The kingdom of Axum had busy building trades, including carpentry, stone masonry, bricklaying, stone quarrying, and architecture. Modern archaeologists, architects, and engineers are only just beginning to understand what the Axumites built. By the beginning of the medieval era the Axumite culture was already more than 1,000 years old. Since the 300s it had been Christian. The capital, Axum, and the main port of Adulis were crowded cities. Roads were paved with crushed stone, and buildings were combinations of wood, brick, and stone. Homes of the rich and powerful as well as fortresses and churches were sometimes three stories high and set on stepped-stone platforms to make them appear higher.

A single-story building and the bottom floors of taller buildings were made of stone, bricks, or wood and rubble. The stone was quarried with wooden and iron wedges pounded into rock faces. The split-off stones were dressed with iron chisels and then transported to the building site and set in place. Brick masonry was carefully laid. A brick wall, regardless of floor level, could be several layers deep. Walls made of wood and rubble had inner and outer layers made of timber, between which was laid stone rubble mortared by mud. This left the ends of timbers projecting from the edges of walls and the corners of windows. Timbers for the sides of windows had been squared by carpenters; other timbers may have been sometimes round and sometimes square. Notches in the timbers allowed them to fit crosswise into each other.

The kingdom of Ethiopia, in the Ethiopian highlands, that succeeded Axum, was famous in medieval Asia for the opportunities it provided for international trade and for its magnificent stone structures. Axumites had carved stelae—squared stone pillars—several stories high, making them look like tall houses, replete with realistic doors and windows. Each stela must have taken several years for teams of masons to carve. From 1000 to the end of the medieval era the Ethiopian kingdom seems to have outdone its pre-

decessor. Fortresses and churches of stone erected as well as churches and monasteries were carved into solid rock. The best known of these are near the village of Lalibela. Builders carved straight down into solid rock and then shaped multi-story buildings in the rock. Curiously, the kings of Ethiopia seem to have chosen to live nomadic lives in tents rather than in impressive palaces.

It would seem that no discussion of building techniques and materials in medieval Africa would be complete without reference to Great Zimbabwe. Great Zimbabwe was a city on the Zimbabwe Plateau in southeastern Africa. It was the principal city in a nation about which little is known, but it appears to have included cities as far away as Botswana, Mozambique, and South Africa. Although Great Zimbabwe receives almost all the publicity, the stone buildings of the Zimbabweans may be found at more than 150 additional sites.

The earliest Zimbabwean structures, from roughly the 1100s, were wattle and daub. The region was blessed with the sturdy building clay called *daga*. Archaeologists have noted that the widespread use of the clay in Zimbabwean buildings became more sophisticated with the passage of time. The high quality of the clay enabled people to construct durable circular houses. These houses had conical roofs of thatch. Evidence suggests that some rectangular buildings were erected using the same materials.

At first, undressed stones were laid without much skill to form walls. The stones did not require dressing before being laid because of how they were formed. There was a great deal of exposed granite on the Zimbabwe Plateau, and the alternating hot days and cold nights caused surface granite to break off in roughly regular blocks. The Zimbabweans accelerated the process by heating granite with fire and then pouring water on the hot rock. It is possible to see how the Zimbabwean stone masons learned how to improve their work, from poorly laid stone in the early years to carefully dressed stone laid with great care by 1300. Although much of the stonework was laid without mortar, for some structures *daga* was used as mortar. Apparently stone construction techniques declined, because by 1450 stone was simply piled loosely to form walls.

To bear its weight, a wall was built broad at the bases and tapered at the tops. The outer and inner sides were usually made of laid stones, and the space between was filled with rubble. The Zimbabwean builders seem to have avoided making corners, instead laying out patterns that allowed the walls to curve gently. This may have meant that they did not have techniques for making stone corners, but it may have been a stylistic preference. In any case, the people of Zimbabwe created buildings that are admirable for their beauty and strength.

THE AMERICAS

BY ARDEN DECKER

North Americans of the medieval period built structures primarily from ephemeral materials; however, there is evidence of the use of more permanent building techniques as well. Most of the structures created during this time served multiple functions, from the residential to the ceremonial. Materials and varying techniques most often reflect the regional conditions of the individual cultures.

In the Arctic region the most common building practice may be found in the need for winter houses. These peoples, such as the Thule of the eastern Arctic region (beginning ca. 1000), utilized what little material resources they had around them, including rocks, whalebone, driftwood, or the ground itself. Often subterranean housing was framed and fortified using such materials. In circular subterranean structures, stones or bones were used to construct walls that would then be covered in sod. The Thule also used blocks made of peat to construct permanent winter houses. The use of stacked snow bricks to form dome-shaped igloos was another innovation in building in the Arctic. While it may at first seem simplistic, the creation of snow bricks was a carefully calculated process that involved the selection of snow that was neither too hard nor too soft, as it needed to be easy to mold but durable.

Some of the more ancient building traditions continued into the medieval period, including wattle-and-daub structures (a framework of twigs and branches covered with clay) and structures crafted from handmade adobe brick. Pit house construction was continued but improved through innovative new techniques. In the North American Southwest such cultures as the Mogollon (ca. 800) began to line simple pit house constructions with stone masonry to create what are called "great kivas." Kiva-style dwellings (ceremonial structures that are at least partly underground) have been found at many subsequent sites as well. In the Southwest large building complexes were constructed using a combination of adobe and wattle-and-daub techniques. The Pueblo of the Four Corners region of the Southwest also utilized adobe brick to new ends as they built large, multistory, multiroom dwellings beginning in the 11th century.

Wood planks were another form of building material used by several different cultures in North America. Among cultures of the Northwest Coast plank houses, which first appeared in the ancient period, continued to be the most prominent type of building. Wood, especially red cedar, would be either split or used as whole logs to create rectangular, roofed structures. Such structures were utilized by sedentary societies and required a communal labor force in their construction. Wigwams also necessitated the use of wood as a source

of structure. Wigwams were found primarily among north-eastern and Great Lakes area cultures and consisted mostly of bent tree saplings tied together to make a frame. These frames varied in shape and size (conical to oblong) and were covered in mats made from reeds or bark.

As many medieval Mesoamerican settlements were large scale and contained both domestic and monumental structures, there is much to be learned about their respective building techniques and materials. Many traditional building practices have continued from the ancient period and have been improved upon. Given the large scale and sophisticated urban planning of many Mesoamerican sites, it is perhaps surprising that much Mesoamerican building was completed using relatively simple local materials and procedures.

Most domestic dwellings across Mesoamerican cultures were composed utilizing such materials as stone, adobe, or wattle-and-daub walls that were then covered with vaulted stone, wood beam and mortar, or thatched roofs. Such general domestic structures would vary in shape, size, and number of rooms. Often the size and arrangement of dwellings reflected the social status of the resident family. Residences and other everyday buildings frequently were built upon stone or earthen platforms of varying heights. Such was the case at the central Mexican site of Teotihuacán (ca. 1–ca. 700), where a large number of apartment compounds were built upon platforms made from a gravel and mortar mixture. The upper walls of the apartments were made using adobe bricks with mud mortar, while the lower walls were made of stone and mud mortar. Such apartments were coated in plaster for painted decoration. Many subsequent central Mexican sites copied this technique in domestic structures and palaces. Many of these residences were more or less finished depending upon the status of the person residing there. Some had dirt floors, but those belonging to the wealthy often had plaster-covered floors.

Among the Maya and other cultures limestone was a popular material used for the facing of monumental structures. The stone was often covered with thick plaster and painted with decorative elements. There is some evidence of fired bricks being used to build walls and other structural elements at Late Classic Mayan sites (600–800) as well as at some Aztec sites. The use of columns, first developed during the ancient period, continued to be employed during the medieval period. One of the chief building techniques developed during the medieval period in Mesoamerica was the invention of the corbel vault. This structural element was especially important at Mayan sites, including Palenque (600–800) in the modern state of Chiapas and in Chichén Itzá (ca. 850–1200) in the northern Yucatán peninsula, where the use of side-by-side corbel vaults allowed interior spaces to become



Wall relief; carved limestone with pigment, Mayan culture, Mexico, ca. 750–ca. 850 (Los Angeles County Museum of Art, purchased with funds provided by the Shinji Shumekai Ancient Art Fund and Joan Palevsky, Photograph © 2006 Museum Associates/LACMA)

larger and higher. The central wall created by the corbel vault system created a stable structure to support the inclusion of roof combs to the exterior of the structures. This style of building was utilized primarily for elite centers or residences and ceremonial buildings.

Like the other regions in the Americas, South America experienced new developments in building techniques as sites grew larger and more complex during the medieval period. Cut stone and adobe were the two most common building materials used at this time. The site of Chan Chan (located near Lima in Peru) was constructed solely from adobe brick. The Inca developed such sophisticated cut-stone technology that their technique was elevated to the status of art form. Structures were typically built atop large earthen or rubble platforms of varying heights and sizes. Sometimes these platforms would be stepped and even faced in cut stone. At such sites as Tiwanaku (beginning ca. 550), located slightly south of Lake Titicaca, adobe was used in the construction of common and elite residences alike. However, cut stone was used in the construction of only the most important structures at the site, as was common throughout South America at this time. A sunken courtyard that functioned as a temple has been excavated, revealing the use of cut stone and sculpted tenon heads to line the interior walls.

At the Middle Horizon (550–1000) region of Lambayeque (in northern Peru), monumental pyramids were constructed from chambered adobe walls that were filled with sand and gravel. The pyramids had smaller structures of perishable ma-

terials with column-supported roofs on top. Some pyramids at other sites, such as Cochasquí (900–1438, near Quito, Ecuador), began to feature access ramps. Here large rectangular pyramids, featuring circular constructions made from wood and thatched roofs, served as elite residences. Iskanwaya (ca. 1300), a site built by the Mollo culture on the northeast side of Lake Titicaca, had rectangular structures made of shale rock from local quarries. Because shale is easily split, the Mollo used it to create structural elements, such as doorjambs and lintels. Many of these buildings included windows and were constructed around large interior patios. There is some evidence that the shale was covered with plaster and decorated with red ochre paint.

The most infamous and innovative technique developed in South America was Incan stonework. Buildings and walls were constructed using a technology that required monoliths, or single stones, which were carefully carved with articulated beveled edges. This carving style allowed the stones to fit perfectly together without the use of mortar, almost like puzzle pieces. Each stone had to be carved individually in order to fit each stone against another and leave no space between stones. The stones were carved using several different techniques. Some were shaped by stone-on-stone abrasion or with bronze and stone tools. Excellent examples of this technique are apparent in the city walls, palaces, and temples of such sites as Cuzco and Machu Picchu (ca. 1438–1534), located high in the central Andes Mountains. However, adobe structures that were plastered and painted also figured prominently at Incan sites. These structures had inventive architectural elements, such as niches, windows, and even double-jamb doorways. The use of the natural landscape was another important Incan building technique. Manmade terraces that were carved from rock outcroppings were used for irrigated gardens and even ceremonial spaces laid out in geometric patterns.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The sort of building materials used in Asia and the Pacific region in the Middle Ages varied according to what was available. In general, wood was preferred, but in central Asia stone and brick were more readily procured and were more often seen in everyday construction. Building techniques differed considerably, being affected by the local understanding of engineering as well as by the nature of the tools in use.

During medieval times the building techniques developed in China and India were the most influential in Asia. In China wood was the dominant building material. The typical

Chinese building began with a raised platform made of clay, earth, or solidly packed stones. The platform usually would be surrounded by a wooden or bamboo frame that would be painstakingly filled in; the filling material would be thoroughly tamped down, and eventually the frame would be removed. On the platform were the frame of the building and, atop the frame, the roof. The raised platform was sometimes paved with bricks or stone on its outside. These basic elements were incorporated into ordinary houses, palaces, and even towering pagodas.

In 1103 a guide for standardizing building in China, *Ying zao fa shi* (Treatise on Architectural Methods), written by Li Jie, was published. This text explained how buildings were to be constructed and also presented standardized forms and sizes, which allowed for the introduction of prefabrication on a large scale. A prefabricated structure is one that is composed of independently fashioned parts that can be transported and assembled with relative ease. In medieval China, then, such parts as brackets and roofing frames could be built in one location and shipped around the country to be used in construction projects for which parts had been built in several different locations, with the expectation that everything would fit together properly.

Construction projects were put in the hands of master builders. A master builder was expected to understand at least the basic principles of Chinese architecture. Under the authority of master builders would be craftspeople, such as carpenters and masons; foremen, who supervised smaller groups of workers; and the common laborers whose muscle was needed to bear heavy loads and perform strenuous tasks. Building peaked during winter, when more farmers were available to provide labor. Before beginning construction, a master builder would consult a geomancer, a magician whose expertise was in divining through a study of the geographical features of the landscape. A geomancer would confirm or ensure that the construction would neither harm the earth nor provoke the land's anger.

The building projects that dwarfed all others were the enormous walls that surrounded Chinese cities and sometimes lined territorial borders. In 607 the construction of a defensive wall extending from Beijing to Datong required over 1 million laborers. The Great Wall of China, which most people know from books and pictures, came into existence through the rebuilding of this wall during the 1400s. The command of large numbers of people brought prestige to master builders, and on occasion temples were built in their honor after their deaths. Foremen were responsible for keeping order among laborers, who usually sang while they worked. Foremen were careful to listen for laborers singing complaints about the hard work, as such singing could curse a new building.



Fragment of a wall with a relief bodhisattva; Tang Dynasty, China, ca. 618–ca. 907 (Freer Gallery of Art, Smithsonian Institution, gift of Eugene and Agnes E. Meyer)

The people of medieval Japan were surrounded by forests, such that Japanese builders were blessed with a wealth of different kinds of woods, including cedar, maple, cypress, spruce, red pine, and mulberry. This abundance of wood and a shortage of stone suitable for building meant that almost every structure was made of wood. Prior to the establishment of the city of Nara as a permanent capital in 710, imperial palaces were sometimes designed to be taken down, transported elsewhere, and then reerected. This gave Japanese builders much experience in working with wood, as well as in creating modules that could be prefabricated and installed wherever building plans required.

The Japanese liked natural forms, and they liked their structures to be elegantly understated, as if part of the environment rather than imposed on the environment. Thus, they emphasized the use of bare wood. In working with wood the Japanese employed a number of different kinds of axes, with blades that could be curved or straight, single-sided or

double-sided; some were long and heavy, some short and delicate. Important to late medieval Japanese building was the carpenter's square, which became popular in the 1300s. This tool allowed Japanese builders to fashion smooth right-angled edges, which led to the development of complex, tightly fitting joints that facilitated the fitting together of prefabricated modules with great precision.

In medieval India wood was by far the preferred building material, as the region had an abundance of different kinds of softwoods and hardwoods alike. Although the stone and brick edifices that survive from medieval India and the island of Sri Lanka are among the most beautiful and impressive structures in the world, medieval writings say that the wooden ones were even more magnificent. Indeed, much of what is known of these wooden structures derives from the writings of people who saw them and from medieval stone structures that were built as if they were wooden, even imitating how wooden beams fit together. The Indians were very industrious builders. In constructing the Kailasantha Temple at Ellora in the 700s, workers carved out about 150,000 cubic feet of stone. In about 1000 workers hauled an 80-ton dome to the top of Brihadeshvara Temple in Thanjavur, which is 200 feet high. They accomplished this remarkable feat by first building an earthen ramp several miles in length and then dragging the dome up.

The chief architect of a building project was called "the holder of the thread." For small projects this person would direct the work of craftspeople, probably all local. One of the chief architect's incidental concerns would be negotiating his way among the various social requirements of Indian castes, because each task, from felling a tree to carving an image, had its own specialists with their own rules to follow. For large projects, especially ones involving the use of stone, the chief architect could have several hundred skilled workers under his command. His principal assistants were the chief stonemason, who would oversee the quarrying and transport of stone as well as its installation in the building, and the chief public artist, who would direct the carving of statues and reliefs as well as the painting of images on the building's exterior.

Medieval Korean builders used wood extensively but also often used stone. In general, Korean builders organized themselves much as the Chinese did, consulting soothsayers to determine whether the time and place were right for building, appointing a master builder, and assembling the materials needed for construction. A notable difference from Chinese building was the Korean taste for painted images on their buildings. Where Chinese builders might have lacquered wood to protect it or included blocks of color on pillars or walls, Koreans were likely to adorn pillars with bronze bases and decorative carvings.

Central Asia and Siberia are equally mysterious regions with regard to medieval building techniques. In Siberia and Mongolia people were mostly nomadic. Their principal structure was the yurt, a tentlike dwelling that could be quickly taken down and folded for carrying on camels or horses and then erected in a new place in about half an hour. The principal materials needed for a yurt were wood, fur, and wool. The wood was carved thin, so as to be lightweight, and would form ribs that arched upward and were lashed together at the central peak of the yurt. Additional hoops of wood would encircle the upper parts of the ribs, holding them in place. Wraps of textiles or furs would encircle the lower part of the yurt, keeping the lower portions of the ribs stable while allowing for a doorway. Fur and wool would also be matted together and laid over the top of the yurt to keep the interior warm.

Before the climate became too dry for settled communities to thrive, many people of central Asia lived in houses in towns and villages built mostly of brick, much of which survives. Both Chinese and Persian influences on building styles are evident, and perhaps some of the building practices were like those of China and Persia.

Wood dominated medieval Southeast Asian building materials, but the stone structures of the Khmer survived longer than the wooden structures that were typical of surrounding areas. For their cities and temples, the Khmer used sandstone, wood, sand, and stone rubble. Foundations were composed of rubble and sand, with the sand smoothed to provide a level surface on which the building would be set. Wooden shafts were set vertically in stones at the base of a building to provide stability for the walls; however, rainwater could cause sand foundations to shift, and wood would decay, and the sides of buildings often collapsed because of these problems. In terms of organization, Khmer builders followed the practices of the Indians.

The islands of Indonesia had their own local building styles, varying among the different cultures inhabiting the islands. By and large, people built houses and storage sheds as communities, and most people were expected to have skills that could contribute to the construction. Wood was by far the preferred building material. On Sumatra an entire house, from the stilts to the walls to the roof, could be made of wood, though walls often featured latticework made of lighter natural materials. Palm leaves could be used to overlay the frame of the roof, as was common on other islands.

The influence of Indian building techniques in Indonesia can be found in stone structures such as Hindu temples. How such projects were organized by Indonesians is unclear, although particular people presumably designed and directed construction; the practice of appointing a chief architect was probably one that Indonesians imitated. Some construction

workers may have been imported from Southeast Asia, Sri Lanka, or India. The builders on medieval Java seem to have improved upon the construction techniques learned from mainland builders, as their surviving structures feature iron braces and stone mortises and tenons not found in the impressive structures of contemporary Southeast Asia.

Wood, bark, and bamboo were the primary building materials in the Philippines and Oceania. In general, all people were expected to have some skill in woodworking. In some places, such as Australia, essential skills included the abilities to trim tree branches and saplings for frames, to trim fibrous roots for use in tying frames together, and to properly lay leaves over the top of a dwelling so as to shield it from rain. On many Pacific islands, local factors were such that building was complicated and required extensive skills in selecting the proper woods and designing structures. Remarkably sophisticated houses featuring thatch or palm leaves, wooden pillars, and latticework walls often were built using only two basic tools: an adze fashioned with a seashell and a stone axe.

EUROPE

BY KIRK H. BEETZ

At the beginning of the Middle Ages, Europe had two significant building traditions. One was Roman and emphasized stone as a building material; the other was northern European and emphasized wood as a building material. Throughout the medieval era Europe south of the Alps used stone as its primary material, while the rest of Europe emphasized wood. Southern Europeans tended to follow Roman building techniques, whereas other Europeans blended Roman techniques with homegrown methods.

During the Middle Ages many parts of Europe were covered by vast forests. From the late Roman era into the early Middle Ages the populations of cities declined, while people sought ways to earn livelihoods in rural areas. Small villages multiplied as the rural population began growing in the 600s. By the 700s there were builders who traveled hazardous forest trails from village to village, taking work where they could find it, but almost everyone in a village needed to know how to do some basic building tasks.

Early medieval homes were fashioned from wooden frames with walls made of wattle and daub. Wattle consisted of the intertwining of tree branches, and daub was mud smeared over the wattle and allowed to dry. Roofs were usually made of thatch and were pitched to allow rain to run off. Sometimes roofs were overlaid with soil, with grass planted in the soil or, in Ireland and Scandinavia, in sod. The weight of this material put a heavy burden on the wooden posts of the house's frame, requiring that the posts be heavy and thick,

but in winter the roof of soil and grass would hold snow, thus helping to insulating the house to keep it warm inside. The builders of such wooden houses in the early medieval era had only three basic tools: a hatchet, an adze, and a chisel. They used these tools to make posts square by hacking the sides off felled tree trunks and chipping out imperfections, creating remarkably smooth sides for their posts.

Every village had a church and, with the rise of feudalism in the 800s and 900s, a manor house. The church was often the strongest structure in a village and the place to which villagers retreated if their village was attacked. The manor house was where the lord of the village lived. Both were wooden. Their construction almost always required the direction of a professional builder. Even for making wooden boards,

the hatchet and chisel were the principal tools. As with the houses, the posts of squared wood bore most of the weight of the structures. Nails were seldom used except for constructing doors. Instead, joints would be carved near the ends of beams so that they slipped into each other neatly.

In southern Europe there were more stonemasons available than elsewhere in Europe, and the destruction of forests during classical times meant that wood was harder to come by than elsewhere. There was a general decline in the wealth of commoners that meant the old Roman-style houses were too expensive for most people, so houses on farms and in villages tended to have roughly laid stone walls topped by wooden frames. Under the Byzantine Empire of southeastern Europe and the Germanic rulers of Italy, some cities continued to flourish. Construction of houses in the cities tended to be of bricks, stone, and concrete, which was a mixture of gravel and cement invented by the Romans. It was possible for stonemasons to have enough work in a single city that they did not have to travel the countryside to earn their livings. In the Byzantine Empire, in particular, Roman construction techniques survived, including the use of the semicircular arch, and there was enough wealth so that large public buildings could be constructed, especially churches based on the Roman basilica, using large stone pillars and cement walls to support roofs of wood and concrete.

In northern Europe during the early medieval era wood was the dominant building material even for the palaces of monarchs, but when possible builders used stone, with stone becoming the primary building material for cathedrals and fortresses during the 1110s. Thus, even palaces and manor houses tended to be built with combinations of wood and stone. Few wooden structures have survived, making it difficult for archaeologists to identify how builders made their transition from wood to stone, but accounts of royal life include incidents when palace roofs or porticos made of wood collapsed. By the end of the Middle Ages advances in warfare had made building defensive walls and fortresses of stone almost a necessity in places where stone was available.

By the 1000s many manor houses built in central Europe had walls of brick for their bottom floors, with wooden walls for upper floors. This construction required greater skill than usually could be found in a village, making the hiring of a master mason necessary for directing the work. As master masons became more available to European settlements, even the walls of ordinary houses tended to become ones of stone, brick, or wood, filling in the spaces between the posts that supported the weight of the roof. In the 1000s, as manor houses and churches became larger, with walls of stone or brick instead wattle and daub or wood, preventing walls from buckling outward became a problem. The Romans



Stone doorway with the arms of the counts of Chazay; France, ca. 1450–ca. 1500 (Los Angeles County Museum of Art, William Randolph Hearst Collection, Photograph © 2006 Museum Associates/LACMA)

had solved the problem by building thick, heavy piers of stone and concrete. A pier was a vertical structure intended to bear outward-pushing weight in buildings. Such piers meant that interior spaces of churches and manor houses could be constricted, because of the space the piers required. In churches it meant that members of a congregation would have their views of the altar and the religious rites blocked.

By the beginning of the Romanesque era in about 1050 the master stonemason had become a fixture of building construction. Master stonemasons directed all aspects of construction of a building and tended to be multitasked. Although they were often illiterate, they knew geometry and mathematics, could use a variety of tools, and often were skilled in more than one aspect of construction. Those who hired them sometimes noted with satisfaction that they had master stonemasons who could skillfully carve both stone and wood. Typically, master stonemasons traveled to where they could find work, and even the least accomplished of them frequently would work in eastern Europe, Scandinavia, France, and England during their lifetimes. Builders of castles and cathedrals competed with one another for the services of the best stonemasons, which meant that master stonemasons were treated respectfully, even by bishops and nobles. The master stonemasons deserved the respect they were given, because they often had to oversee the work of several thousand laborers while managing expenses and the importation of materials. Stone was often imported from quarries in eastern Europe, while the logs that would become the huge beams of cathedrals were imported from Norway and Sweden, sometimes traveling from one edge of Europe to the opposite edge.

Working under the command of master stonemasons, like officers in an army, were masters of the crafts necessary for constructing buildings of wood and stone. Although stones meant to be decorative—that is, visible—were often imported, for most constructions a nearby quarry, still often dozens of miles away, had to be identified. A quarry master supervised the removal of stones from it, and a master stone-cutter was placed in charge of dressing the stones. There was a master mortar maker who oversaw the making of the mortar that was used to hold stones or bricks together. It was vital that he see to it that mortar dried properly. There was also a master roofer, who had to be skilled in the use of wood, stone, concrete, and lead, which often was used in quarter-inch layers on roofs to prevent rainwater from seeping into the structure.

The master carpenter supervised not only the carving of wood for buildings but also the mechanical devices used to put wooden beams and boards in place. The master blacksmith directed the making of nails, latches, and metal bars

that were sometimes used to hold stone blocks in place. The master glass maker became important during the Gothic era (roughly 1150–1550 in most of Europe, with Italy moving into the Renaissance in the 1400s) because advances in architectural design allowed walls to be thin enough to contain numerous windows. Artists were hired to paint glass for windows, to carve wooden altar pieces, or to sculpt stone, though carpenters and stonemasons often did these tasks themselves, depending on the budget of the building project.

By the 1200s the toolkit of construction workers had expanded to dozens of tools. There were hammers, axes, chisels, and levers for cutting and moving stone. There were hammers and wedges for splitting wood, big saws for crosscutting tree trunks and large branches, several different planes for smoothing wood, augers for drilling wood, and braces and bits for drilling fine holes in wood. A brace and bit consisted of a handle bent in the middle like a staple, with a loose grip that allowed the carpenter to spin the handle in a circle; the business end could have one of several different sizes of bit for drilling into the wood. In the 1300s treadle-driven lathes for shaping wood became common.

Although most European houses remained wooden structures that relied on heavy posts to hold both roofs and walls, as the medieval era progressed, demand for large public buildings increased. The increasing size and complexity of buildings meant that humans carrying loads on their backs alone could not handle transporting all the construction material required. By the Gothic era the windlass had come into common use for help in constructing buildings large and small. It consisted of a drum wound with rope and a crank on the side of the drum to turn the drum, thus winding the rope and raising whatever was attached to the other end of the rope.

The windlass was often coupled with pulleys for raising heavy loads. A pulley was a wheel with a grooved rim in which a rope was set. It would be set in scaffolding or other wooden framework above the windlass and above the load to be hoisted and would turn as the windlass was cranked. The force a windlass could apply was limited to the strength of people turning cranks on its two ends, but medieval builders needed great force for raising the heavy Scandinavian logs used in tall roofs as well as large stones and prefabricated concrete parts for walls and roofs. They adapted an ancient Roman device for this purpose. It consisted of a large wheel that looked much like the wheel in cages for rats or hamsters today. One or more men would trudge in it, turning the wheel, which would turn a large windlass. In towering cathedrals and other tall buildings this large wheel would be placed high on scaffolding, at about the level where beams, stones, or concrete needed to be delivered, and it was almost always attached by rope to a large pulley.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Structures surviving from the medieval period in all Muslim countries reflect both local and imported influences. Islamic builders not only copied ancient architectural patterns from Greece, Rome, and Byzantium but also recycled various materials, from pillars to aqueducts. But a local stamp is also evident in every building. Driven by the need to conform to the dictates of their religion, builders in every region of the Muslim world blended their traditions with those of the ancient empires that had ruled their countries in times past.

The Near East was the birthplace of Islam as well as many of the architectural features considered typical of Islamic public buildings: rooms and courtyards arrayed in a series of pavilions, domes on mosques, and interior colonnades that create an illusion of infinite space. The conversion of churches and temples of other faiths into mosques and the tendency to dismantle older buildings to use their pieces in constructing new buildings were common. Otherwise, the inclination was to use native construction workers and local building techniques, resulting in a diversity of styles for Islamic buildings.

The Dome of the Rock, built in Jerusalem in about 691, is an example of the construction methods used in the early Islamic world. It was built over a holy site, the rock where Abraham almost sacrificed his son, Isaac, and where Muhammad left to meet with God in heaven. Much of the stone and brick used to build the Dome of the Rock came from older buildings, and Roman columns were used to hold up the roof. This recycling practice was not uncommon; in Egypt palaces, fortresses, and mosques were often made from materials taken from ancient Egyptian structures.

Near Eastern Islamic building primarily followed the patterns of Greek, Roman, and Byzantine architecture, partly because Roman architecture was well known to local builders and partly because Byzantines were often employed as architects and construction managers. But Islamic structures had some unique requirements. For instance, they needed to have a wall oriented toward Mecca so that worshippers would know in which direction to pray. For help in this orientation the builders of the Near East adopted a numbering system from India, probably the foundation of what became known as Arabic numerals. Muslim mathematicians developed the skills necessary for determining the direction of Mecca from any geographic location, and buildings were oriented accordingly. For courtyards Near Eastern builders often liked to line up the walls with the four directions of the compass. Builders would lay paving stones in courtyards to allow for

water channels that flowed north, south, east, and west from a central fountain. The channels brought water into rooms surrounding the courtyard.

Adequate water supplies were important throughout the Near East and North Africa. Where possible, governments refurbished Roman aqueducts to provide water to thirsty cities, and Muslim builders became masters of water management. For instance, they learned to filter water by introducing an underground cistern into which water flowed, dropped most of its debris, and then flowed into cisterns from which it could be drawn. Keeping the water underground for much of its travel through a city's water system cut down on evaporation. However, only the rich could afford to have water flow into their homes; others had to rely on public fountains and wells, much like the ancient Romans. The wells were notable for their linings of clean, plastered masonry.

Many Near Eastern buildings were made of mud bricks and baked bricks. The baked bricks were used to shore up the sides of mud-brick walls, because baked bricks were less prone to erosion from wind and rain. Typical of the use of brick was Qasr al-Salam (Palace of Peace) in Baghdad, Iraq. Its baked brick was covered with white plaster carved with designs. Sometimes bricklayers made their walls decorative by varying the pattern formed by their bricks. One technique was to set a layer of bricks flat on the long sides, cover that with a layer of bricks on their short edges, and repeat the alternating pattern until the desired height of the wall was reached.

The Islamic movement into southern Europe was no sudden event but took hundreds of years, and the eventual Islamic withdrawal was a slow one as well. In the meantime Muslims created some of the world's most magnificent buildings. In Islamic Spain construction often made use of materials taken from Roman buildings and Christian churches. Thus, even the most elaborate of Muslim structures featured uneven lengths of pillars. Sometimes pillars were set one atop another, and sometimes they received caps of different sizes, depending on how long the pillars needed to be to reach the ceiling.

One of the world's greatest architectural achievements is the Alhambra, derived from the word *al-hamra*, meaning "red fort." The ceiling of the Alhambra's throne room shows the builders' skilled use of wood. In a technique developed in North Africa, where wood was in short supply, the wood was carved into small squares that were then fit together. This painstaking procedure resulted in a wooden structure able to flex with sharp changes in temperature without cracking. The Muslims of Spain had access to more wood than did people in North Africa, and they used it for frames for their roofs, which were often coved with tiles. The Alhambra was built and refurbished over centuries, and the use of wood in its in-



Foundation stone; carved marble with traces of paint and gilding, Islamic Egypt, 15th century (Los Angeles County Museum of Art, the Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA)

terior reveals a mature craftsmanship in its carefully laid out geometric patterns.

The building techniques of East Africa and central Asia are the least understood by modern archaeologists and historians. In East Africa the Islamic influence stretched along the coast from south of Ethiopia to the islands near Madagascar. Archaeologists had long thought that the building techniques of Muslim East Africa originated in Arabia and India because advanced use of stone in the construction of mosques and houses seemed foreign to the region. Extensive research into the ruins of medieval towns and cities since the 1970s, however, revealed that the large, well-built structures of East Africa were the result of a gradual evolution from more primitive structures, showing that the building techniques used in Islamic structures were local in origin rather than imported.

Most buildings in Muslim communities served merchants and the merchant trade. Wood, stone, mud bricks, and coral were the primary building materials. Little is left of wooden structures, because wood decays rapidly in most of the environments of East Africa. Mud brick is quickly eroded

by rainfall and therefore requires constant repair and maintenance. This leaves mostly stone and coral as the building materials archaeologists find to study.

Perhaps the most interesting stone structures are the flood walls built on the edges of islands to protect against storm surges and tidal floods. The walls were composed of large, rough stone blocks stacked without benefit of mortar, yet mortar was often used in East African construction. The mortar was made by mixing sand with lime, which was the by-product of burning coral. That recipe resulted in a durable mortar that still holds together walls of long-abandoned buildings. Coral was mined on land where movements in the earth had thrust up the seafloor, but it was also mined from underwater reefs. Archaeologists do not know how this was done, although the underwater mining of coral was extensive. Coral was also used as building blocks for the walls of houses and decoratively in mosques, often set in walls to mark the mihrab, a niche that marked the direction of Mecca. Walls frequently were covered with plaster made from lime.

The dryness of much of central Asia has helped preserve medieval buildings, but people in the region have long de-

molished old buildings to reuse bricks or stone for new buildings. The primary building materials in Islamic central Asia were stone and brick. Typically, stones were smaller than the blocks used in building Near Eastern monuments and were not dressed. They were laid in rows, sometimes several rows deep. Building a house seems to have been a community project, requiring many people to carry stones and lay them. Structures with walls made of the unmortared stone often collapsed during earthquakes.

Techniques from the Near East, Europe, and China seem to have been used for building, resulting in architectural forms reflecting those influences. Both the Near Eastern and Chinese construction methods appear to have been imported into central Asia, but the European-style techniques may have resulted from a shared culture with European ethnic groups rather than importation. How building was organized during the medieval era is not known, but the building of walls along hillsides to prevent slides from erosion and the construction of public structures such as mosques almost certainly required the employment of master builders. These master builders probably came from Byzantium, the Near East, and China.

Many central Asian Muslims were nomads. In their patterns of life and their building techniques, they probably differed little from the non-Muslim nomads of central and northern Asia as well as Mongolia. They lived in yurts, lightweight tentlike dwellings that could be easily dismantled and carried and then set up again in about half an hour. The frame of the yurt was formed using slender wooden beams bent to meet in the middle of the roof. Straps of leather or textiles wrapped around the upper frame held it in place. Wide, sturdy straps encircling the lower part of the frame kept it steady but left space for a door, which was made of wood and was the heaviest part of the yurt. The structure was then covered in felt mats.

Muslim invasions of India resulted in widespread destruction of buildings as part of an effort to eliminate images of deities and people, which the Koran stipulates are an affront to God. In the early 1200s two Muslim leaders, Muhammad of Ghor and Qutb-ud-din Aybak, apparently destroyed images in 1,000 temples that were subsequently rededicated to Islam. In the 1200s, 27 temples of Hindus and Jains were torn apart so that builders in Delhi could reuse the bricks and stones to construct the Qutb mosque, known as Quwwattul Islam (Might of Islam). It and many other mosques and palaces were intended to be widely visible statements of Muslim power.

In Quwwattul Islam numerous pillars taken from the destroyed temples were used to support the roof. These came in widely varying lengths, and the builders sometimes stacked

three of them to reach the roof. Some Indian building techniques and materials are evident in the structure, indicating that local builders were used. It is possible that architects and master builders from the Near East were sometimes used in designing and directing the construction of public buildings in India, but usually local architects and master builders were used. This resulted in structures Islamic in nature but with the technical flair of India. For instance, the minaret for Quwwattul Islam is a massive structure, five tiers high, resembling a Hindu temple tower intended to represent the mountain at the center of the world. Its tiers are fluted and the balconies ripe for the placing of statues, as a Hindu or Buddhist temple would have been.

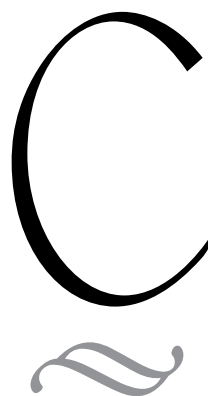
The building projects would have been organized like traditional Indian building projects. The chief architect was known as “the holder of the thread,” and he directed the work of all the craftspeople. His lieutenants included a chief stonemason, who may have been responsible for dismantling local buildings to obtain materials for new construction projects. Building small structures probably involved only local workers, but big projects such as large mosques or palaces would have drawn workers from nearby provinces.

See also ARCHITECTURE; ART; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; EMPLOYMENT AND LABOR; FORESTS AND FORESTRY; HUNTING, FISHING, AND GATHERING; INVENTIONS; MIGRATION AND POPULATION MOVEMENTS; MINING, QUARRYING, AND SALT MAKING; NOMADIC AND PASTORAL SOCIETIES; NUMBERS AND COUNTING; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRANSPORTATION.

FURTHER READING

- Martyn Bramwell, ed., *The International Book of Wood* (New York: Crescent Books, 1987).
- Frances Gies, and Joseph Gies, *Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages* (New York: HarperCollins, 1995).
- Markus Hattstein and Peter Delius, eds., *Islam: Art and Architecture* (Königswinter, Germany: Könemann, 2004).
- Ann Nottingham Kelsall, “China.” In *Builders of the Ancient World: Marvels of Engineering* (Washington, D.C.: National Geographic Society, 1986).
- George Kubler, *The Art and Architecture of Ancient America*, 3rd rev. ed. (London: Penguin Books, 1990).
- David Macaulay, *Cathedral: The Story of Its Construction* (New York: Houghton Mifflin, 1973).
- Bindu Manchanda, *Forts and Palaces of India: Sentinels of History* (New Delhi, India: Lustre Press, Roli Books, 2006).
- Peter Nabokov and Robert Easton, *Native American Architecture* (New York: Oxford University Press, 1989).

- Patrick Nuttgens, "The Flowering in the Desert: Islam," "The Holy Mountain and the Sacred Womb: Southern Asia, 2500 BC to Eighteenth Century AD," and "Puzzles and Modules: China and Japan, Third Century BC to Twentieth Century AD." In *The Story of Architecture* (Englewood Cliffs, N.J.: Prentice-Hall, 1984).
- Pierre Riché, "The Building Trades," in his *Daily Life in the World of Charlemagne*, rev. ed., trans. Jo Ann McNamara (Philadelphia: University of Pennsylvania Press, 1989).
- Joyce Stewart, "India and Southeast Asia." In *Builders of the Ancient World: Marvels of Engineering* (Washington, D.C.: National Geographic Society, 1986).
- Philip Wilkinson, "Great Zimbabwe." In *The Time-Life Encyclopedia of Mysterious Places: The Life and Legends of Ancient Sites around the World* (Alexandria, Va.: Time-Life Books, 1990).



► calendars and clocks

INTRODUCTION

The medieval era is the birthplace of a modern temporal sensibility, yet it is also a place that adhered to premodern forms of timekeeping. Time itself, especially past time, was not measured in years but in other units. It could be counted, but only for very specific purposes. In a predominantly agricultural world most people simply had no need to know exactly the year or the hour. The day began with the first rays of sunshine and ended with the loss of sunlight. The changing of the seasons marked the passage of time. Clocks, if they were known, were a pricy rarity. To the majority of people of the medieval era time moved as it had for the ancients.

Most of the temporal references in surviving medieval texts set events in sequence to the reign of a ruler, not by how much time had passed between one event and another. In most contexts in which dates are used, only the present or the past needs to be named. In a situation in which the future must be described, a consecutive numerical system must be used. Continuous numerical systems were rarely employed in daily life, particularly in Africa and the Americas. There were only several groups of people in society who needed to place themselves in time. The clergy relied upon calendars to tell them when holidays, especially Easter, were to be celebrated. Scribes and notaries who drew up legal documents needed to be able to put dates on the documents. Jews and Christians might count years, known as *anni mundi*, from the Creation

according to the Bible. However, scholars came up with different dates for the base date of the Creation, thereby complicating the calendar considerably.

Consular years, in which the year was named after the two consuls of Rome, had been used since 450 B.C.E. and continued through the imperial period. The last named consul in Constantinople, Basilius, held office in 541 C.E. In 567 the consulship in Byzantium became an office of the emperor, and, after the first year of his reign, the *post consulatum* designation was used until the accession of the next emperor. Regnal years might be of a king, duke, bishop, or another form of authority. Indiction years consisted of a block of 15 years that started in 312 C.E. A year is identified as part of the current indiction (for example, “in the tenth year of the indiction”), but the cycles themselves are not numbered, thus necessitating other information to identify a particular year. None of these dating systems is numerically continuous.

As regnal dates indicate, time could be closely attached to political regimes, as in Asia, the Islamic world, and Europe. The use of a date on documents served to validate a ruler’s authority in a very particular way, by naming time after him or his dynasty. A dating system would change in response to a regime change. In many cases dates on documents might have been used less to place the item in long-term time than to indicate who was in charge.

The method of naming years known as *anno Domini* (meaning “the year of our Lord” and abbreviated A.D.) dating has been in use in Europe since the sixth century. Its basic

premise is that Jesus was born in the year 1. All subsequent years, numbered consecutively, are years of the Incarnation of Christ. A consecutive, numerical system such as A.D. dating allows us to calculate automatically how much time has passed between two dated events and how they are related in time to other events. It took several centuries before this form of dating became the standard system in Europe. A number of different systems for naming years were in use in earlier times, most of which were not continuously numerical. Without a numerical set of year dates, it is not a simple matter to calculate the numerical passage of time. The evidence suggests that A.D. dates were adopted by Europeans in moments of political fragmentation: in England during the seventh century, in France of the late ninth century, and in Italy during the late tenth century. The A.D. method provided a default calendar system that was politically neutral and spiritually appropriate. (In modern times the notation C.E., meaning "Common Era," has been widely adopted as an equivalent and more neutral designation.)

In many parts of the world the day was organized according to the temporal hours system. Under this convention each hour is variable in length because it is calculated by dividing the period of daylight and nighttime into 12 parts each. A daytime hour in the summer is thus longer than its winter equivalent. The widespread introduction of mechanical clocks into Europe in the 14th century ended temporal hours and laid the foundations for our modern sense of time, but older systems of timekeeping remained firmly entrenched. Only those Europeans within sight or sound of a public clock could use the equal-hours system. Mechanical clocks remained too complex and expensive for private use.

AFRICA

BY MICHAEL J. O'NEAL

Historians' knowledge of timekeeping systems in medieval Africa is limited. While cultures in the northern part of the continent developed fairly sophisticated systems late in the ancient period and continued to use them during the medieval period, sub-Saharan cultures with the requisite knowledge of mathematics and astronomy emerged later. Thus, by the start of the medieval period, obelisks and sundials were in common use in North Africa, the Greeks had introduced water clocks, and the Egyptians had developed a calendar. Later, as Islam spread through the northern regions, so did knowledge of astronomy and calendars.

Medieval Africans from the sub-Saharan regions probably measured time in ways not markedly different from those of their ancient ancestors. To measure the time of day, they probably used primitive sundials, which could have consisted

of something as simple as a stick stuck in the ground. More elaborate sundials were obelisks built of stone. When the sun rises, the stick or stone marker of an obelisk casts a shadow pointing toward the west. As the sun rises higher in the sky, the shadow becomes progressively shorter until noon, when the shadow begins to lengthen and point toward the east. A tree or any other vertical object would have served the same purpose.

Although medieval Africans, much like their ancient forebears, probably felt little need to keep accurate measurements of time during the day, they used their observations of the heavenly bodies to mark the passage of the year and the seasons, which would have been especially important for agricultural purposes, like planting and harvesting. To this end they probably relied on stone monuments built during the ancient period. One of the most prominent monuments was built by the Borana people in southern Ethiopia and northwest Kenya. The Borana ignored the sun, instead developing a calendar based on the movements of seven star groups in conjunction with the phases of the moon. Near Lake Turkana in Kenya archaeologists have discovered a group of 19 stone pillars. The site is called Namoratunga, which means "stone people." Although the stones were probably erected in about 300 B.C.E., they continued to be used as a calendar into the medieval period. Indeed, the modern Borana, numbering about a half million, continue to live in the region.

The Borana system of time was based on a 354-day lunar cycle. The Borana did not keep track of weeks, but they did keep track of months, adding a "leap" month every three years to track the lunar calendar with the solar year. The basis of the Borana calendar was seven stars or star groups: Triangulum, Pleiades, Aldebaran, Bellatrix, Orion's Belt, Saiph, and Sirius. The new year began when a new moon was observed in conjunction with Triangulum; the next month began when the new moon was seen in conjunction with the Pleiades, and so on. The Borana had names for each day of the month, but they had only 27 day names, so after 27 days the names repeated.

Astronomers and archaeologists, though, have debated the meaning of "in conjunction with." Some of the stars cannot be seen when they are too close to a new moon. Researchers suggest that the 19 Namoratunga pillars were intended to mark the positions of the stars. Using statistical analyses, archaeologists have determined that there is only a 0.43 percent likelihood that the pillars could have marked the rising of the stars by chance. For those archaeologists this is strong evidence that the cluster of pillars was an astronomical observatory and hence a calendar.

Another calendar system that survived from the late ancient period and was used during the medieval period is

found at ruins called Great Zimbabwe. The site consists of hundreds of stone megaliths, or monuments, spread out over a 200-square-mile area in Zimbabwe. In fact, Zimbabwe, which means “houses of stone,” is named after the ruins.

Construction of the stone megaliths probably began in about 400 but continued into several subsequent centuries, with many of the megaliths erected from the 11th through the 15th centuries. At its most populated the area was home to perhaps 18,000 people, many of whom were engaged in the gold trade. The ruins comprise three groups: the Hill Complex, the Valley Complex, and the Great Enclosure.

Archaeological investigators have debated the purpose of the megaliths, but they are particularly intrigued by the Great Enclosure. Some argue that it was an astronomical observatory and thus a kind of calendar marking the passage of time by the movements of heavenly bodies. A large stone wall encloses the site, and the sun bisects a chevron pattern on one portion of the wall on the summer solstice (the first day of summer). Further, a passageway in the wall is constructed so that a person inside, with a limited view of the sky, can see only the Milky Way on the summer solstice. Other stones at the site appear to be markers for the spring and autumn equinoxes. These peculiarities strongly suggest that the Great Zimbabwe ruins and similar megaliths were used as astronomical observatories and thus as calendars.

Medieval sub-Saharan Africans had a concept of time that differed from that of people in modern Western nations. Under the influence of science and technology, modern people think of time in strictly rational terms. Time is measured accurately to parse the day. Television and radio shows begin and end at certain prescribed times, people are expected to arrive at and leave work at certain times and to keep appointments “on time.” In medieval Africa, however, time had a more spiritual significance. That was particularly the case among various Bantu peoples who lived in the southernmost parts of Africa. In South Africa, where the Gitlane River is met by its northern tributary, the Makgemeng River, archaeologists have made an interesting find: a complex of stone structures that may have incorporated an astronomical observatory and perhaps served a timekeeping purpose.

The structures, made of dolorite stone, are arranged in the shape of a sickle. They are located on a hill called Thotana ed Fedile, which means “Time is up the hill.” The structures are not particularly large. At their base they are 5.6 feet thick, and they taper to a thickness of about 2.3 feet. Overall they are about 3.3 feet tall. The complex is marked by various doors, altars, and walls. It remains unclear when the complex was built, but artifacts found at the site show that the place was a center of trade with India and suggest that it was built sometime around the late first or early second millennium.

The entire complex is arranged in such a way that the movements of both the sun and the moon traverse the sickle at particular points, leading investigators to believe that the complex was a large calendar and astronomical observatory. The purpose of the site, however, was not simply to mark the passage of time. It is believed that it was intended to serve as a point of transition between earthly life and the afterlife and be, in effect, a meeting place for people and their deceased ancestors. Its builders were men who had absorbed some of the religious traditions of the Indians with whom they traded. They lived in what amounted to a monastery, and they could be called monks. Whatever terminology is used, they were holy men who were interested in, among other things, easing the passage of people and purifying them for entry into the afterlife. The entire complex was referred to as the Moon Sickle, with the word *sickle* used to suggest the notion of people being cut down by time and entering the afterlife.

THE AMERICAS

BY ANGELA HERREN

Throughout the Americas an awareness of seasons and the basic movements of the sun and moon played an important role in life wherever settled agriculture was practiced. By the first millennium C.E. many cultures in the Americas erected monuments marking astronomical events, developed sophisticated calendar counts, and established ritual activities in veneration of and propitiation toward supernatural deities associated with natural phenomena. No clocks from the ancient period of the Americas exist, but 16th-century authors indicate a pre-Hispanic awareness of the daily movement of the sun and of cast shadows.

In North America cultures like the Anasazi of the American Southwest (ca. 900–ca. 1300) developed ritual practices aimed at regulating and controlling the seasonal rainfall necessary for the cultivation of crops. Like their descendants, the Anasazi probably carried out dances, rites, and festivities in the communal space near their brick and stone multiple-family dwelling units. Older men probably trained and initiated younger men in circular or rectangular underground spaces known as kivas. Painted plaster frescos in many kivas feature rainmaking ceremonies and anthropomorphized cultigens, such as squash and maize, indicating the agricultural nature of the ritual practices learned in these sacred spaces.

Historical records and architectural structures in South America indicate a basic knowledge of astronomy in the Andean region. By the time of the Inca civilization (ca. 1450–1532) many stone monuments and temples celebrated the agricultural and supernatural role of the sun in society, and some appear to have marked actual astronomical events. Ac-

cording to some scholars Inca elites claimed the sun as an ancestor and patron. Mythic origin stories placed the emergence of the creator god Viracocha, the sun god Inti, and humans at either Tiwanaku or the Island of the Sun in Lake Titicaca, two southern Andean locations. The Inca king, understood to be a divine descendant of Inti, mediated between the sun and the people of the Andes. During the most important solar festival, called Capac Inti Raymi, many children were offered in sacrifice and buried with gold, silver, and other valuables.

An Inca descendant named Don Felipe Huamán Poma de Ayala claimed in letters written to King Philip III of Spain, from the late 16th century or early 17th century, that the Inca sowed and harvested crops based on the advice of an astrologer. He also described the Inca practice of keeping track of the passage of time by observing the way a shadow created by the sun fell at different times of the year. At the mountaintop site of Machu Picchu, in northern Peru, the central window of the Torreón, or “Observatory,” framed the rising sun during the June solstice. In addition to noting the motion of the sun, the Inca and their ancestors appear to have observed the lunar cycle, maintaining a calendar of civic, agricultural, and ritual activity that followed the phases of the moon and may have consisted of approximately 12 cycles of 28 days.

Scholars disagree on the accuracy of Incan astronomical record keeping. Some believe that the Inca tracked the movements of Venus, the Pleiades, and certain constellations. While the Andeans may or may not have predicted eclipses, Huamán Poma de Ayala states that these unusual events caused great concern and fear that the eclipsed planet was dying. Regardless of the details of their records, the Inca followed a calendar of events based at least generally on solar and lunar cycles. Agricultural activities like planting, weeding, and harvesting, as well as such events as boys’ puberty rites, offerings to the gods, and a festival of the dead, occurred at regular annual intervals.

The most complex calendrical systems of the ancient Americas developed during the Late Formative and Proto-classic periods (c. 400 B.C.E.–250 C.E.) of Mesoamerica. Early inhabitants of Guatemala and the Mexican regions of Veracruz and Chiapas devised several methods of keeping time. These calendar counts remained in active use until the arrival of the Spaniards in the 16th century.

The oldest Mesoamerican calendar, 260 days in length, marked the intersection of a continuous and repeating cycle of 20 day names and 13 numbers. Although different Mesoamerican groups gave the calendar various names, it always functioned the same: The day sign and number both advanced daily, and after 260 days the original configuration was restored. Each day name carried positive or negative associations in supernatural terms. Painter-scribes recorded



Pottery plate with a deer glyph (Cholula, Mexico, ca. 1200–1521); the deer was a calendrical sign common to this pottery and found in Mixtec and Aztec manuscripts that show the 20 day signs that formed the basis of the 260-day calendar. (© The Trustees of the British Museum)

this information in almanacs, and diviners used the calendar to interpret the future. For example, the Aztec called in a diviner after the birth of a child to assess the nature of his or her birth date. If necessary, the diviner manipulated the calendar, naming the child on a more auspicious day. The 260-day calendar probably derived from the nine-month human gestation period. Some indigenous communities in southern Mexico and the Mayan highlands continue to use this calendar count.

A 365-day solar calendar came into use shortly after the introduction of the 260-day calendar. This calendar consisted primarily of 18 periods of 20 days, with each period bearing a name and associated number; ancient Americans considered the five days of the year following these 18 periods to be unlucky and dangerous. People avoided activity during these days and thought of them as unfortunate birth dates. Known as the “Vague Year,” the solar calendar lacked leap days and so eventually wandered through the seasons, necessitating movable feasts, or periodic adjustments of seasonal festivals.

Mesoamericans used the 260-day and 365-day calendars concurrently and kept track of the intermeshing of these two cycles. Every 52 years the two calendar counts completed a full cycle, or calendar round. Important ritual activities marked the completion of one cycle and the beginning of

the next. The Aztec celebrated this period with a New Fire ceremony. During the New Fire ceremony, called *toxiuhmolpilli*, or “binding of the years,” all Aztec extinguished the fires in their private homes and temples. Families threw out old utensils and kitchen implements, replacing them with new ones. At a site to the east of Tenochtitlán, the capital, priests sacrificed a captive taken in battle and ignited a New Fire. A torch from this bonfire relit the fires at the Great Temple of Tenochtitlán, and representatives disseminated the fire to surrounding communities.

While the calendar round completed every 52 years and then started over, the development of the Long Count calendar allowed for records of a much longer span. The Long Count posited a zero date, or starting point, equivalent to the European date of August 2, 3114 B.C.E. Units of time in this calendar thus measured the amount of time elapsed since that date. According to the Maya Long Count system, time was recorded in units of one day, 20 days, one year, 20 years, and 400 years. These five tallies appeared on monuments and architecture in descending order, with the largest numbers first. The Maya used a vigesimal system, or a system based on units of 20, the number of fingers and toes on a human being. In the Long Count system all years equaled 360 days.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The cultures of Asia and the Pacific region were enormously varied during the medieval era, developing many different methods for keeping track of the days and of the passing of time during a day. Accounts of these cultural traditions can make it seem as though China and India had the most sophisticated calendars and timepieces, but this perception may be a distortion because Chinese and Indian records of their timekeeping practices are presently more complete than those of other cultures.

For most Asian peoples, developing calendars that could predict such future seasonal events as solstices and equinoxes seems to have been of great importance, but this concern was not universal. The peoples of medieval Australia kept track of the passage of the year by watching the movements of constellations in the night sky, looking for celestial signs to tell them when they should move to fresh hunting territories or when the local birds would lay their eggs. These societies did not look to the sky for predictions of the future but for indications of what was happening in the present. The peoples of the Pacific islands often memorized the patterns of stars in the sky, which could tell them about seasonal changes that might affect local fisheries or warn of the arrival of the stormy season.

Two traditions of calendars dominated timekeeping in eastern and southern Asia. One was the Indian tradition, which was used not only in India but also in what is now Sri Lanka, most of Southeast Asia, and Indonesia. The other was the Chinese tradition, which was used in China, Japan, Korea, northern Vietnam, Manchuria, and the small kingdoms along China's southern and western frontiers. It is likely that there were places where neither tradition was adopted; these areas would include the peoples living in tropical forests in and near Burma (Myanmar) and in the far north of Asia.

The origins of Indian calendars are steeped in antiquity: It is possible that even in the Vedic Period (ca. 1500–ca. 600 B.C.E.), the times of the solstices and equinoxes had already been established by Indian astronomers. During the medieval era Indian calendars varied in their details in different regions of India, and there were occasional variations in the names given to parts of the calendar according to the different religions of India, especially Hinduism, Buddhism, and Jainism.

The calendars of India were influenced by the traditions of timekeeping that had developed in Mesopotamia, Greece, and China. From ancient Sumer, India derived the seven-day week. In Sanskrit the days of the week were *Ravi vaasara* (meaning the “Sun’s day”), *Soma vaasara* (the “Moon’s day”), *Magala vaasara* (“Mars’s day”), *Budha vaasara* (“Mercury’s day”), *Guru vaasara* (“Jupiter’s day”), *Shukra vaasara* (“Venus’s day”), and *Shani vaasara* (“Saturn’s day”). From the Greeks, Indian mathematicians borrowed trigonometry, which provided the mathematical techniques for calculating the lengths of the solar year and the movements of the planets. From the Chinese, India derived the concept of coordinating lunar years with solar years.

The Indian solar calendar divided the year into six seasons, with each season having two months, making 12 months altogether. The seasons were *Vasant* (roughly corresponding to late spring), *Grishma* (summer), *Varsha* (the monsoon season), *Sharad* (fall), *Hemant* (early winter), and *Shishir* (early spring). In addition to a solar calendar, the Indians used a lunar calendar. It usually had 12 months. Depending on local custom, a lunar month began either with the new moon or with the full moon. The first month of the lunar year was known as *Chaitra*. Indian calendar makers compared the movement of the moon to the earth’s movement around the sun; in order to keep the lunar years in agreement with the solar year, they would add a 13th month every few years. This added month would be identified as *adhika*, meaning that it was an extra month. The next month would be identified as *nija*, meaning that it should be counted as the original month. Thus, *adhika Chaitra* would be followed by *nija Chaitra*. The *nija Chaitra* would have been considered the first month of the new year. The lunar calendar usually was used to keep

track of special religious days. There might be more than one lunar calendar for any year, varying by region and religion. The variations included changes in the names of the months and in the way in which extra months were added.

Chinese calendars were inspired by the regular movements of celestial bodies across the sky. In ancient times the Chinese had calculated the length of the solar year at 366 days. In the fourth century C.E., however, the Chinese fixed the solar year at $365\frac{1}{4}$ days. The Chinese solar year had 12 months, which Chinese astronomers marked off by following the movement of the handle of the constellation known as the Big Dipper across the sky. The movement of the planet Jupiter was especially important to the Chinese, and they noted that it orbited the sun approximately every 12 years. They called Jupiter the "Year Star." From the 12 years of Jupiter's orbit the Chinese derived their 12-year cycle of the zodiac, with each year named for an animal, as well as their 12 months of the year and their 12-hour cycle of day and night. Also important were the movements of the moon; the Chinese calendar makers combined a lunar calendar geared to the phases of the moon with a solar calendar geared to the $365\frac{1}{4}$ -day year.

The Chinese calendar makers were considered to have a sacred duty: They had to predict key events during the year so that the emperor would be sure to conduct religious rituals at the proper time. Failure to do so could result in chaos and disaster, because when the monarch failed to fulfill this sacred duty, the harmony between the earth and the heavens might be disrupted, releasing violent forces on the earth. This belief not only made the predictions of annual events important but also made the calendar-making process so vital that access to its results was often limited to the imperial family. Chinese calendar makers continually ran into problems of accuracy. For instance, they discovered that the solstices drift about 20 minutes per year; this discovery was hard to square with their belief in a consistent, unchanging universe. Another problem was that months based on the phases of the moon did not fit easily into a solar year.

The Chinese calendar makers made a new calendar every year by placing a stick vertically in the ground and watching its shadow. When the shadow reached its shortest point of the year, the calendar makers fixed that day as the summer solstice and then calculated the occurrence of all the other annual events from it as well as whether an extra month would be needed to keep the lunar months in agreement with the seasons.

This Chinese calendar was accepted by China's neighbors for political reasons. For most of the medieval era Chinese recognition of another nation as an independent state was coveted by other nations in eastern Asia because it conferred great prestige. Among the obligations a nation undertook

when it was recognized by China was to adopt the Chinese calendar. Thus the Chinese calendar became the standard measure of time in eastern and central Asia. Japan began using the Chinese calendar in 645, although it was not consistently used until the 700s. In 839 Japan and China broke off relations, which meant that Japanese rulers no longer received updated Chinese calendars. This, in turn, resulted in Japan's calendar quickly falling out of line with the Chinese calendar.

There were two dominant approaches to dividing up the period of daylight in Asia and the Pacific in the medieval period. The more common approach involved stretching the daylight hours to fit the period of sunlight as spring gave way to summer and shrinking them as summer turned to fall. For most people this seasonal variation made sense because their lives were ones of working from sunrise to sunset, regardless of the length of that period. For instance, in Japan daylight was divided into six units and night was divided into six units regardless of the length of day or night. An alternative approach was the one most modern people are familiar with, namely, the division of each day into rigid time periods that remain the same no matter how long daylight lasts.

For some peoples in the medieval period the measuring of hours and minutes mattered so little that it is unlikely that they were motivated to make timekeeping devices. These people would have been found in rural areas that did not observe the daily rituals common in cities. Timekeeping devices often were very simple. In China and India people told time by burning a stick of incense of a certain length that was known to require a specific amount of time to burn down. This method was imprecise but was adequate to remind someone to prepare a meal or to perform a religious ritual.

It is unclear when water clocks, called clepsydras, first appeared in India and China. Some historians believe that water clocks were introduced to eastern and southern Asia from the Near East, but others maintain that water clocks were invented independently in several parts of Asia. There is evidence to support both points of view. One kind of water clock consisted of a basin with regular marks along its inner side. The basin was filled with water that drained from it at a regular pace; as the level of the water lowered, the newly revealed marks indicated the passage of time.

Another timekeeping device was the sundial. In India the sundial seems to have been influenced by the ancient Greeks and served to divide the day into hours. Chinese sundials often consisted of a rod stuck vertically in a circular surface. In an effort to measure the time of day with precision, the Chinese divided the circle into 100 equally wide units, across which the shadow of the stick fell as the sun crossed the sky.

This method of keeping time proved to be unsatisfactory because it did not work in the dark of night or on a cloudy day.

China made the most rapid progress toward the invention of a reliable mechanical clock of any country in Asia or the Pacific during the medieval era. In 725 the astronomer Yixing and the engineer Liang Lingzan built an escapement for a device called the “water-driven special bird’s-eye-view map of the heavens.” The development of the escapement, which is a mechanism that converts the force of a power source (usually a pendulum or balance wheel) into equal specific movements of a gear train, was a crucial step toward creating a truly mechanical clock. The device constructed by Yixing and Liang Lingzan was intended primarily to keep track of the movements of heavenly bodies.

Around 1088 an armillary sphere was built on the grounds of the imperial palace under the direction of a royal minister named Su Song. An armillary sphere is a device composed of movable rings depicting the movements of astronomical bodies. This device included an escapement that measured the passage of time. It had no face but had small mechanical figures built into it that rang bells and beat drums to toll the hours of the day. It stood about 40 feet high, with a wheel about 10 feet wide that was turned by water. Measured scoops of water, always the same amount, turned the wheel, which in turn moved the escapement the same distance each time a scoop of water was poured. This machine was the closest that any country in the world had come to creating a fully mechanical clock in the medieval period. Su Song’s work was eventually destroyed during the Mongol invasion of China. The design notes for its construction survived, however, and modern engineers have been able to duplicate it. Its importance for the world was that engineers in the Near East and Europe learned of its existence and thereby knew that it is possible to build a complex functional escapement for measuring time.

EUROPE

BY JULIE-ANN VICKERS

For most of the medieval period daily activity was linked to the natural rhythms of day and night as well as the passing of the seasons. The methods used for calculating the calendar year and measuring the hours were often imprecise and confusing. These problems, however, were the concern primarily of an educated minority and had little effect on the lives of ordinary people. However, by the end of the Middle Ages the calendar and daily time had become increasingly standardized and their measurement more accurate, owing to developments in technology and astronomy. These developments, in turn, had a profound economic and social impact on all levels of society.

The civil calendar used in Europe throughout the medieval period was the same as that introduced in Rome by Julius Caesar (100–44 B.C.E.) in 46 B.C.E. Known as the Julian calendar, this was a system of 12 lunar months synchronized with a solar year of 365.25 days. Every fourth year was a leap year, to account for the additional quarter day every year. Unfortunately, an error in calculation meant that the Julian year was 11 minutes, 46 seconds too long. This error added up over the years so that by the 13th century, the calendar year was seven days in arrears. Although medieval scholars had identified the source of the error and found this disruption to the calendar year problematic, the issue was not finally resolved until the reform of the calendar by Pope Gregory XIII (1502–85) in the 16th century.

Ancient Rome also supplied the Middle Ages with a system for designating the days of the month. Unlike the sequential system of numbers we use today, known as direct reckoning, in the medieval period dates were allocated in anticipation of fixed points in the month. These fixed points were known as *Kalendae* (the first day of the month and the name from which we derive the word *calendar*), *Nonae* (the fifth or seventh day), and *Idus* (the 13th day—except in March, May, July, and October, when it was the 15th day). Inclusive counting was also used, and therefore March 27 was called the sixth day before April 1 (*ante diem VI Kalendas Apriles*). Aside from errors caused by the use of inclusive counting, the previous example highlights another major problem with this system: Days from the latter half of each month were designated using the name of the following month. This practice was a common source of confusion for medieval readers and writers. The advantages of using direct reckoning, or a sequential system, were recognized early on in England, and this system had become common there by the end of the 12th century. In the other major centers of Europe direct reckoning had become standard by the later Middle Ages.

An even greater source of perplexity in the medieval calendar was the date for the beginning of the year. There were at least six different dates in use during this period. In ancient Rome the first day of the year was January 1, and during the Middle Ages this date was still generally known as New Year’s Day. Nevertheless, this date was the least used to mark the start of the year, probably due to its association with the religion of ancient Rome. Another Roman date, March 1, was sometimes adopted but was officially recognized only in Venice. The Byzantine Empire commenced the year on September 1, a date inherited from the ancient fiscal year. The other three dates were religious in origin and became popular because they were associated with festivals commemorating important events in the life of Jesus. By the 10th century

December 25, the date of the Nativity of Christ, had been established as the start of the year throughout western Europe. However, March 25, the date of the Annunciation, gradually gained in popularity and had become the dominant usage by the late Middle Ages—particularly in England, where it remained in use until 1752. In France, Easter Sunday was sometimes employed as the start of the year, but its popularity remained limited because the date on which it fell varied from year to year.

While the confusion generated by different aspects of the medieval calendar caused problems for the scribes and scholars of the period, it had little impact on the lives of the bulk of the population. In a period when many people were unsure of their date of birth, time was experienced as a deeply cyclical phenomenon marked by events rather than by numerical dates. The annual round of religious festivals and the seasonal work of the agrarian year were the two most important cycles of time for the majority of people. From the ninth century onward calendars providing a list of

feast days commonly accompanied liturgical service books. One of the most common types of calendars in both eastern and western Europe during this period was a liturgical calendar, containing illustrations of the type of agrarian work carried out in each month. These were known as the “labors of the months.”

For most of the medieval period the hours of the day, like the calendar year, were linked to natural cycles and religious observance. The primary means of dividing each 24-hour cycle was into two 12-hour periods of day and night, starting, respectively, at sunrise and sunset. Daytime in this period, therefore, referred literally to the hours of natural light available for work. These 12-hour periods were accorded to day and night regardless of the season so that a system of variable hours had to be used; for instance, an hour of daytime in summer was necessarily longer than an hour of nighttime in summer in order to maintain an equal number of hours in each period. Numbered hours, however, were rarely used to indicate time. Instead, the canonical hours—otherwise known as the Divine Office or the Liturgy of the Hours—signaled the passage of the day. These were the hours in which the monks engaged in formal prayer; they were divided into matins (dawn), prime (daybreak), terce (morning), sext (midday), none (afternoon), vespers (evening), and compline (night). In every village church bells rang out these hours, alerting lay people to the liturgical time of day.

In order to observe the canonical hours, people needed to be able to determine the approximate time of day. Prior to the 14th century there were four main methods available to measure time. One method was the observation of the movement of celestial bodies in the night sky. In this way the need to keep the canonical hours led to advances in applied astronomy. Burning candles marked with gradations was another way for determining how much time had passed, particularly at night. But candles were expensive in this period and therefore were used sparingly. One of the more common instruments for determining the hour in the earlier Middle Ages was the sundial. This instrument measured time by the position of the shadow cast by a central rod onto a surface marked with the hours; its major drawback was the need for a direct source of sunlight. Clepsydras, or water clocks, were also commonly used in this era. They measured time by the regulated flow of water into or out of a graduated vessel, thereby circumventing the limitations of the sundial. None of these methods of timekeeping was precise by today’s standards. However, by the early Middle Ages water clocks were already well developed; when calibrated with the sundial, they were more than adequate for keeping the canonical hours.



Calendar showing the month of November, with saints' days; France, ca. 1495–ca. 1505 (Courtesy the Morgan Library and Museum)

In the 13th century the need for a more precise timekeeping instrument developed in response to the advancing field of astronomy. It is likely that the technology for mechanical clocks first appeared in northern Italy in the late 13th century—but because medieval Europeans used the same word for both the water clock and the mechanical clock, the origins of the latter remain obscured. By the early 14th century the first mechanical clocks had begun to appear in towns. The technology behind these clocks was the escapement system, a weight-driven mechanism that controlled the periodic movement of a wheel. These first clocks were huge and lacked numbered faces; they were placed in towers and did not sound the hour automatically but relied on someone to ring a bell in response to an alarm. In 1335 the first fully automatic clock was erected in Milan, and by the end of the 14th century mechanized clocks were sounding the hours in major urban centers throughout Europe.

The transition to mechanized time, however, did not immediately bring precision and uniformity to timekeeping. Despite their technological sophistication, the first generation of mechanical clocks kept time very poorly, often losing or gaining time in a single 24-hour period. There was also confusing variation from city to city regarding the point of day allocated for the zero hour, which could be noon, midnight, or, more commonly, sunrise or sunset. Despite being a source of bewilderment for both travelers and merchants, this situation continued well into the Renaissance. There was a similar lack of uniformity in the length of the hours. In order to assist the calculations of astronomers, mechanized clocks were originally designed to keep uniform hours, regardless of the season. In some towns, however, the clocks were adjusted to maintain the centuries-old tradition of variable hours. The initial impact of mechanized clocks was also limited by their sheer size. Moreover, it is thought that hourglasses, the first evidence of which appears in ships' records of the 14th century, developed in response to the need for a portable and reliable means of measuring time at sea.

Despite these problems, the development of mechanized time represented nothing less than a technological revolution. At a fundamental level, the building of mechanized clocks in urban centers represented the separation of time, and therefore people's daily activity, from the domain of the church. The daily hours were no longer linked to religious observance but became numbered, secular, and uniform. In the economic sphere the ability to measure time accurately and publicly led to a more precise regulation of labor hours. Combined with the increasing uniformity of the calendar, mechanized clocks also allowed merchants to carry out their business transactions between cities more efficiently, thereby facilitating trade and productivity.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Timekeeping has been important to the Islamic world since Muhammad gave instructions on the kind of calendar to be created and on the five daily prayers every Muslim must say at certain times of the day. The research and invention that went into organizing calendars and timing the hours of the day were part of the scientific achievement that marked the Islamic world.

Umar the Great (r. 634–44), the second caliph, established the Islamic calendar in 634 or 638. The first year of the calendar was the year in which Muhammad moved with his followers from Mecca to Medina. Thus year 1 of the Islamic calendar began in year 622 of the Christian calendar. The first day of the first year of the Islamic calendar fell on July 16. The Islamic year had 354 days rather than the 365 of the Christian calendar, which means that soon after year 1, the years of the Islamic and Christian calendars ceased to correspond. The 365-day calendar is a solar calendar; that is, it is based on the time it takes the earth to orbit the sun. The Islamic calendar was a lunar calendar, based on the time it takes the moon to go through its phases.

To keep them in sync with the solar year, lunar calendars must be adjusted by the addition of days to certain months or by adding one or more months to a particular year. Muhammad specifically forbade the making of such adjustments, however, because God created the lunar cycle for people to measure the passage of time, and God's cycles were not to be tampered with. Even so, the moon's phases do not follow a precise set of days, meaning that Islamic months varied from 29 to 30 days in length. The order of the 12 months of the resulting calendar was as follows: Muharram, Safar, Rabiul-Avval, Rabiuth-Thani, Jamadiyul-Avval, Jamadiyul, Thani, Rajab, Shaban, Ramadan, Shavval, Dhil-Qadih, and Dhil-Hijjijh.

The first, third, fifth, seventh, ninth, and 11th months were each 30 days in length, with each of the other months 29 days long. This is how the 12-month year totaled 354 days. Although the first day of Muharram is the first day of *ras al-sana*, the new year on the Islamic calendar, it was not celebrated during the medieval era. The most important month on the calendar was Ramadan, the month that Muhammad received the Koran from God. During that month Muslims were forbidden to wage war, except when attacked, and they were supposed to fast during the day.

Within the limitations of their faith Muslim scholars strove to create the most precise 354-day calendar possible. Muslim astronomers discovered that even by alternating 29- and 30-day months, a slight drift in following the phases of the moon caused an extra day to appear every few years.

They compensated for the drift by creating a 30-year cycle during which one day was added to Dhil-Hijjah in the second, fifth, seventh, 10th, 13th, 16th, 18th, 21st, 24th, 26th, and 29th years.

The years of the Christian calendar sometimes are preceded by the abbreviation A.D., which stands for *anno Domini*, meaning “in the year of our Lord,” which is itself short for the original phrase, *anni Domini nostri Jesu Christi*, meaning “in the years of our Lord Jesus Christ.” The years of the Islamic calendar are often preceded by A.H., an abbreviation for *anno Hegirae*, meaning “in the year of the migration,” referring to Muhammad’s move to Medina. The designation A.H. probably was not used by Islam in the medieval era but came into use in the Western world to distinguish Islamic dates.

A few names of the months on the Islamic calendar seem to have come from an older Arabian lunar calendar, now apparently lost. Other lunar calendars developed in the Near East occasionally added a month to keep certain months within certain seasons. Because Muhammad forbade that common practice, Islamic months drifted 11 days at a time from one year to the next, relative to the solar year, which meant that the months did not correspond to seasons. This created a significant problem for farmers, whose work depended on keeping track of the seasons so that they could plant crops when they should and know when harvests should take place. Keeping track of rainy and dry seasons was especially important in many areas of the Islamic world.

The result of this problem was that the Islamic calendar was closely followed in cities, but in rural areas other calendars were followed for everyday life and the Islamic calendar for tracking holidays and religious observances. In some parts of the Near East and North Africa people found that the Christian calendar, only about 100 years old, was the easiest to use. Elsewhere farmers employed lunar calendars such as those of the Sumerians, Greeks, and Jews. The Sumerian year had 360 days divided into 12 months of 30 days each; the Babylonians added the 24-hour day. The Greeks had a 354-day calendar to which they added 90 days every eight years. The additional 90 days were added haphazardly. Many Islamic farmers chose to use calendars similar to the Jewish one, in which months and seasons were linked. Developed to meet farmers’ need to track the seasons, the Jewish calendar had a 19-year cycle, with each year having a normal 12-month cycle into which an extra month was added during the third, sixth, eighth, 11th, 14th, 17th, and 19th years. The extra month came after Adar, the sixth month of the year, and was called Second Adar. Although a given day of the month could drift by about 28 days from one year to the next, days of the month remained roughly in the same season from year to year, enabling most Muslim farmers to track seasons.

Measuring the hours of the day has always been important to Muslims because the Koran requires them to pray five times a day at certain hours. Timepieces therefore became a special interest to Muslim engineers. Unfortunately for the modern historian, almost every timing device used in the medieval Islamic world has been lost, with the remains of a couple of water clocks in Morocco being the only exceptions. Historians disagree greatly about which cultures invented what device or important enhancement, but there was probably cross-pollination between the Islamic world and China. Indian devices most likely became known to the Islamic world when much of India was conquered by Muslims, and Muslim engineers credited ancient Greek scientists for providing essential knowledge in developing timepieces.

In general there were sundials, water clocks, candle clocks, and possibly mechanical clocks and sand clocks. The issue of who created the first mechanical clock is a murky one, with credit usually going to European inventors of the 1300s, although some Islamic water clocks included mechanical works in their movements. What is known about Islamic clocks comes mostly from written sources and pictures made of the clocks. Many medieval Muslim engineers made their discoveries public or published treatises on how to make devices such as clocks. The most important of these writers was Ibn Ismail ibn al-Razzaz al-Jazari (1136–1206), usually called simply al-Jazari. He invented or adapted about 60 devices, including water clocks and candle clocks.

The most important clock for the medieval Islamic world was probably the water clock, also called a clepsydra, a Greek word meaning “steal water.” A water clock uses the regulated flow of a liquid to keep track of time. The liquid was usually water but could be other liquids, and late in the medieval era Muslim engineers may have developed a clock that used the flow of mercury. The clock that was the most famous in the medieval Islamic world was al-Jazari’s elephant clock, which may have stood five feet high and was made in the shape of an elephant.

Al-Jazari credited the writings of Archimedes for inspiring his elephant clock, which tracked the daylight hours in 12 parts, regardless of how long the day was. Thus in the summer, with its long days, hours on the clock lasted longer than in winter. It had two cisterns inside, one above the other, with floats that acted as stoppers on the openings through which water flowed. The passage of water from the upper cistern to the lower one regulated the time, while the floats occasionally plugged the holes, thus keeping water pressure steady in the upper tank. Every half hour the water in the lower cistern was heavy enough to pull a string, releasing a ball that would fall into the image of a snake, which would tip forward, pulling other strings that moved the clock’s hands. By adjusting a flow regulator at the

IBN ISMAIL IBN AL-RAZZAZ AL-JAZARI (1136–1206)

Usually known simply as al-Jazari, he was one of the great engineers of the medieval world. Born in northern Mesopotamia, between the Tigris and Euphrates rivers, al-Jazari was the son of the chief engineer of the Artuqid Dynasty of Diyarbakir. He had become the chief engineer before 1181, when the sultan Nacer ed-Din Muhammed ibn Qura told him to write a book about engineering.

Al-Jazari responded by researching the state of Islamic engineering and then setting out its principles in carefully detailed language along with illustrations. So complete were his descriptions that modern engineers have been able to follow his instructions to recreate his designs. He finished his book in about 1204, and it was published in 1206. The book is known as *Kitab fi ma rifat al-hiyal al-handasiyya*, roughly meaning “Book of Knowledge of Ingenious Mechanical Devices.”

More than a mere chronicler of other people’s work, al-Jazari was an inventor as well as a designer, and his book describes some of his inventions along with the techniques he used to build the other machines he writes about. He was both a master hydraulic (water) engineer and a master mechanical engineer, seemingly at home explaining irrigation machines as well as gears and levers. He based much of his work on the writings of the ancient Greeks and on his own wealth of practical experience.

Although al-Jazari is probably most famous for his water clocks, his devices for moving water from streams or canals to irrigation channels or storage cisterns were probably of the greatest practical value to his audience, because managing water was a constant issue in the Near East and North Africa. He created artificial singing birds, and he designed mechanical musicians that had gears and levers that moved the figures and made the sounds. Perhaps because he had a sense of humor about his work, his book included inventions of a less spectacular nature, such as a cup that appeared to be full of water yet poured nothing and a cup that appeared empty but did, in fact, pour water.

connection between the two cisterns, a timekeeper could lengthen or shorten the hours for the day. The clock needed to be started at the break of dawn.



A candle clock from a copy of al-Jazari's treatise on automata (opaque watercolor, ink, and gold on paper); Syria, 14th century (Freer Gallery of Art, Smithsonian Institution)

Whether candle clocks were used extensively or not is not known. A candle clock consisted of a candle of a specific weight placed in a metal tube that was capped, with a groove around the cap's edge and a hole for the wick. As the candle burned and became lighter, a device, perhaps a weighted lever, pushed the candle upward; as it rose, the passage of time could be noted in a bowl on which it stood. The groove collected wax from the burning of the candle and needed to be periodically wiped clean.

The possible existence of purely mechanical clocks and sand clocks in the medieval Islamic world is much disputed by historians. Most historians believe that sand clocks, typified by the hourglass, were not invented until after the medieval era, but it is possible that sand clocks were used before then, although what they looked like is a mystery. As for mechanical clocks, the clock designers of the Islamic world were interested in making devices that would track time independent

of outside interference, and the general interest in mechanical devices among Muslim engineers resulted in water clocks with extensive mechanical movements, much like the elephant clock's weights and strings.

An inventor named Abbas ibn Firnas is said to have invented a timekeeping device in the 800s that was much like a modern watch, but what it looked like or how it worked is not known. What is known is that by the 1200s engineers in Islamic Spain were creating clocks for public places. Their work may have been the foundation for the first fully known examples of mechanical clocks that emerged in the mid-1300s elsewhere in Europe.

See also AGRICULTURE; ALCHEMY AND MAGIC; ARCHITECTURE; ART; ASTRONOMY; DEATH AND BURIAL PRACTICES; EDUCATION; FESTIVALS; INVENTIONS; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; SCIENCE; TRADE AND EXCHANGE.

FURTHER READING

- Anthony Aveni, "Pre-Columbian Images of Time." In *The Ancient Americas: Art from Sacred Landscapes*, ed. Richard Townsend (Chicago: Art Institute of Chicago, 1992).
- Brian S. Bauer and David S. P. Dearborn, *Astronomy and Empire in the Ancient Andes: The Cultural Origins of Inca Sky Watching* (Austin: University of Texas Press, 1995).
- "Cosmovision, Religion and the Calendar of the Aztecs." In Eduardo Matos Moctezuma and Felipe Solís Olguín, eds., *Aztecs* (London: Royal Academy of Arts, 2002).
- Laurance R. Doyle and Edward W. Frank, "Astronomy of Africa," in *Encyclopaedia of the History of Science, Technology and Medicine in Non-Western Cultures*, ed. Helaine Selin (Boston: Kluwer Academic, 1997).
- David Ewing Duncan, *Calendar: Humanity's Epic Struggle to Determine a True and Accurate Year* (New York: Avon Books, 1998).
- Bridget Ann Henisch, *The Medieval Calendar Year* (University Park: Pennsylvania State University Press, 1999).
- Cyril A. Hromník, "Gitlane: Where the Moon Sickles Strikes," *Nordic Journal of African Studies* 8, no. 2 (1999): 1–17.
- Chris Humphrey and W. M. Ormrod, eds., *Time in the Medieval World* (York, England: York Medieval Press, 2001).
- James E. Lindsay, "Christian and Islamic Calendars with Conversion Table." In *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- B. M. Lynch and L. H. Robbins, "Namoratunga: The First Archaeoastronomical Evidence in Sub-Saharan Africa," *Science* 200 (1978): 766–768.
- Colin McEwan and Maarten Van de Guchte, "Ancestral Time and Sacred Space in Inca State Ritual." In *The Ancient Americas: Art from Sacred Landscapes*, ed. Richard Townsend (Chicago: Art Institute of Chicago, 1992).
- Edward Graham Richards, *Mapping Time: The Calendar and Its History* (New York: Oxford University Press, 1999).

► children

INTRODUCTION

The vast majority of the population of the medieval era left no record of its feelings toward children. Poetry, paintings, sculpture, and other art forms give an indication of attitudes to children and the treatment of childhood, but such sources focus largely on elite Europeans. Children in Asia, Oceania, Africa, and the Americas in this period are the subject of few sources. Nevertheless, some generalizations can be drawn. While some cultures treasured children, others overworked them and worse.

The historian Philippe Ariès declared in 1960 that the idea of childhood in medieval society did not exist. To an extent, he was correct. Among the ordinary people of Korea, India, Japan, and China children were needed to help support the family. They could not always enjoy the luxury of play, especially when their labors on the farm were critical for the family's survival. The wealthier families of Asia could afford to give their children a childhood. These youngsters could play and study instead of engaging in labor from dawn to dusk. In medieval Australia and Africa both boys and girls were much indulged. Africans rarely disciplined their children. Australian children were given toy hunting tools to prepare them for lives as hunters. Male children in the Americas were taught to hunt, while female children were taught to gather.

In Europe, in the time between 300 and 800, ideals about childhood underwent substantial change. The treatment of children became gentler, partly due to the influence of Christianity and partly because of more humane traditions of child rearing brought by the "barbarians" to the former classical world. The Christian belief in the need of every human being for salvation immediately implied a higher status for young children. They needed to be brought as quickly as possible into the family of God. Young children were made aware that they had a soul and that their lives in the hereafter were dependent on the state of their souls.

Christians viewed infanticide as murder, in contrast to the acceptance of the practice in ancient Greece and Rome. Abandonment was judged less harshly, partly because of familiarity with the biblical story of Moses and his son. Medieval Christians extended sympathy and understanding to those who abandoned their children through poverty or other misfortune.

Children were generally marginal to medieval society, not fully part of it. Part of this marginality stemmed from the likelihood that they might die before reaching adulthood and becoming part of society. If an Incan child survived infancy, his or her relatives celebrated with a feast. While epidemic

diseases were relatively uncommon from the eighth until the mid-14th century, children succumbed to infections, famine, and malnutrition. Gregory of Tours in the sixth century movingly described a famine that first killed young children. Writing with tears in his eyes, he lamented the loss of those that were so dearly loved. Unnatural causes also claimed the lives of many children. Children were virtually unattended and thus could be the victims of crimes and accidents. To explain their deaths and disappearances, medieval Europeans revived the Greek and Roman libel that the Jews practiced ritual murder of children. The belief that Jews were capable of such atrocities fueled anti-Semitism.

Medieval children had a range of educational opportunities, depending upon their culture and status. In the Americas childhood was not even viewed as a distinct stage of life because of the shortness of life. The medieval European world recognized the first seven years of life as a separate stage of life. The second stage, up to the age of 12 for girls and 14 for boys, was a time for education, with fathers training sons and mothers training daughters. In China and India education was equally valued as a means of advancing. Elite children had the opportunity for more formal, written education. Africans educated only boys, generally giving them a religious training. For most children around the world education simply meant a gradual initiation into the world of adult work, whether through a formal apprenticeship or simply through carrying more and more tasks within the home or on the land. From an early age children were not cut off from adult society. In the outside world children were immediately part of society in which the ages mixed and in which neighbors played their part in looking after children.

AFRICA

BY AMY HACKNEY BLACKWELL

Although very few historical records describe childhood in medieval Africa, observers from modern times have noted that children in traditional societies all over Africa were treated kindly and rarely disciplined. Children throughout the continent spent their early years playing and learning how to function in their societies. Their training included life skills such as weaving and hunting and instruction in the rules of their cultures.

African mothers tried not to give birth too often. Women who lived as hunter-gatherers tended to allow the longest amount of time between births. The Bushmen of the Kalahari raised their children four or five years apart. Children nursed until they were at least four years old because it was difficult for them to eat the foods available to them. The nursing

also kept them hydrated in the dry climate. Small children rode on their mothers' backs as they wandered from place to place; some hunter-gatherers walked many miles every day in search of food or water—distances too far for young children to cover.

In farming societies children received siblings at a much faster pace. Babies typically arrived every two or three years. Infants spent most of their time with their mothers. A mother often tied her baby to her back with a sling and carried it while she went about her day's work, tending her crops, grinding grain, and cooking. Toddlers were weaned when their mothers gave birth again, and from that point on children spent much less time with their mothers and much more with other children.

With whom a child lived was determined by the clan's particular practices. Babies lived with their mothers, and though many children continued to live with their parents after being weaned, some children left their biological parents to live with their uncles. Their parents still saw them often and attended any important ceremonies involving them, but this arrangement allowed the clan to form strong relationships in several directions. The concept of family in African societies included clan; therefore, children were not moving outside the family when they left their biological parents to reside with an uncle or some other adult relative.

In many societies children were grouped by ages. A group might contain all the children within a four- or five-year range. The children in a group moved through their society's various stages together, progressing from toddlers to school-aged children and into adulthood at the same time. For most African youngsters childhood was a time to work on the skills they would need as adults and to work themselves. The youngest children, three- and four-year-olds, spent their days playing while their mothers worked in the fields. They played various games that involved singing and movement, and they engaged in imaginary play, pretending that they were performing adult tasks.

Slightly older girls (between about the ages of five and 12) acted as the village babysitters. Their mothers entrusted them with the care of their younger siblings, and the girls carried the babies around and fed them while performing their daily chores. Girls also helped their mothers in the fields, gathered wood, fetched water, washed and made clothes, wove cloth, and assumed other household responsibilities. Their mothers taught them skills specific to their regions, such as distinctive weaving patterns or pottery styles. Girls in hunter-gatherer groups accompanied their mothers on gathering expeditions, learning to identify food sources and helping to carry home the food they found. By the time a girl was 12 years old she

was usually proficient at all the skills she would need to run a household as a wife and mother.

Boys spent their childhoods in a similar fashion, engaging in work that trained them in the skills they would need as adults. In herding societies boys between about five and 10 years of age were put in charge of the herd animals. They had to bring the animals out to graze every morning and scare away any wild animals that might kill the livestock. At the end of the day they brought the animals back home and made sure they were safely secured. They also milked the livestock. Boys in farming communities might spend their days helping in the fields. Fathers taught their sons how to hunt, including how to make weapons, stalk animals, and skin and clean their prey. Boys also learned how to make farming tools, fences, houses, musical instruments, boats, and other useful objects.

Both sexes participated fully in the festivals and cultural events of their communities. Children listened to storytellers at night, learning the histories and beliefs of their cultures. At various festivals children heard adults singing traditional songs, saw them perform traditional dances, and then imitated them on the outskirts of the festival activities. Likewise, children watched sporting events and learned to play games by imitation.

Both boys and girls had time to play, though girls typically worked much harder than boys and had less free time. Children's games often imitated the activities performed by adults. They might play house or marriage or pretend to be grinding corn like their mothers. Adults sometimes stopped their own work to assist children in their play "work." Girls played a game with a loop of string similar to cat's cradle, and most children engaged in footraces, wrestling matches, and play battles. Many games included songs that the children sang while they played.

During the medieval period some African societies provided formal schooling to at least some of their children, almost always boys. Typically the schooling was religious. In Muslim areas some boys attended a school where they learned to read and recite the Koran. In Christian areas of Ethiopia some boys learned to read and write Ge'ez. But the majority of African children remained illiterate. They learned about their religions through oral transmission, listening to their leaders speak of the gods and religious obligations. These included daily prayers, the worship of ancestors, the proper sacrifices, and an individual's obligation to observe all the correct rituals throughout life.

One set of rituals was the rites of passage marking the transition from childhood to adulthood. These rites generally occurred somewhere between about the ages of eight and 14, though this varied among regions. In many societies, when children reached puberty, they went away from their villages

for a period of seclusion and training. They might go alone or in a large group.

Boys' initiation rites typically included seclusion, training, and a ritual ceremony. Often boys went off to live away from the village for a period of weeks or months. The men of the village instructed the boys on what it meant to be a man. The boys practiced skills such as moving quietly through the woods, hunting, and camping on long journeys. They might learn about routes through the wilderness to other settlements. They studied the traditions, history, and customs of their society. Some of their training might focus on warfare and the use of weapons.

In many societies the initiation into manhood concluded with circumcision or some other form of genital cutting. In circumcision the foreskin, the loose skin covering the end of the penis, is removed. Some Africans practiced subincision, in which a slit was cut on the bottom surface of the penis, exposing the urethra. Muslims, in particular, believed that circumcision was a requirement for manhood, but many traditional societies performed the operation as well. The boys being circumcised were expected to endure the cutting without sound or movement. Some Africans practiced other kinds of cutting as well; the Bushmen, for example, cut patterns into boys' faces, chests, and backs and rubbed dirt into the cuts to form decorative raised scars. When the manhood initiation was completed, the village usually held a celebration to welcome the boys back. The boys rejoined their communities as men, with all the rights and privileges attached to that rank.

Girls went through their own initiations into womanhood. In many cultures, when a girl first menstruated, she was expected to live in seclusion for some time, either in a special hut in her village or in a location slightly removed from the settlement. The women of her family and village instructed her on the proper roles and duties of women and prepared her for marriage. The girls learned the taboos associated with menstruation, which often included not touching tools used by men in hunting. Some Africans pampered a girl at this juncture, carrying her on their backs to prevent her from touching the ground and feeding her special foods.

Many cultures performed a version of genital cutting on girls. Female genital cutting, sometimes called circumcision, appears to have existed long before the advent of Islam in Africa. Different cultures practiced different forms of cutting. In some societies a girl's clitoris or just its hood was cut off. In others her inner labia was cut away. In the most extreme form of cutting her inner labia and clitoris were removed and her outer labia cut and sewn together, leaving only a small opening for urine and menstrual blood to escape. People believed that this procedure was necessary to make girls faithful

wives. As with boys, girls were expected to endure the pain in silence. Girls in some societies had their skin cut in decorative patterns to make them more beautiful.

Many Africans permitted adolescent boys and girls a wide degree of sexual freedom. Girls and boys might engage in sexual play together before puberty. In most cultures women married much older men, and girls often set their sights on older men. Among the Maasai, for example, it was not uncommon for men to have prepubescent girlfriends. Teenage boys in most cultures could not marry until they were quite a bit older, even if they had already passed the manhood initiation. In some societies they were encouraged to form relationships with older women, typically widows.

THE AMERICAS

BY ANGELA HERREN

While little information exists about childhood in early American cultures, archaeological data and material culture remains suggest that these societies welcomed children into the world and celebrated when they defeated the high infant mortality rates. In these societies women raised children, teaching them to participate in community and household labor as soon as they were capable. Perhaps as the result of shorter life spans, early American peoples did not conceive of childhood as a distinct era in one's life. Parents educated children on their societal roles early in life. Skeletal remains indicate that many cultures engaged in the practice of cranial deformation, strapping boards to the soft skull of an infant to induce a permanent profile of aesthetic value in the culture. Spanish and mestizo accounts from the 16th century provide the most detailed information on childrearing in the Aztec and Incan cultures.

Many native North American children grew up in nomadic or seminomadic communities until around 1000, when some groups established a more sedentary lifestyle based on agricultural production. Native North American women typically carried their children on cradleboards on their backs while they traveled or worked, and many groups practiced cranial deformation by tying a flat board to the child's forehead. As children grew up, their parents and relatives taught them the duties and values of the community.

The Mississippian people (ca. 750–ca. 1500), who inhabited the area around the Mississippi River basin, taught their children to perform household and community tasks and to respect the rituals of the dead. Girls learned to perform such tasks as planting and caring for crops, collecting firewood, weaving, preparing ceramics, drying meat, and caring for younger children. Boys eventually learned important male activities, like hunting, trading, felling trees, clearing land,

and engaging in warfare. Like the Adena (ca. 1000 B.C.E.–ca. 200 C.E.) and the Hopewell (ca. 200 B.C.E.–ca. 400 C.E.), inhabitants of the area around southeastern Ohio, the Mississippians interred their deceased with many goods and precious items in great earth mounds. While the Adena often shaped their mounds like animals, the Mississippians built rectangular mounds and used them as bases for temples. Children learned to respect the religious official known as the Great Sun and to participate in the ritual life of the community. For recreation, children played with toys of wood and bone, eventually learning to race, gamble, and play chunky (a game played with stones and spears) like their elders.

The Anasazi (ca. 900–ca. 1300), Hohokam (ca. 500–ca. 1400), and Mogollon (ca. 500–ca. 1400) cultures of the American Southwest began to live more sedentary lives around 900–1100, though they remained seminomadic until the arrival of Spaniards in the mid-16th century. Traditionally, male children learned to hunt deer, rabbit, and other animals with spear-throwers and eventually bows and arrows, while female children learned to gather fruits, roots, and nuts. In the more sedentary societies children learned to clear land and cultivate corn, squash, and beans. Anasazi boys learned to weave baskets, and girls learned how to make and paint ceramics. Ball courts and platform mounds appear at some sites around 550–900, indicating that children would have been exposed to religious and communal activities.

The Taíno of the Greater Antilles, one of the best-documented cultures of the Caribbean, raised children in small chiefdoms until the arrival of Christopher Columbus (1451–1506) in the late 15th century. According to European accounts, mothers used padded boards to carry children on their backs and practiced cranial deformation. Children were born into either the *naboria*, a lower class that performed hard labor, or the *nitaíno*, the upper class. Owing to the warm climate, Taínos wore little clothing, but they decorated their children with jewelry and protective amulets. Children grew up in small, thatched-roof dwellings that surrounded the central plaza of the village. Their parents taught them to perform everyday labors, like cooking, hunting, fishing, and cultivating staple crops, such as cassava. At times warring neighbors called Island Caribs seized women and children in a process known as bride capture.

The Aztec, a culture that dominated central Mexico in the 16th century, celebrated the birth of their children with many rituals and festivities. Soon after a woman gave birth, a diviner arrived to review the calendar and to determine the nature of the day sign under which the child had been born. For example, the day sign 1 Monkey signaled a future in the creative arts, while 7 Flower produced good craftsmen. The diviner could mediate the effects of a negative day sign by

choosing an auspicious date for the naming ceremony. During the naming ceremony the midwife ritually bathed the child, and guests presented gifts. Boys received a small warrior's shield and arrows, and girls received a spindle whorl, a reed basket, a spinning bowl, a sweeper, and a broom. These gifts signaled the gender-specific tasks in which all community members participated. Boys often received more specialized craft symbols as well. If their day signs permitted, they might follow in the footsteps of their fathers and receive a carpenter's awl, a feather worker's obsidian knife, a scribe's brush, a goldsmith's tool, or another such object as a symbol of their probable trade.

Sixteenth-century sources indicate that Aztec children lived highly regulated lives. For example, custom dictated the number of tortillas a child was allowed to eat per day at different ages. Parents expected young children to stay close to home, where they learned to perform household chores. If children did not abide by strict behavioral codes, they received punishment. Naughty children were made to breathe the smoke of burning chilies.

Sometime in the early teenage years Aztec children attended school. Children of lords and nobles studied under priests at the *calmecac*, a school associated with the temple. Children of commoners typically attended the *telpochcalli*, a school with military emphasis, though they could attend the *calmecac* if they showed exceptional ability. Both schools taught song and dance from manuscripts painted with the ancient Aztec pictographic writing system. Children at the *calmecac* focused on history and religion, while *telpochcalli* students learned more about the military success that held the empire together. While women's roles typically centered on the home, some women occupied important ritual, social, political, and professional positions in society. Around the age of 20, Aztec couples married and began to have their own children.

At the time of the 16th-century Spanish conquest, indigenous inhabitants of Costa Rica, Panama, and Colombia raised their children in chiefdoms with varying degrees of social complexity. Children learned practical skills like farming, fishing, and preparing food, and they learned cosmological concepts from designated spiritual leaders. Elite objects made from ceramic, gold, feathers, jade, and other materials taught children simultaneously about social roles, spiritual concepts, and the many animals, birds, and insects of Central America.

Like the Aztec, the Inca, who dominated the Andean region of South America in the 15th and 16th centuries, marked important changes in a child's life, though they waited much longer than the Aztec to celebrate. While Incan mothers bathed their children shortly after birth, little formal celebra-

tion occurred until a mother weaned her child, around one year of age. Mothers strapped infants to their backs while they worked or placed them in cradles to rest. According to 16th-century accounts, mothers picked up their children infrequently, as a way to acclimate them to the hardships of adulthood. Once a child had survived infancy and had grown healthy and strong, adult friends and relatives gathered to celebrate with feasting. During a ceremonial ritual, guests cut the child's nails and locks of the child's hair, and an adult male relative named the child. Celebration and ritual also accompanied the onset of puberty; at this time young adults received a new, permanent name, given to them by an important adult male relative.

Most Andean children spent childhood learning to perform household duties and playing with dolls, tops, figurines, slings, and other toys. By the 16th century male children of Incan nobles were attending school in Cuzco, the Incan capital, for four years. Under wise men, they studied oratory, Incan history, religion, warfare, and the use of the quipu, an accounting device made of knotted strings. "Chosen women" between the ages of 10 and 14 also attended school for four years, learning how to cook, weave, spin, prepare corn beer, and perform other domestic activities. Selected from among the conquered peoples of the Incan Empire and from noble families in Cuzco, these women were revered for their great beauty. Most of the girls became teachers, temple caretakers, or secondary wives to the Incan ruler. Some of the most beautiful became sacrifices to the gods of the Inca.

During a ceremony dedicated primarily to the sun god Inti, the Inca chose a particularly beautiful child between the ages of 10 and 15 to offer as a sacrifice. After feasting and celebration that brought great honor to the victim's family, ritual leaders took the child to a mountaintop. After killing the child, the Inca interred the body with ceremonial garments and small toys. The Inca valued the purity and perfection of children and believed that human sacrifice was the highest form of offering. Scholars suggest that these rituals occurred on momentous occasions, such as a natural catastrophe, a war, or the coronation of a king. While Incan sacrifice is well documented, earlier examples of human sacrifice have been found as well. For example, in 1995 archaeologists unearthed the remains of 42 sacrificed adolescents at a Moche (ca. 1–ca. 600) site called Huaca de la Luna.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The lives of children varied greatly among the many cultures of Asia and the Pacific and often varied significantly within an individual culture over the 1,000 years of the medieval era.

In some cultures children were treated with great indulgence, but in others children were abused and overworked.

Care should be taken in making generalizations about how medieval Australians treated children, partly because Australians had many cultural groups with varied perspectives of what children were and should be. Further, archaeological evidence indicates that cultural practices relating to children changed over time, with some once-strong practices abandoned by the time Europeans arrived in Australia. For example, excavated grave sites reveal the remains of men surrounded by ornaments, indicating that they held high status in their communities. With them are the remains of infants. Although archaeologists theorize that infanticide was part of the burial ritual for a man of high status, the reasons for the sacrifice are not known because the practice seems to have ended long before Europeans arrived to record the customs of the Australians.

As ghastly as infanticide is, it was only one side of how Australians treated their children. In general, medieval Australian children probably were treated with much indulgence, even being carried when they were sturdy enough to walk. As soon as they could stand and play on their own, they were introduced to toys such as small spears and hatchets. The ends of spears were blunted and wrapped in kangaroo or similar skin to protect the youngsters. Beginning at about age five both boys and girls were shown how to hunt game and identify useful plants as well as how to find their way home if they became separated from their groups.

In Micronesia the elders particularly indulged boys, who were often allowed to do as they pleased until they were initiated into manhood and then expected to follow social rules. In highland tribes in New Guinea even young men were not expected to behave maturely. Often a young man lived apart from his family, perhaps to avoid upsetting the community of women in which girls tended to remain even as young adults.

The lives of children of the wealthy and socially elite in medieval Korea differed greatly from those of the children of most other Koreans. The children of wealth and privilege tended to have many toys and had access to education. On a child's 100th day of life, family members gathered to feast on fruits and drink alcoholic beverages, because even among the wealthy in medieval Korea about half of children did not live to that milestone.

Children took their fathers' names and belonged to their fathers, not their mothers. Among the rich and highborn every young man was expected to father a male heir. At age 14 a boy had his hair tied into a long topknot to represent his coming of age, and usually a wife in her 20s was found for him. The wife was responsible for enticing the boy into fathering

children with her, giving him the opportunity as early as possible to sire a male heir.

For most medieval Koreans, however, this marriage custom was not practical. Korea had an economy based on agriculture, and most Korean children had to work on farms as soon as they could walk. They were expected to rise at dawn, go into the fields, and work until dark, usually with their parents. They learned how to farm and how to practice the crafts necessary to keep a farm productive. Children of blacksmiths, carpenters, and other craftspeople may have had more social opportunities than the children of farmers because their parents had a better chance of acquiring the wealth needed to reach a higher social standing, but they, too, had to learn to work very early in their lives.

In imperial Japan before the 1180s the gulf between the courtly elite and the rest of society was enormous. The nobility and those who worked in government had almost nothing in common with other Japanese. For a son of a government official or a courtier, educational opportunities were abundant. Confucianism was imported from China in the 600s, but unlike the Chinese the Japanese did not use Confucianism to allow the best students to compete for good civil service jobs. Only the sons of the elite in Japan were allowed to study Confucianism, and only they were allowed to have government jobs, which were hereditary. Even after the establishment of military rule in the 1180s, this continued to be the custom.

Both the sons and daughters of the courtly elite were taught to write with brush and ink from an early age. They were expected to become fluent in spoken and written Chinese. By the time they were in their teens, they were expected to be able to write poetry in Chinese as well as Japanese, and their skill could gain them valuable contacts among nobility and the royal family. During most of the medieval era girls could aspire to become famous writers. By contrast, the children of commoners had little hope of acquiring an education or venturing far from their homes, unless they were conscripted into military service. Farm children worked in the fields, usually on lands their families did not own. Children of craftspeople begin learning the family craft as soon as possible.

The era of the Kamakura Shogunate (1192–1333) in Japan brought with it changes for some children. The son of a samurai would become a warrior like his father. The boy learned to ride horses almost as soon as he could walk, and much of his time was spent practicing horsemanship and the martial arts, especially archery. When he was not outdoors, he learned from tutors or family members the fine arts of writing, painting, and playing a musical instrument. Further, he learned the military code of Japan: unswerving loyalty to his master,

merciless cruelty to his master's enemies, and the willingness to sacrifice his life at any time for his lord or family.

Japan had a tradition of great female military leaders before the 1180s, and even under military rule some women learned the martial arts. Although it was rare, some women became samurai. Typically, however, the daughter of a samurai was trained to become the wife of samurai, and her education was limited to what would attract and keep a husband. Ideally, a wife was an ornament of her home, promoting her husband through her skills in art and in entertaining important guests. In practice, a girl had to learn the skills of running a business, because when she was married a woman often had to manage her husband's money and his feudal lands.

A child in medieval China yearned to go to school. For boys, school was a way to a better life. Although government officials often hired family members for government jobs, written records show that even the sons of slaves sometimes climbed the social ladder to great success by becoming scholars. The primary purpose of an education for most Chinese was preparation for government service. Life for uneducated Chinese was usually bleak. Because it had an agricultural economy, China needed most of its people to live on farms. Children who remained on farms worked almost every waking moment. The opportunities for children of craftspeople were somewhat greater. With their skills in making porcelain, metal objects, or wooden furniture, craftspeople could

live in cities, where the standard of living for children was usually higher than in rural areas.

Students educated in mathematics could aspire to become an architect or engineer. With knowledge of Confucianism, a young person could try to obtain a civil service job, which could elevate the status of the entire family. Acquiring such knowledge required more than memorizing Confucian texts, however; from the Tang Dynasty (618–907) through the Ming Dynasty (1368–1644) students were expected to be able to write essays analyzing Confucian texts and comparing Confucian principles to modern governmental practices. At age 17 a student took part in a nationwide test; passing the test almost guaranteed the student a promising future, and a student who failed could take the test again.

Boys often went to boarding schools, where they spent their time memorizing texts and learning mathematics and the arts. Classes were conducted outside in enclosed courtyards by teachers who had whips close at hand. Failure to complete homework could result in a whipping, although the use of corporal punishment was limited by government edicts. For most young Chinese the chance for a better life made living away from home, studying continually, and being whipped much preferable to following in their fathers' footsteps.

Girls had somewhat more limited opportunities for education. During the early medieval era girls could learn what boys learned, but they were rarely allowed to go to boarding schools. Daughters of well-to-do families could have tutors to teach them the sciences and the arts. As the medieval era continued, life for even the daughters of the social elite had become bleak. In the 900s members of the elite began binding their daughters' feet to show that the girls were highborn and did not need to work to survive. Typically begun when a girl was between the age of four and seven, foot binding caused the girl's feet to grow to only half their normal length, caused intense pain, and handicapped the girl for life.

Not much is known for certain about the lives of children in Southeast Asia. The children of northern Vietnam probably lived much as Chinese children did. On the islands of Sumatra and Java, Indian practices may have been followed by many people. On Sumatra boys seem to have been raised to be warriors. To the west of Vietnam were the cultures of Cambodia and Thailand, heavily influenced by India.

In medieval India children were usually cherished, regardless of their social status. At birth an infant's lips were moistened with water, butter, curds, and honey. The father whispered the name he and his wife had chosen for the child into the newborn's ear but did not disclose it to anyone until the child came of age. At about two weeks of age the baby



Children playing in a garden; color on silk, China, possibly Ming Dynasty, 1368–1644 (Freer Gallery of Art, Smithsonian Institution, gift of Charles Lang Freer)

A ROYAL CHILD IN INDIA

Medieval Indian monarchs were usually members of the Kshatriya caste, composed of warriors and government leaders. A king often had many concubines living in a harem. Children of the king spent their early childhoods in the harem, where they played games. Sometimes the king took his harem, including the children, out on excursions that included bathing in a river. When they were deemed old enough, children were removed from the harem and put in the care of a tutor.

The birth of a crown prince was cause for celebration. For about 10 days the king and his subjects celebrated with parties, dancing, and music. Every day of his childhood the crown prince had his body rubbed with yellow oil to make him look golden. He wore a necklace of tiger claws to ward off evil. When he was removed from the harem, the crown prince began training to become a leader. From the age of three he learned the rules of conduct for his caste and studied sacred books. As he grew bigger and stronger, he practiced horseback riding and the skills of a warrior in addition to studying academic subjects. At age 11 he began training in how to run a kingdom and how to manage the national bureaucracy. When his tutors considered him ready he was placed in a military unit, and eventually his father sent him to fight in a war. By the time he was a young man he was expected to command a military unit.

If a king had only daughters, sometimes the eldest daughter was raised as if she were a crown prince. She was expected to marry and have a son, who would become part of her father's line of kings. A king might adopt a son who by custom would have all the rights, privileges, and duties of a natural-born crown prince.

was given a name to use until the real one was revealed. At night the family kept a lamp lighted beside the child to ward off evil.

Children of the poor were put to work in the family business as soon as they could walk. Education was very much desired by children of all social ranks because only through education could they learn how to live fulfilling lives. In general, a Hindu child was expected to learn the rules of his or her caste, especially those regulating moral behavior. With a good education a girl could aspire to marry a well-to-do

husband or manage a business of her own. A boy could hope to become a leader in his community.

EUROPE

BY SOPHIE OOSTERWIJK

In the medieval period childhood was a clearly recognized phase of human life. The "ages of man" were a popular theme in art and culture. Ranging from three basic ages (youth, maturity, and old age) to more extended schemes, depictions show the different stages of life from birth until death. Many variations of this theme included separate stages for infancy, childhood, and adolescence or youth. Artistic renditions may depict infancy as a swaddled baby or a toddler behind a baby walker and childhood as a young boy at play.

In real life there were also specific stages of childhood that marked a transition. Medieval infants often were weaned relatively late, at the age of two or even three, but they remained in the nursery during this first age of infancy. Children usually started their elementary education or training at the start of the age of childhood, around seven and grammar school education or formal apprenticeships in their early teens. There was no uniform age to mark adulthood. Children might marry young: Legally, girls could marry as early as 12 and boys as early as 14, though laws varied and did not necessarily apply to other aspects of life. An adolescent could still be technically a minor in terms of inheritance or legal responsibility.

Birth and child care are among the topics discussed by such medieval authors as Bartholomaeus Anglicus (fl. ca. 1220–40) and the Tuscan physician Aldobrandini of Siena in the 13th century, though in reality midwives rather than physicians assisted mothers during childbirth. Newborn babies were expected to be bathed and cleaned after birth before being swaddled tightly in cloths or bands with the intention of keeping them warm and allowing their limbs to grow straight. Many late medieval tomb monuments show images of swaddled infants, or so-called *chrysoms*, which usually commemorate children who died in early infancy. The need for hygiene is often emphasized in medieval medical handbooks. It is impossible to prove how often children were washed, but there are many literary references to bathing as well as depictions in medieval art of infants being bathed in a tub by their mothers or nurses.

Birth was a hazardous event for mothers and children alike. Many miracle stories describe parents praying desperately for a stillborn baby to revive, at least long enough to allow baptism to safeguard the child's immortal soul. Birth rates were generally very high, but so were infant mortality rates, and therefore many parents experienced child loss. The high

infant mortality rate did not make such losses any less sad: Expressions of loss and regret are found in many medieval texts, such as the Middle English poem *Pearl*, in which a dreamer mourns the death of a little girl not yet two years old.

Baptism was the first sacrament that a medieval child was expected to receive, and it was considered vital in terms of salvation. Children were regarded as innocent, yet their souls first had to be cleansed from original sin through baptism. For this reason, it was officially forbidden to bury unbaptized children in hallowed ground. The earlier theological stance that death without baptism meant eternal damnation gave way to the idea that the souls of unbaptized children would be consigned to the *limbus puerorum*, which was a kinder fate than hell but which did not offer any hope of ever attaining heaven. To prevent the perdition of an immortal soul, some medieval preachers' handbooks include instructions for midwives on how to baptize an unborn child in extremis without the help of a priest.

Baptism of noble children could result in lavish celebrations and exchanges of gifts, with godparents being carefully chosen as sponsors for the child. However, such feasts might be abandoned or curtailed in favor of a hasty baptism if the baby proved to be weak or unlikely to survive long. In a ceremony known as churching, mothers were ritually received back into the church after giving birth. In continental Europe bishops bestowed the sacrament of confirmation on older children; in England, however, it was not unusual for very young children to receive confirmation, as is illustrated in many medieval depictions of the seven sacraments.

Child care was regarded as a woman's domain. Babies were breast-fed, and the Madonna suckling the infant Christ (known as the *Virgo lactans*) became an increasingly popular image in medieval art. However, aristocratic and royal mothers tended to employ wet nurses, who were carefully chosen for the quality of their milk and for their moral behavior. In Italy it was customary to send newborn babies away to be nursed in the country, though wealthier families preferred live-in wet nurses. Rich households usually had designated nurseries, often with their own staff. High-born babies might even be attended by their own rockers to rock their cradles, and extant lullabies prove that there were special songs for babies. Many examples in art attest to the existence of baby walkers to help a toddler in learning to walk. Games and play were also important. Depictions in art, literary texts, documentary evidence, and archaeological finds all prove that medieval children had a wide variety of toys to play with, ranging from simple objects made of wood or clay to more expensive toy castles and swords for young princes.

Medieval children were also distinguished by the clothes they wore. Few medieval items of clothing survive, yet there is

evidence that children's dress was adapted to suit their needs, in terms of both material and style. An example is the 1494 portrait of the 26-month-old dauphin Charles Orland (1492–95), who is shown wearing a white shift with a bib and a thick cap over his white coif to help prevent head injuries in case of a fall. The exception was the type of court costume represented in early Renaissance depictions of high-born children, such as Hans Holbein's (ca. 1497–1543) portrait of Edward, the infant son of Henry VIII (r. 1509–47), in his Tudor cap and gold-trimmed shift and robe. Such dress was obviously intended for formal occasions and not for everyday wear.

Medieval education was different for girls and boys. High-born sons often received private education, while other boys might be sent to school before receiving further training in their future professions, either in apprenticeships or at university. Discipline was strict, and medieval schoolmasters are traditionally depicted with a birch. Children learned their letters initially with the help of a hornbook, a tablet onto which the alphabet was copied. Literacy became increasingly important for girls as well, though they were usually taught at home. The image of Saint Anne teaching the young Virgin Mary to read became a popular theme in art and thus an example to medieval mothers. Monasteries and nunneries also often derived an income from educating pupils.

Although young children were usually involved in the world of adult life and work, they were not treated as adults. In the countryside peasant children were gradually introduced into an active working role, usually with tasks to match their age and experience, such as running errands or tending livestock. Inevitably, accidents did happen, but authorities were apt to reprimand irresponsible parents who failed to recognize the limitations of young children or to exercise due care and attention.

Families usually determined their children's future. An extreme example was the earlier practice of child oblation, through which parents could donate young children to the church and which was regarded as binding; the custom was questioned in the 12th century and was finally abandoned. Apprenticeships were contracts that parents or families entered into on behalf of children in their care; these contracts were strictly regulated by the guilds and stipulated the duration of the apprenticeship as well as the conditions and fees. Many sons followed their fathers' careers, and many medieval artists and artisans were trained by their fathers or continued their fathers' workshops, as in the case of the Louvain painter Dirck Bouts (ca. 1400–75).

Marriage was another aspect over which children themselves had little control. They could be promised in marriage at a very early age, though the church did not regard such marriages as legally binding until both parties had reached

the age of consent. Royal and noble children were sometimes handed over to their prospective spouses or in-laws after the contracts had been signed, with conditions intended to safeguard the interests and welfare of both parties. An example was the marriage in 1396 of the English king Richard II (r. 1377–99) to the French princess Isabella of Valois (1389–1409), age six. The king apparently pampered his child bride with toys and gifts, but the marriage was never consummated because he died before Isabella reached the legal age of consent as stipulated in the marriage contract. She was later returned to France and married off to her younger cousin, Charles d'Orléans (1394–1465).

Although the conditions surrounding childhood were different in the Middle Ages, it would be wrong to assume that children in this period were regarded or treated as miniature adults. The depiction of children in early medieval art was dictated to a large extent by artistic as well as religious conventions, so that the Romanesque Madonna appears formal and remarkably less affectionate than the more tender Gothic Madonna of later periods. While children are admittedly harder to find or to recognize in early art, the fact that they became an increasingly popular theme for artists in later periods reflects a growing trend toward secularization and realism in medieval art. Likewise, the high mortality rate among children may have resulted in a degree of resignation among parents, but not indifference. There are numerous records testifying to the anguish felt by bereft medieval parents from all stations of life, even if only a small proportion of deceased children were actually commemorated on tomb monuments. The fact that children were often demanded as hostages to guarantee their parents' loyalty proves that the natural tie between parents and children was believed to be the strongest possible bond.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Children's lives were governed by their family relationships, their obligations to their faith, and their educations. The lives of children in the Islamic world were governed primarily by the customs of Arabians, which became part of the laws derived from their Islamic faith. Even so, variations were created by local traditions.

In the medieval Islamic world a child was anyone who had not yet reached puberty, with adulthood coming at age 14 or 15. Childhood was seen to progress in stages. The first was from birth to teething. This period was crucial because many children died from disease at this time, making teething a special event that marked a child's progress in life. At a child's birth someone would whisper into the child's ear

the *adhan* and then the *shahada*. The *adhan* was the call to prayer, and the *shahada* was the first pillar of Islam, that there is no god but God and Muhammad is his messenger. The *shahada* would be repeated frequently to the infant, not in the expectation that he or she would understand it but to accustom the child to repetition of passages from the Koran. Seven days after a child's birth the family would host a feast, during which the child would be named. A sheep or goat was slaughtered for the occasion as an expression of gratitude for the child's successful birth. A child had the right to be breast-fed until age two.

The second stage in a medieval Islamic child's life ended at about age seven, an age at which a child was expected to be able to begin memorizing the Koran. No one was considered properly educated who had not memorized the Koran word for word, and children were expected to be able to recite passages from it. The third stage in a child's life ended at around the onset of puberty, which could be as late as age 14 but was watched for at about age 12. It was at this age or a little earlier that boys and girls were segregated from each other. Before puberty children were not considered sexual beings because they could not complete the sex act, and the genders were allowed to be in each other's company. The final stage of childhood was the transition into adulthood, rarely taking place later than age 15.

Circumcision was an important rite in the Islamic world of the medieval period. It had been a custom practiced in Arabia before Muhammad's time, and it became an important part of Islamic life. During the medieval era Islamic scholars were in wide disagreement over when circumcision should occur. Some thought a child should be circumcised on the seventh day of life. Others thought that circumcision should not take place before the age of 10 years, while still others said it should not take place until after puberty. Circumcision was considered an important act of ritual purification that cleansed a child. For boys from well-to-do families a parade was held, with the child carried on the back of a horse before a barber removed his foreskin. Poor families would wait until there was a wedding procession that could include their son's parade.

Circumcision of girls was very controversial and entailed the cutting off of some of the upper genitalia. Many scholars claimed that female circumcision was necessary for the girl to be purified. Some people believed that it would dampen a girl's sexual desires and make giving birth to boys more likely than giving birth to girls. The circumcision was not a cause for celebration but was performed in private by a woman hired for the purpose. It is probable that the majority of Muslims in medieval times regarded female circumcision as shameful, regardless of what scholars might say. It was more common



A musical toy from a copy of al-Jazari's treatise on automata (opaque watercolor, ink, and gold on paper); Syria, 14th century (Freer Gallery of Art, Smithsonian Institution)

in North Africa and Arabia than elsewhere, probably because some pagan cultures in those regions had practiced female circumcision before their conversion to Islam.

The matter of educating girls was contentious. Muhammad had set an example by having well-educated wives, but he was also quoted as having said that teaching a woman to write was like feeding venom to a snake, which some people interpreted to mean that just as giving a snake poison would make it more venomous, educating a woman would make her more poisonous. Many girls therefore were denied any kind of education and even punished if they learned to read. Yet many people reasoned that like a boy, a girl had to learn to read the Koran and commentaries on the Koran to fulfill God's wishes.

Before the age of seven, children learned to read and write mostly from male family members such as fathers, uncles, cousins, and older brothers and sometimes from educated female family members. Seemingly, a girl was more

likely to become educated if she had educated female relatives as her teachers. In general, it was acceptable for a woman to teach boys and for a man to teach girls. In fact, some women became esteemed for their knowledge of the Koran and religious laws and were sought out by adults who wished to learn from them.

The educational process involved learning passages by rote. At age seven a child would be expected to learn to recite the shortest chapters in the Koran and work his or her way through increasingly long passages. Reciting the Koran from beginning to end was an act of piety that every educated person was expected to do on important occasions and to mark religious holidays. A child who could do so was a source of pride to the family. By the 1000s a child was also expected to learn the hadith, which were accounts of what Muhammad said or did. These, too, were memorized. Although paper made its way into the Islamic world from China by the 1000s, it was too expensive for any but the wealthiest of people to

use. So children wrote their lessons on surfaces that could be cleaned, usually wooden tablets, and their best way of retaining their understanding of what they learned was to memorize it. Some young people performed prodigious feats of memorization. Important texts were passed on from teacher to student from generation to generation for hundreds of years. Teachers would recite their personal insights into religion, law, or science, and students were expected to memorize them word for word. To a student who had mastered a complex text, the teacher gave an *ijaza*, a kind of diploma that said that the student was qualified to teach the text to others.

Discipline was an important part of a child's life. Teachers were urged by experts in education to beat students who misbehaved. Misbehavior included inattentiveness to studies, failure to learn a text, gambling, lying, and other moral transgressions. There were even texts that described the kind of stick to use and the area of the child's body on which to inflict the beating.

The family was central to the Islamic way of life. After loyalty to the family came loyalty to the family's clan. From birth a child was usually surrounded by family. Under the law adult men were expected to care for women, and in a big family a child would have uncles and cousins involved in seeing to his or her welfare. Adult family members were expected to help teach children how to live and behave. Early in life, often before age seven, girls began to prepare for marriage. Boys began to prepare to care for the women in their lives. Marriage rarely had anything to do with love, because the husband and wife seldom had the chance to get to know each other beforehand.

It was possible for children to be betrothed to each other before puberty, but this seems to have been uncommon. Usually the husband was older than his wife, sometimes decades older. A girl could be married before she was 10 years old, but a boy was expected to be able to support a family with his labor and therefore almost always had to be an adult. Further, the husband was expected to give his bride a dowry. Ancient Arabian custom had assigned the dowry to the father or male guardian of the girl, but under Islamic law the dowry had to go to the girl, and it was supposed to remain her money throughout her life. If her husband divorced her, she kept the dowry he had given her. This meant that husbands either came from wealthy families or had to be well established in their careers before marrying.

When boys and girls reached puberty, they could no longer be in the company of the opposite sex unless they were family members, women past menopause and therefore no longer considered sexual beings because they could no longer bear children, or men who were eunuchs (that is, men who had been castrated). A sure way for a person to gain a bad

reputation was to fail to be generous, and generosity included entertaining outsiders in one's home. This resulted in the development of the harem, which was a space in a house into which no males who were not family members could enter, unless the male was a eunuch. In the homes of the wealthy the harem was a separate room in which women could gather and be comfortable. It was the place that learning began for both girls and boys. For the majority of homes there was no separate room, so women and children stayed behind a curtain, apart from the male hosts and their male guests.

Childhood was not just a relentlessly bleak experience of beatings and rote memorization. Children were recognized as being different from adults and were not expected to fulfill adult responsibilities. For instance, even though children were expected to know the difference between right and wrong, they did not receive adult punishments if they broke the law. In many communities children were not obliged to fulfill the rituals of worship required of adults. This changed at age 14, when the full weight of punishment would be meted out and children had to fulfill many responsibilities of adults.

Children had a large variety of games they could play. Playing with balls was especially popular. They could ride seesaws; as they matured, they could wrestle, race, and play polo. Horsemanship was a highly esteemed skill, and many children not only rode horses but also competed with each other in feats of skilled horsemanship. In central Asia a girl was as likely as a boy to be seen riding for fun. Puppetry was a common form of entertainment for children, as was playing with dolls and toy animals. Young and old alike enjoyed board games, and a child might learn chess and backgammon from the same adults who taught them the Koran and hadith. Gambling games were forbidden, as was the use of dice.

See also ADORNMENT; AGRICULTURE; ALCHEMY AND MAGIC; ART; CLOTHING AND FOOTWEAR; CRAFTS; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FAMILY; FESTIVALS; FOOD AND DIET; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; LANGUAGE; LAWS AND LEGAL CODES; LITERATURE; MILITARY; MUSIC AND MUSICAL INSTRUMENTS; OCCUPATIONS; RELIGION AND COSMOLOGY; SCIENCE; SOCIAL ORGANIZATION; SPORTS AND RECREATION; WRITING.

FURTHER READING

Traci Ardren and Scott R. Hutson, eds., *The Social Experience of Childhood in Ancient Mesoamerica* (Boulder: University Press of Colorado, 2006).

- Sally Crawford, *Childhood in Anglo-Saxon England* (Stroud, U.K.: Sutton, 1999).
- Barbara Hanawalt, *Growing Up in Medieval London: The Experience of Childhood in History* (New York: Oxford University Press, 1993).
- James E. Lindsay, "Children and Childhood." In *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- Janet Mathews, "The Children." In *Wurley and Wommera: Aboriginal Life and Craft* (New York: Collins, 1978).
- Tanure Ojaide, *Great Boys: An African Childhood* (Trenton, N.J.: Africa World Press, 1998).
- Nicholas Orme, *Medieval Children* (New Haven, Conn.: Yale University Press, 2001).
- Joel Rosenthal, ed., *Medieval Children* (Donington, U.K.: Paul Watkins, 2006).
- Shulamith Shahar, *Childhood in the Middle Ages*, trans. Chaya Galai (London, U.K.: Routledge, 1992).

► cities

INTRODUCTION

Cities in the medieval period had many purposes; they were centers of governance, trade, culture, the exchange of ideas, and the sharing of natural resources. Many of the cities established in the ancient world were still being used in the medieval period, but a sizable number had declined, some considerably. Then, too, new cities emerged, and minor settlements grew into significant population settlements, with the rise of new centers of commerce and wealth. The constant need for defense against attacking armies and also from marauders and bandits saw most of the cities erecting large walls to protect their populations or adapting previously existing walls from the ancient period.

Traditionally, the city served as the population center of a political entity, often being self-governing to some extent. Cities were usually surrounded by defensive walls, built at enormous cost and maintained and adapted over many centuries. The entrance gates were usually garrisoned, and these gates served as points to control the inflow and outflow of population, both in terms of law and order and in terms of the collection of tariffs or other taxes levied on goods coming into a city. In some cases the city had a number of concentric walls to protect the entire city and then particular parts of the city. Charlemagne's capital at Aachen (in modern-day Germany) and the city of Baghdad (in present-day Iraq) are two examples.

Most of these cities emerged over time, with relatively little thought going into long-term planning. Indeed, the choice of the location of capitals, such as in the early part of the kingdom of Angkor in modern-day Cambodia, seemed to be very much at the whim of the ruler. As a result, the growth

of many cities was haphazard. They would often sprawl along the side of a river or bay, since most cities were reliant on water for drinking as well as for trade. At the same time, they were carefully located away from floodplains. Medina and Mecca (in today's Saudi Arabia) were not located on the coast or on rivers, relying instead entirely on wells.

The largest city of the medieval period, Ch'ang-an, located near the modern city of Xi'an, the capital of the Tang Empire of China, was noticeably preplanned as a massive rectangle. It had 11 great avenues running north-south and 14 running east-west, with the entire city divided into 106 wards. At its height during the eighth century it is thought to have had a population of about 1 million within its walls and as many as another 1 million people living in the suburbs beyond its walls. The Japanese Yamato rulers were so impressed by accounts of the city that they modeled Nara and Kyoto on it when they were built, respectively, in 710 and 794.

The second-largest city of the period, Baghdad, straddled the Tigris River, and the third-largest city, Constantinople, was set on a peninsula and enclosed within the Wall of Theodosius, built in the late 440s. Although the fourth-largest city, Córdoba, stretched to both sides of the Guadalquivir, the walled part was all on the north bank. The southern bank saw the suburban expansion of the city.

The medieval European definition of a city was a large town made into a city by charter and usually dignified with a cathedral and therefore with a bishop. The size of the city and its commercial activity often meant that a level of local government operated in these cities, with a number of them emerging as city-states. San Marino (on the Italian peninsula) and Vaduz (Liechtenstein) are two that have survived as independent states to the present day, although many in Italy and Germany retained levels of autonomy they had gained in medieval times well into the early modern era.

With cities being the central focus of the medieval state, the capture of a city earned status for invaders or rebels, and the loss of a capital city often symbolized the fall of the kingdom or empire, regardless of whether it survived as a political entity elsewhere. Thus, the sacking of Rome by the Visigoths in 476—even though the Romans had moved their capital to Ravenna—signified the end of the Roman Empire as a major power and, indeed, the end of the ancient world. The fall of Jerusalem to the crusaders in 1099 and its subsequent fall to the Seljuk Turks in 1187 marked two important phases in the history of the Crusades. The triumphal entry of Joan of Arc into Orleans in 1429 symbolized the beginning of the end of English rule in France and the emergence of early modern France.

As cities represented the power of particular political entities, attacks on cities led to the developing of siege-warfare

techniques. If the city resisted, the attackers often sacked the city, pillaging it and either killing many of the inhabitants or selling them into slavery. The destruction of the city of Béziers (modern-day France) in 1209 during the Albigensian Crusade, the sacking of Acre (present-day Israel) in 1291, and the ruin of the city of Angkor in 1432 were all done with such thoroughness that none of these cities was able to recover.

To protect its citizens, city councils often sought terms from attacking armies to prevent the inhabitants from being slaughtered. The Huns and the Mongols tended to attack places with such ferocity that many cities surrendered quickly. Occasionally, some cities prevaricated in the hope that reinforcements would arrive, as in the case of York during the Viking invasion of northern England in 1066. In that instance the delays provided enough time for Harold II to defeat the Vikings and save the city from attack. During the Hundred Years' War, Edward III laid siege to the city of Calais for more than a year. In 1347, he offered to spare the city if six citizens would surrender to him. Five burghers of the city volunteered, expecting to be executed. Their lives and those of the citizens of Calais were spared, but the city fell to English rule.

AFRICA

BY TOM STREISSGUTH

The cities of medieval Africa developed along trade routes, in populous farming areas, and on the continent's long Atlantic Ocean and Indian Ocean coastlines. The earliest sub-Saharan communities were nomadic, in constant search of food and game herds. They followed networks of footpaths and river systems to move from place to place. They raised villages in forest clearings or near sources of freshwater. But with a range of natural and human enemies, these settlements were temporary, their inhabitants always ready to move to safer and more productive locations.

Ironmaking among agricultural peoples went hand in hand with the rise of permanent settlements. The tools manufactured from iron ore allowed farmers to clear land and cultivate the soil efficiently and to manufacture useful household utensils and weapons. To be exploited, however, a source of copper or iron ore had to be protected. Iron technology also demanded a permanent workshop, where the difficult work of heating and smelting iron ore could be carried out. The needs of an artisan and metalworking class thus led to the establishment of the first large, settled communities.

Agricultural surpluses and the profits of trade allowed African cities to develop aristocracies and build civic institutions. The wealthy ruling classes sought to conserve their privileges by raising permanent capitals, which made possible the extension of authority over a wide area. These towns grew

around a defensible point, such as a hilltop or river promontory, which could be protected by walls of stone, earth, or wood. Within the perimeter of some major cities a citadel contained a royal seat of power, surrounded by the homes of retainers, courtiers, and servants. Coastal cities were dedicated to trade, while some inland centers served as religious sites. The largest African cities had neighborhoods of farmers, artisans, and merchants; the urban population also absorbed foreigners, who arrived as traders or slaves.

CITY PLANS IN MEDIEVAL AFRICA

Large public works often were constructed by slaves or, in places of strong central authority, by levies of residents conscripted to labor for a set period each year. Roads, palaces, walls, public squares, and religious shrines rose to serve the city's populations and glorify their rulers. The outer walls of the city protected residents and visitors from the hostile elements, both human and animal, lurking in the surroundings. It was common for tolls to be collected on all merchandise passing through the gates, providing an important source of income for the city rulers. Within African cities, walls also marked out neighborhoods and the property of kinship groups (clans) with claim to specific plots of ground, on which they raised homes, outbuildings, and garden plots. The home itself was often in the form of a walled compound, in which daily life revolved around an enclosed field or courtyard.

Some cities grew to cover many thousands of acres, which included extensive crop fields that could provide food whenever the city was besieged. In many cities the royal palace and surrounding buildings were enclosed by inner walls that served to mark and protect the royal precinct, considered the exclusive, sacred ground of divine kings. Common people were forbidden to observe their ruler or to know anything about the movements or actions of the king. The work of artisans who served the ruler also was protected; their knowledge was considered privileged and secret, and the products of their forges and workshops were reserved for the use of the king.

The fortunes of African cities rose and fell with the levels of trade, the fortunes of royal dynasties, and the extent of conflict with neighboring cities and societies. Trade with India and Southeast Asia via the ports of the Indian Ocean stimulated the growth of prosperous coastal towns, including Mombasa, Zanzibar, and Mogadishu. Foreign trade and colonization also played important roles. The cities of Ethiopia and the Sahel region, for example, depended on trade with Arabia and North Africa, respectively. Over the medieval period, Islam arrived with traders and Arab merchants who moved south into the Sahara Desert region, transforming the architecture, religion, and culture of prosperous cities. In the 15th century

Portuguese caravels began sailing down the West African coast, disrupting trading ports and carrying out a murderous trade in slaves and gold. As Europeans established depots and trading stations in West and East Africa, Christian missionaries followed them. The effort to settle and exploit Africa's human and natural resources brought about new concepts of city design and function in sub-Saharan Africa.

FALL OF ROME AND ALEXANDRIA

The city of Alexandria, founded by the Macedonian general Alexander the Great in the fourth century B.C.E., remained the busiest port in the Mediterranean for several centuries. A vital link in the importation of grain from the Nile River valley to Rome, Alexandria was a major harbor and a city of fine palaces, mansions, and public buildings laid out on a regular grid of streets divided into four major quarters. As a cultural center Alexandria was unsurpassed in the Mediterranean world; it was home to respected philosophers and astronomers, and its library and academies were renowned throughout the empire.

The decline of the Western Roman Empire in the fifth century wrought a transformation in the city. As its harbor declined in importance, Alexandria lost population and grew isolated from the Nile Valley as well as the new center of imperial authority, the eastern capital of Constantinople (modern-day Istanbul), far to the north on the bridge between Asia Minor and Europe. Pagan temples and monuments in Alexandria were thrown down by the dominant Christians, and the city's libraries and academies were largely abandoned.

In 616 Alexandria was overrun by a Persian army under King Khosrau II. An Arab army arrived to lay siege in 641; the citizens endured 14 months of assaults before the city finally surrendered in 642, having lost its renowned library and the thousands of manuscripts contained within it. The Arab conquest of Egypt and North Africa that soon followed destroyed the last remnants of Roman culture on the continent and began an era of Islamic domination of North African cities, trade, religion, and culture that has lasted to the present.

AXUM

In the early Middle Ages, while Alexandria declined into a small and isolated coastal settlement, the Axum Empire of northern Ethiopia was prospering. The abundant rainfall in the region allowed its farmers to produce two harvests every year. Terracing of the mountainsides increased the area under cultivation. The bumper crops and the wealth that flowed along trading routes between mountainous Ethiopia and the Red Sea created a prosperous merchant class whose members spent their disposable income on luxury items created by artisans in wood, stone, gold, and gems. By the fifth

century C.E. the capital of Axum was one of the wealthiest cities in Africa.

Axum drew a large population of migrants and foreigners while extending its power to far-flung valleys and towns in the Ethiopian highlands. Trade through the Red Sea port of Adulis linked the city to India, Persia, and the Mediterranean ports of the Byzantine (Eastern Roman) Empire. The city imported cattle, iron, and salt while exporting luxury goods from the interior of Africa, including ivory, rhinoceros horn, gold, spices, frankincense, and war elephants. Metalworking technology arrived from the Middle East via the Nile Valley, giving rise to a busy iron industry; Axum was one of the first realms in sub-Saharan Africa to mint its own coins. Beginning in the fourth century the Axumites adopted Christianity through links to the eastern Mediterranean. (Christianity remains an important faith in modern Ethiopia.)

The Axumite nobles built impressive mansions in the city and provided a market for expensive cloth, wine, glass, and spices from Arabia and the Levant. The Axumite kings celebrated their lives and their reigns by raising tall obelisks, more than 100 of which eventually fell and now litter the streets and parks of the modern town of Axum. The tallest of these monuments was 108 feet high. The most elaborate obelisks had detailed bas-reliefs carved into their surfaces.

Axum began a slow decline soon after the fall of the Roman Empire, which had traded with Axum via Egypt and the lower Nile Valley. Axum's foreign markets either vanished or were besieged and conquered by Islamic armies sweeping across the eastern Mediterranean and down the coast of the Red Sea. The city's farming hinterland also suffered environmental damage. As trees were cut down to provide wood for the furnaces of metal foundries and for the manufacturing of brick and glass, the soil began to erode, and crop yields suffered. The situation worsened as rainfall began to decline in the eighth century; the port of Adulis was conquered by the Arabs in the same period, and Axum's main link to the outside world, and its main source of revenue, disappeared. Urban society grew tumultuous, with violent revolts brewing in the streets and hunger rampant. The city's nobility took refuge in isolated hilltop fortifications and then moved to central Ethiopia, leaving Axum a poor and sparsely inhabited ghost town.

The Axum Dynasty was finally toppled and Aksum itself destroyed in the 10th century, after an assault by Queen Gudit, a determined opponent of Christianity. In 1137 the Zagwe rulers ascended to power from their capital at Roha in the Lasta Mountains. In this northern town (modern-day Lalibela), a series of 12 rock-cut churches were constructed during the reign of King Gebre Mesqel Lalibela, which ended in the early 13th century. This Christian king envisioned Roha

as a new center of Christianity, meant to replace Jerusalem, which had fallen to the Muslims in 1187 after the short-lived reign of the European crusaders. The layout of Roha's streets, the design of its churches and monuments, and even the name of its principal river, the Jordan, were all in imitation of ancient Jerusalem. The Zagwe Dynasty was overthrown in the 13th century by rulers claiming descent from Solomon and the Queen of Sheba. Under the Solomonid kings, the city of Roha declined, and the kings themselves wandered from place to place with no fixed capital.

JENNE-JENO

In the fertile plains and marshes of the Niger Delta, in what is now central Mali, the city of Jenne-jeno (or Djenne) reached its greatest extent in the ninth century. For centuries the city had been a center of copper and iron manufacture and served as a trading hub linking the interior regions of the Sahel with the western coasts of the Atlantic Ocean. Jenne-jeno grew among an ancient network of small and separate communities, each with its profession or craft specialty: farmers, herders, ironworkers, potters, weavers, and merchant traders. A grid of narrow streets was laid out on a series of low hills, each inhabited by one of these communities. Streets were connected by alleys; the houses shared common walls. A stone wall surrounded the city's residential area and protected the inhabitants from hostile raids as well as from flooding from the regular rises of the Niger River and its tributaries.

Jenne-jeno became an important political center of the Mali Empire, which at its greatest extent comprised parts of what is now Mali, Senegal, Gambia, Mauretania, and Guinea. From their excavation of rare Chinese porcelain and glass and beads from the Near East, archaeologists have concluded that the city traded extensively with Egypt and Arabia as well as the East African ports on the Indian Ocean. As trade developed, an infrastructure arose to meet its needs: quarters for lodging travelers and their caravans, carpenters to provide vehicles, and buildings for storing goods.

Historians still debate the reason for Jenne-jeno's decline, which started in the 12th century. In the 10th century the arrival of Islam may have disrupted trade and set rival religious faiths against each other in political dissension and civil war. A general climate change in the region may have brought about pestilence, drought, or a loss of fertility in the overworked soil. The Songhai Empire that replaced the Mali realm finally conquered the city in the late 15th century.

TIMBUKTU

The town of Timbuktu rose on the frontier between the Sahara Desert and Sahel, the grassland savanna lying between the desert and the rain forests to the south. Tuareg nomads,

who founded the city in the 10th century, used the site as a depot for their trade in salt, in high demand throughout North Africa. According to one legend, the name of the city comes from Buktu, an old woman renowned for her honesty whose home was used as a place of safekeeping for the possessions of Tuareg nomads, who traveled constantly between this region and the North African coast.

Timbuktu became a center of trade in gold, ivory, salt, and slaves. It was a principal city of the Malia Empire beginning in 1324 and then was brought into the Songhai Empire in the late 15th century. The city lost its importance as a trading center when Europeans began building warehouses and ports on the West African coast. These ports, which overlooked the mouths of rivers, diverted a considerable amount of trade from the Sahara Desert region to the sea lanes of the Atlantic Ocean. Timbuktu itself became a cultural, educational, and religious center of Islam, with impressive mosques and one of the largest universities in Africa.

KOUMBI SALEH

Lying in what is now southeastern Mauretania, 200 miles north of the modern-day Malian capital of Bamako, Koumbi Saleh was a capital of the Ghana Empire, one of the largest united realms in the history of West Africa. The city was founded in the third century C.E. by the Mandinko, a people speaking the Mande language who plied the trading routes between the Sahara region and the coastal cities and forests of West Africa. Koumbi Saleh held a strategic position between the salt deposits of the Sahara Desert and the productive goldfields of West Africa. (Salt was in high demand throughout Africa and in some markets was traded for an equal weight of gold.) At the rise of the Ghana Empire in about 1000 C.E. the population of the capital city rose to as much as 30,000.

Koumbi Saleh had two major urban concentrations, lying about 6 miles apart. The northern and southern halves were divided along religious and cultural lines, with separate Muslim and traditional African neighborhoods and a network of suburbs lying between. Muslim merchants occupied the northern half, while a royal palace and precinct, enclosed by a wall, were located in the southern half. A traveler named Abdallah ibn Abdel Aziz, also known as El Bekri, described an audience with the king, who appeared within an elaborate pavilion guarded by fierce dogs and who possessed gold so abundant that it was crafted into the collars of the dogs and woven into the hair of the king's attendants. Several large mansions in the ruins of the city have been uncovered by archaeologists, who discovered foundations covering an area of several thousand square feet. These homes included extensive storehouses where a variety of iron weapons and goods were found.

Koumbi Saleh became the center of a web of busy caravan trails. Several satellite towns, including Aoudaghost to the north, were constructed to facilitate trade, but these routes also cut an easy path through the desert for Berber traders who were expanding their influence and disrupting trade. In the 11th century the Almoravid realm of North Africa conquered the Ghana Empire, seized salt and gold mines, looted the homes and palaces of the capital, and converted the population forcibly to Islam. With its main source of taxes and revenue diverted to the Almoravid rulers, the city declined into a series of small, poor settlements. Eventually the site was abandoned and many of its people made slaves.

Smaller trading outposts, including Gao, Agades, and Timbuktu, survived the Almoravid conquest to become major cities of the Mali Empire. This realm flourished under the rule of Kankan Musa, a king who extended his authority over all the busy trading stations of the Sahel. Kankan Musa held a vast treasury in gold and spent much of it on the building of mosques in Gao, Timbuktu, and other flourishing cities. Mali was said to have so much gold that the king crashed the Arab gold markets of Cairo by his generous presents of gold coins, nuggets, and objects during a formal state visit.

Many cities of the Mali Empire have disappeared from the map and remain the object of archaeological searches. Other cities of the Sahel lie in ruins and bear little testimony to their origins or history. In Darfur, 600 miles west of the Nile Valley, a desert town known today as Jebel Uri was built of stone within a circular wall that still reaches a height of 12 feet. The wall stones were fit together skillfully without mortar and provided the townspeople with a nearly impenetrable line of defense against desert nomads and raiders. Based on its location historians have concluded that Jebel Uri was a part of the trading network of the Kanem Empire, which arose in the region north of Lake Chad. The town was a key point on the routes that crisscrossed the Sahel, linking the Niger Valley, the Nile, and the Indian Ocean. The city was inhabited for several centuries, during which its people raised hundreds of circular stone huts and a large hall or palace with ceremonial steps and platforms that have survived centuries of neglect and weathering.

KANO, IFE, AND KONGO

The Hausa people of West Africa also built walled towns, which they called *birane*. The Hausa were among the first indigenous Africans to master ironworking technology and, as a result, were among the first to raise large, permanent communities. Kano, in modern-day northern Nigeria, was one of the largest of these Hausa cities. It was the southern terminus of an important caravan route that crossed the central Sahara Desert and reached the Mediterranean coast in Tunisia.

Slaves, gold, ivory, and kola nuts were traded through Timbuktu and other stations to the north, while silk and leather goods, copper, and salt arrived from the desert. These caravans stretched for miles and consisted of thousands of camels and carts; Kano became a distribution center for foreign goods in a wide area of West Africa.

Kano was founded as an important religious center on a prominent cliff known as the Dalla Rock, believed to be the home of a deity. The town fell to the Berbers in the 11th century, but its walls survived and were reinforced during the following centuries. Walled enclosures remained a key feature of Hausa cities throughout the medieval period. (The walls of Kano itself eventually grew to 30 feet in height and attained a circumference of 12 miles.)

The earliest major town in the neighboring Yoruba region was Ife, which was founded about 700 B.C.E. and flourished as a source of bronze, stone, iron, and terra-cotta goods. The city's iron and pottery workshops produced goods that were distributed throughout West Africa. As in the Sahara region and Ethiopia, ironworking was a direct cause of the stratification of societies into groups based on their crafts and livelihoods, the emergence of an aristocracy and a merchant class to trade nonessential goods, the growth of cities, and the establishment of highly centralized states.

Kongo (Mbanza Congo) became the center of a large medieval empire that rose in the early 15th century and covered what is now Angola, the Atlantic coastal region of Zaire, and Gabon—one of the largest realms in African history. King Mbene founded this imperial capital, a town that eventually reached a population of nearly 100,000 people, making it by far the largest urban center in medieval sub-Saharan Africa. The arrival of the Portuguese in the late 15th century transformed Kongo, raising a Christian cathedral and making the city a center of the trade in slaves captured in the rain forests of the interior and brought to depots on the Atlantic Ocean coast.

EAST AFRICA

The eastern coasts of Africa, from Somalia to Mozambique, were linked from prehistoric times with ports in Arabia and across the Indian Ocean to India and Southeast Asia. Settlements on the island of Madagascar were founded by explorers from Indonesia during the time of the Roman Empire, and this society of mariners, fishermen, and traders eventually spread up the coast as far as the Red Sea. Cities of this coast preserved their independence, though beginning in the seventh century many began paying periodic tribute to Arabian princes and governors. East African cities traded in ivory, gold, rhinoceros horn, iron goods, and tortoiseshell from the interior and bought wheat, rice, honey, sesame oil, and ghee from India. Contacts with Ethiopia and the Lake District of

east-central Africa also helped the spread of ironworking technology down the coast to southern Africa.

By the eighth century the immigration of Arab merchants and traders was transforming these cities into strongholds of Islam. Zanzibar, Mogadishu, and Mombasa were key ports in the medieval period, linking the Red Sea with the emerging kingdoms of southern Africa through the bustling harbor town of Sofala, at the mouth of the Sofala River. This port and Sinna were the principal towns of the Monomotapa realm, which covered what is now eastern Zimbabwe. The wealth of the ruling aristocrats of Monomotapa was based on their immense herds of cattle. The nobles and princes of the kingdom raised great mansions in Sofala and monumental religious centers in the interior.

Cattle farming had spread south to the valley of the Limpopo River and the Transvaal region of present-day South Africa, giving rise to bustling market centers such as Toutswe and Mapungabwe, which also traded gold and ivory with Indian Ocean ports. The capital and metropolis of Monomotapa, and the largest archaeological site in sub-Saharan Africa, was Great Zimbabwe.

GREAT ZIMBABWE

Like Kano, Great Zimbabwe was founded as a religious center, the home of the Mwari cult. It was settled sometime in the 10th century. Beginning in the 12th century the town began to prosper from trade in gold and cattle. The great wealth that was collected into the city's treasury allowed its rulers to raise monumental walls, religious centers, marketplaces, and palatial homes. The principal market of Great Zimbabwe lay within the so-called Great Enclosure, while outside that precinct were a residential neighborhood and the cult center on a nearby hill.

In about the 14th century Great Zimbabwe may have come under siege or been involved in a protracted conflict. The residents began raising walls of cut stone, laid in a variety of patterns and reaching a height of more than 30 feet, with an outer wall extending 800 feet. Great Zimbabwe reached the peak of its prosperity and influence—from Zimbabwe into neighboring Mozambique—in the middle of the 15th century. The city itself covered an area by some estimates as large as 3 square miles while controlling subject towns and farms as much as 200 miles in every direction. At its height Great Zimbabwe may have been home to a population of about 20,000.

Archaeologists divide the city into three main areas: the Hill, the Valley, and the Great Enclosure, which sheltered several hundred buildings. The homes, walls, and palaces were constructed of close-fitting stones joined without mortar. The excavations revealed that Great Zimbabwe was a vital trad-

ing center, where objects from as far away as the Middle East, Persia, and China have been found. In the 16th century the site was visited by Portuguese explorers who wondered at the great extent of the city and the ingenuity of its builders and engineers. By that time, however, the city was in decline, its trade routes usurped by the Portuguese and other Europeans who were taking control of coastal ports on the Atlantic and Indian oceans. Over the following centuries the site was plundered for its stone and artifacts. It was also subject to excavations by archaeologists convinced that no African nation had been capable of raising such a city and that some forgotten European or Middle Eastern community had built an outpost somehow lost to recorded history. Although Great Zimbabwe has been long abandoned and damaged by looters, it remains a national shrine of the modern nation of Zimbabwe and a symbol of the achievements of native Africans before the transformations wrought by the Arabs, Europeans, and other outsiders.

THE AMERICAS

BY J. J. GEORGE

The process of indigenous American urbanization and the development of cities saw its greatest achievement in the years 500–1500 C.E. By the 1530s the Spanish had landed throughout the Americas, as led by Christopher Columbus in the West Indies in 1492, Hernán Cortés in Mexico by 1519, and Francisco Pizarro in Peru by 1532. The arrival of the Spanish and subsequent European colonists meant that American life as an autonomous cultural process ceased. Characteristics of and approaches to urbanization that had evolved out of earlier traditions were discontinued, and the landscape of the Americas shifted, irrevocably, to its colonial period. Thus, meriting close historical attention are the principles of urbanization in the Americas as they originally developed, such as can be seen in the evolution of certain primary American type-sites in the period 500–1500 C.E.

Urban settlements and cities had begun developing in ancient times and with a unique American vocabulary, generally originating during the social transformation of simple nonhierarchical farming societies into class-stratified states. There is little consensus among scholars regarding the specific qualities that determine whether or not a site qualifies as a city, as no checklist with enumerated characteristics exists. Rather, the conditions are broad and flexible, and any particular site might display some but not all general criteria. Indeed, a wide array of typologies is used to classify sites and settlements. Among the most commonly defined types of settlements, as based on function, are major capitols, political

towns, fortresses, administrative centers, regal-ritual centers, ceremonial centers, burial mound sites, and mercantile cities. As based on size and complexity, smaller settlements may be defined as towns, villages, village clusters, hamlets, or camps. Most scholars agree only that a few major settlements from the medieval Americas, such as central Mexico's Teotihuacán (c. 100–700 C.E.) and 16th-century Tenochtitlán, should be classified as cities or, at the least, major examples of advanced urbanism.

Part of the scholarly uncertainty over classification stems from the fact that terms like *city*, *urbanism*, *urbanization*, and *urban society* are often left undefined. Uncertainty also derives from the fact that textual evidence is in short supply, such that most of the relevant data come from archaeological evidence; reconstituting entire complex civilizations through excavations, without the subtleties and nuance of native written thought, has its limits. For example, archaeological scholars have thus far met with extreme difficulty in trying to decipher the roles of most individuals in the urban environment, primarily because they are much less visible in the material remains. In contrast, archaeologists often have become more familiar with elite classes, as through interpretations of grave goods, royal burial contexts, and specialized architecture. Clarification of the roles of common individuals—their practices, perceptions, attitudes, values, calculations, and emotions—will ultimately provide a more detailed understanding of American urbanism and of how cities worked.

Questions of demography—the statistical study of populations, especially with reference to size, density, and distribution—and of function are usually primary considerations in determining a site's urban texture. Cities are typically political, economic, and religious centers for surrounding territory, and they usually feature a wider range of specialized production and services. As in modern times, the city represented the central core of a greater community within which a more diverse range of activities could take place. According to the 20th-century archaeologist and urban theorist V. Gordon Childe, criteria that qualify and determine “city-ness” include the status of a site as the head of a hierarchy of settlements that performs unique functions for a regional society for its time; status as a permanent settlement that is considered home by a significant number of residents whose activities, roles, practices, experiences, identities, and attitudes differ substantially from other members of the larger society, particularly from those who identify with more rural areas; and status as a large settlement with various functions affecting a large hinterland. A town is a smaller settlement with fewer functions affecting a smaller region.

Childe has attempted to tie the rise of civilization to the development of cities. Other theorists have attempted simi-

lar analyses, with the primary questions constituting mirror images of one another: Can civilization exist without cities? Similarly, can a city exist in the absence of a civilization? In defining civilization, Childe identifies various qualifying factors that in turn reflect upon the internal workings of city-ness, such as monumental public architecture; advanced art styles involving artistic representations in multiple media; the development of practical means of recording, such as astronomy, calendars, numeral notation systems, accounting systems, and, sometimes, writing; relatively large population and density; the differentiation of the population into ordered, hierarchical social classes, such that access to knowledge or privilege is granted only to some; the concentration of human and natural resources for public enterprise; and extensive foreign trade. Such criteria as these were rarely, if ever, all in evidence at one settlement at a particular time. Rather, they serve as clues, benchmarks, and examples that help scholars determine a typology and assess the urban complexity of different sites.

Beyond the various typologies, scholars have used various methods in analyzing cities and the process of urbanization. The anthropologist and Mesoamerican scholar Michael E. Smith has delineated four basic approaches to urbanization: ecological, functional, “cosmovision,” and built environment. With an ecological approach, research focuses on subsistence, settlement patterns, economic organization, and population. Cities and towns are analyzed as part of a society's adaptation to the natural environment. The functional approach emphasizes regional economic functions, as based on the idea that economic activities tend to cluster in specific settlements, which geographers refer to as centers. From this perspective, a smaller settlement might yet be classified as a city if it shows a wide influence. The cosmovision approach emphasizes the symbolic role of cities as human replications of the cosmos, as sacred spaces, or as places containing sacred spaces where ritual activities are carried out, often affecting a larger hinterland. The built-environment approach applies a vocabulary derived from architecture, design, and environmental psychology to examine the relationship between human behavior and architecture. In this approach features such as earthen-mound pyramids, large plazas, and ceremonial avenues, all of which were common in cities throughout the Americas, are read as efforts by rulers to impose political ideology on inhabitants, often as expressions of power.

NORTH AMERICAN URBANISM

North America lacks superior examples of urbanization when compared with the Mesoamerican cities of Teotihuacán and Tenochtitlán. Perhaps because much of the regional geography is conducive to easy travel, nomadic hunter-gatherer societ-

ies remained common in many areas. Even where agriculture bore an early influence, large cities failed to evolve, although this does not indicate that complex societies did not exist or that settlements with urban characteristics did not develop. Material evidence remains scarce and data largely insufficient, but a number of North American sites merit attention.

By size and complexity the site of Snaketown is not properly a city, but it does show advanced urban characteristics. Southeast of modern Phoenix, Arizona, and a capital city of the Hohokam culture, Snaketown represents about 700 years of continuous occupation, with its decline occurring around 1200. The site comprised more than 30 acres, with an estimated total of perhaps 5,000 houses, which were built and rebuilt on the ruins of earlier ones. Special architectural features included earthen pyramids, the largest of which was 95 by 70 feet at the base and 10 feet high, with a perishable structure at the top; crude replicas of the ball courts of Central America, with a playing field 185 feet long and 60 feet wide; and irrigation ditches that were expanded over the centuries, with canals eventually reaching over 30 feet in width and 10 miles in length. A Mexican influence is revealed in the frequent use of the snake motif on art objects.

While Pueblo Bonito (920–1085), in Chaco Canyon, in modern New Mexico, and Mesa Verde (1100–1275), in southwestern Colorado, are most accurately called villages or towns, as proto-urban sites they provide architectural examples that resonate with elements considered “citylike” in modern times. Initial settlement at both sites occurred as early as 350 C.E. and is attributed to the Anasazi culture. Using only the immediately available materials—stone, earth, and wood—the Anasazi built unit structures with adjoining walls called pueblos that often appear in striking harmony with their physical environments. As populations grew, the Anasazi added second stories to their pueblos, reserving many interior rooms for storage, thus forming what are sometimes informally referred to as the first apartment buildings. Mesa Verde is most famous for its dramatic setting, with its apartment-like structures and kivas, or religious ceremonial structures, set into a deep niche on the underside of a canyon wall.

By the time the Anasazi flourished, between 1100 and 1300, the “great houses”—highly integrated assemblages of rooms, kivas, plazas, towers, and terraces—of Chaco Canyon rose as comprehensively planned structures, each incorporating ceremonial, religious, defensive, economic, and political functions into a single, walled development. Like Mesa Verde, these developments exhibited proto-urban characteristics, the most prominent of which were, again, the stacked units, which reached as high as four stories at Pueblo Bonito.

Farther east, the floodplain of the Mississippi River, a wide and well-defined natural area of easily cultivated soils

and marshy lakes, is referred to as the American Bottom. Usually thought of as a “cult center” of the late Mississippian culture, the major temple site of Cahokia (fl. 900–1100), to the east of Mississippi River at modern St. Louis, Missouri, is a cluster of groupings of ceremonial mounds and temples covering several square miles. The Mississippian culture period was characterized by the emergence of sedentary societies based on maize agriculture, with ranked or layered social orders governed by leadership believed to have been semi-divine. Mississippian settlements were formally organized around plazas flanked by earthen mounds surmounted by temples, council houses, or chiefly residences.

As broadly defined to include nearby mound groups, Cahokia stretches over 10 miles from the banks of the Mississippi River eastward. The Cahokia site proper occupied an area of 5 to 6 square miles, with more than 100 mounds. The site’s innermost sanctum, a ceremonial and residential center, comprised the most substantial temple mounds and was surrounded by a palisade of vertical logs, with defensive towers set at intervals. (The largest temple mound, referred to as Monk’s Mound, after a Trappist community that lived there from 1809 to 1813, is 104 feet tall, covers 16 acres, and contains 22 million cubic feet of earth.) Archaeologists have divided the history of Cahokia into a series of phases, as defined by the diagnostic pottery type, distinctive architecture, level of sociopolitical integration, and relationships to neighboring peoples; the phases are called Lohman, Stirling, Moorehead, Sand Prairie, and Oneota. Cahokia was occupied in various forms until about 1650, but the site ceased to be a major city at least 300 years before the French arrived in the mid-eighteenth century. Some scholars estimate that at its height as many as 40,000 persons lived in greater Cahokia.

MESOAMERICAN URBANISM

Regarding Mesoamerican urban, social, and cultural development, the village farming community was the primary template during the Early Preclassic (ca. 1800–ca. 1200 B.C.E.). In some regions, especially southern Mesoamerica, the temple center was a contemporaneous development, with major religious architecture being built during this period. The Middle Preclassic (ca. 1200–ca. 400 B.C.E.) and Late Preclassic (ca. 400 B.C.E.–ca. 150 C.E.) witnessed population increases and the rise of ceremonial centers; in nearly all areas such centers were found. In the lowland forest territory of modern Guatemala, on Mexico’s Yucatán Peninsula, and in the Veracruz-Tabasco region of Gulf Coast Mexico, temple centers grew in size, complexity, and importance as politico-religious nuclei of scattered village and hamlet life. The emerging trend, with energy, population, and organization being drawn inward toward a center, precipitated civic devel-



Jade figure of an eagle warrior (Aztec culture, Mexico, ca. 1325–1521); the eagle played an important role in the legendary foundation of the Aztec capital, Tenochtitlán because, according to myth, the god Huitzilopochtli asked the Aztecs to found their city where they saw an eagle perched on a cactus. (© The Trustees of the British Museum)

opment; thus, the Mesoamerican city has relatively ancient origins, even though it is best known from the Classic Period (ca. 150–ca. 650), through the major examples of Monte Albán, in the valley of Oaxaca, and Teotihuacán, in central Mexico. The Postclassic (ca 900 to the Spanish conquest in the 16th century) was marked by the rise of new states. The Toltec capital of Tula rose to the north of contemporary Mexico City and dominated the region from the 10th to 12th centuries. Toltec migration also influenced Postclassic Mayan cities on the Yucatán Peninsula. After the fall of the Toltec, the Basin of Mexico witnessed the settling and organizing of nomadic tribes. Finally, by 1325 Tenochtitlán, the great capital city of the Aztec Empire, was established in what is today Mexico

City. The Spanish arrived in Tenochtitlán in 1521, thus ending purely American urban development.

Mexican urban development initially arose north of contemporary Mexico City at Teotihuacán (ca. 1–ca. 650 C.E.) and in the south in the Valley of Oaxaca at Monte Albán (ca. 600 B.C.E.–ca. 900 C.E.). Teotihuacán was the largest and most complex urban settlement in the Americas until the rise of Tenochtitlán in the 14th century. By 600 C.E. Teotihuacán was the fifth-largest city in the world, with a population estimated at 125,000. Urban developments at Teotihuacán included an internal drainage system of subterranean canals, administrative and ceremonial buildings, a central thoroughfare called the Avenue of the Dead (which featured a monumental linear arrangement), a regular grid pattern, large public congregational plazas, and barrios for workers and foreigners on the periphery believed to have been organized by craft specialization. Teotihuacán was the center for an extensive empire with trade ties extending throughout Mesoamerica.

Monte Albán developed gradually and saw great fluctuations in population as well as in regional influence, eventually losing ground as an urban center while remaining a pilgrimage site of religious importance. It was thought to have risen as a center for the coordination of various regional sites, eventually developing advanced administrative, economic, social, and ritual capabilities and responsibilities. Monte Albán was built atop a hill 1,000 feet above the surrounding valley floor, with its population concentrated on terraced hillsides. Its layout focused on a civic-ceremonial center atop the hill, with multiple structures framing a central plaza. A ball court, stone slabs covered in bas-relief, slabs with evidence of a ritual 260-day calendar, and pottery produced on a large scale all suggest the kind of cultural complexity indicative of cities.

After the fall of Teotihuacán in the eighth century Mexican urban life disintegrated, with the decline lasting some 300 years. Tula, Xochicalco, El Tajín, Cholula, and Cacaxtla either continued as occupied sites or rose to prominence in the void left by Teotihuacán. Scholars suggest that Xochicalco (700–1000), built on a hill near modern-day Cuernavaca on the western slopes of central Mexico, replaced Teotihuacán as a trading center. Among its remains are palaces, a ball court, circular platforms, stepped-pyramid temples, stelae, glyphic inscriptions, and sculpted reliefs, indicating a fairly complex urban environment. Xochicalco was located on a route between the Basin of Mexico and southern and eastern regions along which cacao, cotton, feathers, jade, and obsidian were carried. Some scholars suggest that the settlement represented a merger of Mayan, Oaxacan, and Gulf Coast influences that,



The major Mesoamerican cities in the medieval period included Tenochtitlán, Chichén Itzá, Tikal, Machu Picchu, and Cuzco.

in effect, formed a bridge between Classic Teotihuacán and Postclassic Tula. Its peak population was around 20,000.

Following the fall of Teotihuacán, Tula, also called Tollan of the Toltecs, became the dominant city. Tula followed a traditional courtyard model spread over a large area. Its main square reveals a transition between the monumental linear center at Teotihuacán and the clustered center favored by the Aztec. The main square was a space of some 400 feet on each side, bordered to the north by several palace-type structures and a colonnaded hall and to the east by a stepped pyramid; the western and southern sides were open. Tula was occupied from about 800 to 1150, at which point it was sacked and burned. Its peak population is estimated to have been between 30,000 and 60,000. The Aztec looted much of Tula's undestroyed artwork, in a sense claiming the site as an ancestor city in order to establish their legitimacy as an empire. Toltec influence was felt widely, and in due time Toltec architecture and art styles were transferred to the Yucatán, especially the site of Chichén Itzá.

The climax of Mesoamerican urbanism came at Tenochtitlán, the great city of the Aztec empire, which rose over a period of less than 200 years from a swampy backwater island in the middle of Lake Texcoco to a vibrant, organized, complex metropolis with as many as 200,000 residents, larger than anything the Spanish knew when they arrived in 1521. In the following decades the Aztec reclaimed swampland by constructing agricultural plots called *chinampas*; built an immense dike system; and, through a combination of political alliances and military prowess, increased their influence such that by 1428, under the ruler Itzcóatl, the Aztec were the dominant power in the Basin of Mexico. From this point they began to spread their influence throughout central Mexico.

As the Aztec state expanded, the capital at Tenochtitlán grew, relying on tribute from conquered territory to support a large population invested primarily in governmental, religious, cultural, and military pursuits. The absolute center of activity, so to speak, was the Templo Mayor, also called the Great Pyramid, the main religious temple-pyramid. The basic plan of Tenochtitlán was cruciform, with the two axes meeting at the Templo Mayor, subdividing the city into four districts, each with its own temples, squares, markets, schools, and general constructions. Three causeways connected the island to the mainland, extending to the west, north, and south along the axes dividing the city.

The urban conceptions of the Maya were totally distinct from contemporaneous urban developments in central Mexico. In Mayan settlements clear differentiation is made between three typical sectors contributing to the overall texture of the settlement. The first typical sector is the central complex, featuring a group of plazas, courtyards, and plat-

forms surrounded by stepped pyramids, palaces, and other constructions with ceremonial or perhaps residential functions. The second area is an intermediate sector that shows declining numbers of built structures as it transitions to the third sector, the agricultural countryside. Scholars do not completely agree regarding site typology—whether Mayan settlements are cities by either function or demography—but the Mayan treatment of urban space was certainly unique.

One factor that made Mayan centers unique was the aesthetic sensibility displayed in the combination of public space, ceremonial architecture, and topographical exploitation into a functional and beautiful unity. Although their techniques were limited and they were working with only a few architectural forms and urban elements—such as paved streets, reservoirs of water, platforms, low walls or embankments, stairways of various sizes, stelae, and the stepped pyramid-temples, which were crowned by roof combs and often painted a vibrant red—the Maya were nonetheless able to sculpt transformative architectural spaces. Late Classic Period (ca. 650–ca. 900) ceremonial centers such as Tikal, Copán, Palenque, Piedras Negras, Yaxchilán, and Uaxactún were as much works of art as functional spaces. By and large the Maya avoided the axial monumentality and the linear progression of the grid of Teotihuacán, favoring instead elemental surprises that give the feeling of improvisation within well-defined structures. Mayan population statistics vary by site; for instance, a proposed upper limit at Tikal ranges between 40,000 and 80,000, while a suggested population for Copán is 20,000.

By the ninth and 10th centuries Classic Maya civilization in modern Guatemala, Honduras, Belize, and highland Mexico was collapsing, for unknown reasons, with power shifting to the northern Yucatán lowlands. Toltec influence was very important in the cultural development of the Yucatán Maya; arriving from central Mexico, the Toltec forced upon the Maya the cult of Quetzalcoatl, the feathered serpent god, and also introduced changes in local sculpture, architecture, and urban planning. Chichén Itzá was a regional capital and remained an important religious center for more than two centuries.

SOUTH AMERICAN URBANISM

In South America a golden age of urbanism began in the Andes around 1000 C.E. following the decline of Tiwanakan influence, as led by the rise of the Wari Empire in central Peru and of the Chimú in northern Peru and culminating with the rise of the Inca Empire in the 15th century; the Spanish arrived in 1532.

The cities of the Wari empire (750–1000), including the capital of Huari and the regional center of Pikillacta, developed in opposition to each other from a planning perspective.

Huari developed organically, changing a great deal over the years, eventually accomplishing a switch from ritual to administrative concerns. At its height Huari covered roughly 6 square miles, with population estimates ranging from 10,000 to 70,000. High walls erected across the city during its final phase suggest a garrison and speak to the militaristic impulses of the empire. Pikillacta was planned and erected in one phase, as dominated by an enormous rectangular complex 2,445 by 2,067 feet. Its right angles belie an undulating landscape that slopes nearly 270 feet from end to end. The complex is subdivided into four main parts separated by very few interior passageways. A single exterior entrance leading through an extremely long corridor along the east wall seems to reveal much about control of access.

The Chimú Empire (c. 1100–1470) was centered at the coastal capital city of Chan Chan. Although the city did not grow in accordance with a preconceived plan, it did contain streets, alleys, wells, and communication and sanitary facilities necessary for urban life. The city's urban core covered more than 2 square miles (with the total ruins covering around 8 square miles), as entirely occupied by 11 immense, high-walled adobe *ciudadelas* (citadels that combined royal palaces, administrative and storage spaces, and mausoleums) and intermediate spaces. Chan Chan supported an estimated population of 30,000–36,000, with most living in commoner housing or workshop neighborhoods outside a core of elite residences.

The culmination of Andean urban development occurred with the great Inca empire (ca. 1450–1532), which had its capital at Cuzco. Despite its symbolic character, political-administrative nature, and preeminent ritual and religious importance, Cuzco never managed to equal the commercial activity of Tenochtitlán, the monumentality of Teotihuacán, the elaboration of Tikal, or even the size and scale of Chan Chan. It was, nonetheless, the most important urban space in the empire. In the course of their empire building the Inca made use of cities they conquered, frequently reorganizing them to meet their own needs and demands, often along a similar organizational scheme as used in Cuzco. Some of these cities were Quito, Tumibamba, Tumbes, Cajamarca, and Pachacamac.

Cuzco rose quickly from obscure village to royal domain built of exquisite masonry. It was centered at the confluence of three rivers—the Huatanay, Tullumayo, and Chunchul—taking advantage of a traditional Andean concept known as *tinkuy*, which conveys the harmonious balancing of opposites that occurs where rivers or paths meet. The Inca straightened and canalized the first two rivers, creating a space that Spanish chroniclers claimed was shaped like a puma—certainly as unique an urban design element as seen anywhere. The city was divided further into an upper and a lower section,

or *hanan* and *hurin*, demarcating dominant and subdominant moieties, respectively. Further delineating urban space was a system of lines radiating from the absolute center of the empire, a sacred structure called the Qorikancha. These lines, not truly straight, were both symbolic and practical inventions, connecting sacred spaces called *huacas* as well as delimiting water rights. When the Spanish arrived in 1532, the Inca were already in decline. Smallpox arrived ahead of the conquistadors and set the tone for a rapid conquest. With their arrival, indigenous American urban development came to an end.

ASIA AND THE PACIFIC

BY LAURA LEE JUNKER

Cities are generally defined by anthropologists, geographers, and historians as larger-scale settlements that lie within regional settlement hierarchies and have populations in at least the tens of thousands. They play a central role in the political, social, economic, or religious life of societies, and they are accordingly functionally diverse, often featuring monumental ritual and administrative architecture, commercial zones, and socially stratified housing areas. The terms *cities*, *urbanization*, and *state-level societies* tend to be associated but are not synonymous. *Urbanization* refers to the relative percentage of people living in cities versus rural areas; a highly urban society is frequently defined as one that has 20 percent or more of its population in cities. Large population concentrations in cities may be associated with states or, in rare cases, with a prestate level of society, such as that of a politically fragmented chiefdom.

India and China developed cities on a grand scale at the center of extensive empires or states by the second millennium B.C.E., while cities were very late in developing in Korea, Japan, and Southeast Asia. They arose partly from contacts with China and India during the beginning of the medieval period (the early first millennium C.E.). Of these societies, those of the islands of Southeast Asia were the most urbanized in the 10th through the 15th centuries, owing to the great significance of foreign maritime trade that drew people to coastal ports. China and India had cities approaching 1 million in population. Many Pacific island chiefdoms developed ritual and political centers dominated by monumental ceremonial architecture and elaborate chiefs' residences by around 1000 C.E., but they were essentially rural agricultural societies with no true cities.

INDIA

Cities date back to the third millennium B.C.E. in India in association with the rise of the large urban centers of Harappa

and Mohenjo Daro. These centers boasted sophisticated sewage systems but show little evidence of large-scale religious architecture. The fall of the Harappan civilization in the early second millennium B.C.E. was followed by a long period of the rise of political centers, during which the tenets of Hinduism and ideas about social caste began to coalesce through a combination of indigenous developments and Indo-European (Aryan) migrations into the region between 1500 and 500 B.C.E. These changes in religion and society set the stage for a new type of urban center by the early first millennium C.E. in which religious architecture on a grand scale was the key to ideological reinforcement for royal authority, and the residential structure of the city reflected strong social segregation.

During the rule of the Gupta kings in the Ganges basin of northern India in the fourth and fifth centuries C.E., which was considered a golden age for the development of classical Indian culture, cities were focused on large Hindu temple complexes with exquisite religious art devoted to specific deities. Cities of the period were centers for learning and the arts, including sculpture, painting, Sanskrit literature, religious philosophy, mathematics, and scientific discovery. Historical descriptions make it clear that residential and production zones in large cities and surrounding villages were organized according to social strata and craft professions, since social prohibitions about intercaste interactions were already in place.

Between about 650 and the 1400 C.E., the core time frame for the medieval period, two factors significantly shaped urban landscapes in India. The first was the repeated invasion by foreign groups with new religious orientations, particularly Islam, including Arabs, Turks, and Mongols. The second factor was the outflow of Indian merchants and missionaries both east into Southeast Asia and west into the Middle East and eastern Africa. India became a battleground between rising Muslim polities to the north and Hindu and Buddhist states and empires to the south, and its cities emphasized militarism and defensive constructions. While capitals were often placed in the interior in defensible positions and near strategic borders, cities oriented toward maritime commerce grew along the shores of the Bay of Bengal and the Indian Ocean. The capital city of Vijayanagara, the center of the Vijayanagara Empire beginning in the 14th century until its conquest by northern Islamic states in 1565, has perhaps been studied in greater detail than any other Muslim or Hindu cities of the medieval era.

Between the 14th and 16th centuries the Vijayanagara Empire controlled nearly the whole of southern India, and its capital near the northern border housed an estimated 200,000 to 500,000 inhabitants. At the core of the city was a

4-square-mile walled royal center featuring towering gates, large brick and stone temple complexes dedicated to various Hindu deities, opulent imperial palaces, elite mansions built by ruling kings and other high-ranking nobility, and administrative buildings associated with military activities and the state economy. The greater urban area covered an astounding 135 square miles, fortified by natural granite outcrops, the Tungabhadra River, and cut stone fortifications 6 to 20 feet thick, with towers, bastions, and gateways. This urban sprawl encompassed nucleated neighborhoods, craft-production zones, markets, agricultural fields, complex irrigation systems, and additional Hindu temple complexes. Archaeological and epigraphic evidence suggests that households were clustered both by social class, or caste, and by ethnicity or religion (Muslim traders, for example, being concentrated in their own section of the city), with distinct architecture, access to wealth, and symbols of social identity.

The central location of Hindu temples and shrines emphasized the kings' use of religious ideology and public ritual to reinforce their political authority. Carved scenes of battle and large-scale military facilities (such as elephant stables, soldier barracks, and artillery magazines) manifested their military might. An elaborate system of water control, including large-scale reservoirs and irrigation canals, attests to strong imperial control of the subsistence economy, while minted coinage and high foreign-trade volumes at the capital show a centrally managed economy. While the degree of urbanism—the percentage of urban versus rural dwellers—in the large polity is unknown, it is clear that Vijayanagara was the largest of an extensive network of smaller but similarly structured cities throughout the empire, with those near the coast supporting maritime trade with polities of western Asia, eastern Africa, Southeast Asia, and China.

CHINA

China developed the earliest cities in eastern Asia. Many scholars argue for a trend toward urbanism by the late third millennium B.C.E., culminating in the huge cosmopolitan cities of the Tang (618–907) through Ming (1368–1644) dynasties in the medieval period. At the time of the Roman Empire in Europe the Zhou feudal states of China were unified through the conquests of the emperor Qin Shi Huang (r. 221–210 B.C.E.) into the Qin Dynasty (221–207 B.C.E.), ushering in the beginning of a 2,000-year imperial phase of Chinese history and the model of cities as rigidly ordered bureaucratic and commercial centers. The unification of the empire through centralization and standardization (of money, writing systems, language, architecture, and culture) was a key strategy for the Qin Dynasty and the Han Dynasty (202 B.C.E.–220 C.E.) stretching to the waning years of the Roman Empire.

Chinese cities became international trade centers along the Silk Road stretching to the Roman-held eastern Mediterranean. Ruling an empire of 57.7 million people, which extended from northern Vietnam in the south into the Korean peninsula in the east and contained numerous cities of up to 250,000, the Han established 1,500 administrative provinces, each centered at walled cities.

The breakup of the Han led to a several-century period of political fragmentation, social instability, and economic decline in China that ended with the reestablishment of a strongly centralized empire, the spread of Buddhism as a state religion, and renewed urban growth by the Sui (589–618 C.E.) and Tang dynasties. In the seventh century the Tang imperial capital Xi'an was the largest city in the world, housing more than 1 million people within the 32-square-mile area encompassed by its 23-mile rectangular outer wall. Establishing a model for emerging urbanism in Korea and Japan of this period, Xi'an was laid out in a rectangular grid of streets traversing and delimiting walled neighborhoods, royal compounds, administrative and commercial areas, and Buddhist temple complexes.

Central to the Tang capital was a royal palace and administrative core. This was a walled inner city within the city that housed the imperial family, high-ranking nobility, and various government offices, and it was often constructed anew or augmented by each successive Tang emperor. Typical of these walled palace complexes was the approximately 1-square-mile imperial center known as Daminggong built by the Tang emperor Taizong (626–49 C.E.). This consisted of a U-shaped group of several dozen buildings on earthen platforms that included lavish living quarters, ceremonial halls, and administrative offices, according to Tang Dynasty texts. While few pre-10th-century Buddhist temple complexes have survived in China, silk paintings of the period depict huge monasteries with dozens of courtyards at Xi'an and at major provincial capitals and cities throughout the empire, underscoring the religious underpinnings of imperial authority.

Fundamental changes in Chinese politics, economic systems, and social order occurred with the waning of the "golden age" of Tang rule and its succession to the Sung (960–1279 C.E.), Yuan (1279–1368 C.E.), and Ming dynasties. These changes had significant effects on Chinese demography, urbanization, and city structures. Aristocratic Tang period bureaucracies, landed estates, and wealth controlled largely by birthright nobles gave way to some degree of political meritocracy and economic mobility for commoners. Foreign trade opportunities expanded to encompass overland routes through central Asia and maritime routes to Japan, Southeast Asia, India, the Middle East, and East Africa, which opened up new possibilities for production and commerce in cities

along trade routes. Paper money, improvements in transportation, and technological innovations (such as mechanized silk spinning, printing presses, a new crucible method of iron extraction from ore, and technologies of mass porcelain production), combined with the rise of peasant entrepreneurs, revolutionized city-based trade and industry, while changes in wet-rice technology fed larger and larger populations. The result was a rapid population increase (to 100 million by the 12th century and 150 million by the late 14th century) and intensified urbanization.

While the capital of Xi'an was China's only very large city during the Tang era, by the late 13th century a significantly greater proportion of Chinese people lived in cities (particularly the rising peasant entrepreneurs), and more than 10 cities had populations higher than 1 million. Hangzhou (the southern Sung capital and Yuan-captured city) had 4 million inhabitants. It was described by the Venetian explorer Marco Polo (1254–1324), who knew it as Kinsai, as having the traditional highly ordered Tang pattern of grid streets, Buddhist temple complexes, Confucian learning centers, and sprawling commercial zones, but on a particularly spectacular scale, teeming with abundant wealth and luxuries.

KOREA

Beginning around 500 B.C.E. during the height of militaristic competition and economic growth among the Zhou feudal states in China and continuing through the establishment of the Han Dynasty in China, the Korean peninsula became enmeshed in Chinese exchange networks and political expansion. These contacts with powerful Chinese states and empires, combined with already growing social stratification and political complexity in Korean societies, set the stage for the emergence of early states and cities in the region by at least the second century B.C.E.

The pre-10th-century rise of cities is best exemplified in the history of the southeastern Korean city currently known as Kyōngju, established as the capital of a polity known as Saro in 57 B.C.E. It expanded to a city of nearly 1 million people during the ascendancy of the powerful kingdom of Silla before its ultimate defeat in 935 C.E. by the rising Koryo kingdom of northern Korea. Kyōngju emerged in the first century B.C.E. as a response to the Han Dynasty invasion and occupation of northern Korea and fears of military forays into the south. According to early accounts, Kyōngju consisted of a small palace complex with 21 buildings surrounded by a wall with eight gates that may have been the center of a polity of about 10,000 people. This legendary past is supported by wall foundations and large building foundations that may be dated to this period, as well as elaborately furnished graves with horses, bronze armor, and ornaments of gold, jade, and glass.

By the fourth century the small, legendary Sado polity had incorporated adjacent groups through conquest and emerged as the large Silla state centered at Kyōngju, one of three competing kingdoms (including Paekche to the southwest and Koguryo to the north) that dominated the Korean peninsula between about 300 and 668 C.E. The archaeological remains of the city in this period consist of three fortresses (the largest about half a mile in area), the foundations of numerous large structures, and dozens of huge, brick-lined earthen mound tombs, the largest 404 feet long and 75 feet high, scattered over an area of about 12 square miles. The tombs house what are clearly royal and noble burials.

Textual evidence indicates that the nonelite population of the city was divided into craft groups that produced at least 22 distinct classes of goods, including textiles, pottery, gold and bronze work, leather products, and jade items. It is not clear whether craft workshops were segregated in the city (since only a single pottery kiln site has been identified archaeologically) or whether the laborers lived in distinct residential zones by social class or profession, though burial tombs are clearly segregated by social rank. The enormous wealth in the tombs reflects both the sophistication of craft specialization in the state economy of Silla and its far-flung foreign trade interests overland through central Asia along the Silk Road or by sea via Southeast Asia and India. Silla was renowned for the gold bracelets, rings, and crowns it exported to other Korean kingdoms, China, Japan, and possibly more distant lands. A glass pitcher from the Roman world, a silver bowl from central Asia, and lacquer fragments, bronze vessels, and glazed ceramics from China provide evidence of Kyōngju's link to international commerce.

By the mid-seventh century the kingdom of Silla had established an uneasy alliance with the Tang Dynasty of China, which aided in its expansion through the conquest of the neighboring kingdoms of Paekche and Koguryo. Chinese cultural influence intensified, including the importation of Chinese writing systems, the large-scale adoption of Buddhism, and the implementation of Chinese concepts of bureaucracy and civic organization, all of which had profound effects on cityscapes like Kyōngju. Chinese ideals of city layout, function, and order were adopted, such as the establishment of a rectangular grid of streets, functionally discrete walled compounds within the larger walled city (including separate royal palace zones and housing areas divided by social rank), and the central predominance of royal and religious architecture.

The construction of Buddhist temple complexes on a grand scale was central to the growth of the city. One temple group known as Hwangyongsa, north of the gridded core of the city, included an enormous 96,000-square-foot pil-

lared temple, underground ceramic drains, and wide streets separating it from other ritually significant buildings. These included a stone Tang-style pagoda, a unique bottle-shaped structure, and a star-gazing pavilion that is the oldest standing astronomical observatory in Asia. Archaeological excavations also have revealed several palace compounds that probably housed the Silla kings, including one with five pavilions, elaborate gardens that surrounded the artificial Anapji Pond, and broken wine cups, the remains of wooden boats, and gaming dice, indicating the pleasures of palace life. According to texts, the non-kingly aristocracy also maintained elaborate households with tiled roofs and enclosed courtyards within the city as well as large, walled country estates worked by thousands of peasants and slaves, which formed a second tier in the settlement hierarchy.

The later medieval period (ca. 1100–1600) saw significant warfare with and influence by external powers such as the Mongol Yuan rulers of China and the newly reunited imperial Japan. These developments led to increasing international trade and monetization of the economy, the rise of a nonelite mercantile class, generally greater wealth disparities among the social strata, and a fading of Buddhism in favor of Confucian ideals. Urbanization grew dramatically because of the external threats, the increasing use of technology in agriculture and resultant displacement of human laborers, and the commercial opportunities in cities. The structure of cities reflected these changes: The once-dominant Buddhist architecture gave way to large commercial zones, ostentatious displays of wealth in nonaristocratic households, and the incorporation of foreign styles in architecture and city layout.

JAPAN

Japan's trend toward urbanization and the formation of cities is strongly tied to trade and cultural contacts with China and Korea in the early first millennium C.E. This is not to say that Japanese societies had no previous trajectory toward sociopolitical complexity, population growth, or concentration in large settlements. The first Japanese states and cities emerged just after the Yayoi Period (ca. 300 B.C.E.–300 C.E.), characterized by the coalescence of population into large fortified towns, the emergence of social stratification as manifested in elaborate moated and mounded tombs, and the sophisticated production of bronze and other prestigious goods.

Fujiwara (built in 694 C.E.) and P'yōngyang (built in 710 C.E.) in the Nara basin are considered the first cities in Japan, constructed as capitals of the Yamato state that emerged near the beginning of the Kofun Period (300–737 C.E.). Before this time the Yamato kings ruled from a series of scattered fortified palaces that were primarily administrative and ritual centers lacking the diverse population and economic activi-

ties generally associated with true cities. By this period the Yamato kings and other aristocrats had long ties to the Tang court, which had resulted in the importation of Buddhism, Chinese writing systems, a culture of horse-riding warrior-aristocrats wearing Chinese-style armor, and Chinese concepts of state administration and city planning. Therefore, it is not surprising that these early cities tended to replicate the Tang capital of Xi'an but on a considerably smaller scale. Fujiwara, for example, covered an area of 2 to 3 square miles and had an estimated population of 30,000.

Like Xi'an, Fujiwara was laid out in a grid system of streets that segregated the city into neighborhoods and administrative units, with a walled royal palace complex in the northern-central sector of the city featuring the king's residence, administrative buildings, and audience halls. These were built of nondurable wood, but their foundations and the remains of their clay tile roofs are archaeologically visible. Japanese cities like Fujiwara, however, did not follow the Tang practice of protecting the outer city with defensive walls, presumably owing to the absence of foreign predators. Aristocratic residences that contained high-status goods, one covering an area of 130,000 square feet, were situated close to the central palace complex wall, while more modest dwellings of commoners, craft-production workshops (for metal, ceramics, bone, and textiles), and at least two markets (using minted coinage) were located nearer the city's periphery. Large Buddhist temple complexes were situated both inside the walled royal center and in several places within the city. The Yamato administrators solved the problem of waste disposal in the crowded city by constructing simple latrines that emptied into ditches along the sides of streets, but maintaining health in the population was a continuing challenge, as evidenced in archaeological finds of parasite eggs in the soil of the latrines.

In the Heian Period (737–1185 C.E.) the Nara Basin state expanded to incorporate groups to the north and south on the island of Honshū to form an empire, ushering in a 400-year period of relative stability and the flourishing of traditional Japanese aristocratic court culture before the rise of feudal warrior (shogunate) rule in the late 12th century. The new capital of Heian-kyo (present-day Kyoto) rigidly followed the city-design precepts of Fujiwara, featuring gridded streets, a walled royal center, mansions for nobility close to the royal center, state-controlled market and production zones, and Buddhist temple complexes, but on a much grander scale; the city covered around 10 square miles and housed about 100,000 people, of whom about 10 percent were noblemen-administrators.

The capital city became first and foremost the center of an aristocratic culture that became a lasting symbol in con-

temporary times of all that is uniquely Japanese: The development of certain formulaic poetic styles and fictional literary canons, forms of writing and painting, spiritual and ceremonial practices derived from Buddhism, ideas about gender relations, and an idealization of the warrior spread outward from the polity center at Heian-kyō. However, the increasing diffusion over time of once-absolute imperial power to court administrators who amassed private estates outside the capital, coupled with the rise of independent militarized bands led by warlords in the frontier regions, soon led to a complete refiguring of the political order and urban landscapes by the 12th century.

Between the 12th and 16th centuries, the period known formally as the medieval age in Japan, the weakened imperial court survived but was eclipsed by independent warlords (shoguns) with only nominal allegiance and obligation to the emperor. While an aristocratic dominance of the social order persisted in the form of shogun leaders, nonaristocratic warriors (*bushi*, or samurai) and, to a lesser extent, merchants and commoners moved for the first time to center stage in Japanese culture and urban life. Large-scale cities like Kamakura, Kyoto, and Hakata of 200,000-plus inhabitants developed outside the imperial capitals. These cities retained some elements of traditional city planning but were focused less on aristocratic housing and imperial administration and more on commercial activities. Guilds of merchants under the protection of shoguns or other powerful authorities traded in specialized commodities such as salt, oil, paper, silk, or lumber, and both sanctioned ships and Japanese "pirates" left ports for China, Korea, and parts of Southeast Asia.

Another important element of the settlement landscape were the hundreds of so-called castle-towns centered on the large, heavily fortified, multistoried palaces of feudal shoguns and lesser-ranked warlords. European missionaries and merchants who entered Japan in the 16th century were astonished by the scale, architectural complexity, and lavishness of the wooden castles, which were often five to seven stories high and surrounded by walls 30 to 50 feet tall. These small cities in themselves also contained the mundane houses and commercial establishments of the peasantry whose economic livelihood depended on the protection and patronage of their warlords. At the end of the 16th century Togugawa Ieyasu (1543–1616), the third of three feudal warlords who reestablished a unified Japan through the military conquest of the more than 250 warring fiefdoms, ushered in the modern era of Japanese history. He established his new capital, in a symbolic nod to the warrior ideal, at the fortified castle of Edo on the site of what is modern Tokyo.

SOUTHEAST ASIA

Southeast Asia contradicts the notion that cities and urbanism emerge only in regions with generally high population densities and in which kingdoms or states are the primary type of political organization. The earliest known cities for which there is archaeological evidence arose in Southeast Asia by about 200 C.E. and began to proliferate after the ninth century. Some emerged in rich, rice-growing river valleys, such as coastal Vietnam (various Cham polities of the third through the 14th centuries), the Mekong valley (the Khmer state of the ninth through the 15th centuries), the Chao Phraya plains of the Thailand (the Dvaravati states of the fourth through the 10th centuries), and the fertile plains of Java (such as the Mataram of the 14th through the 16th centuries). Others arose in coastal locales strategic for maritime trade, such as the eastern coast of Sumatra (Srivijaya of the seventh through the 11th centuries) and the smaller islands of the eastern archipelagos (such as the cities of Majapahit on Java, Manila and Jolo in the Philippines, Ujung Pandang on Sulawesi, and Ternate on Maluku in the 13th through the 16th centuries).

By around 1200 C.E. and certainly by the time of European contact in the 16th century Southeast Asian cities tended to be larger in both population and area than most European ones, with Thang-long (Vietnam), Ayutthaya (Thailand), Pegu (Myanmar), Melaka (Malay Peninsula), Ujung Pandang (Sulawesi), Brunei (Borneo), Mataram (Java), and possibly other cities reaching populations at least in the range of 100,000 to 200,000 and covering areas between 4 and 15 square miles. Urban population densities often averaged more than 50,000 people per square mile, and more than 20 percent of the population lived in cities, making Southeast Asia one of the most urbanized regions of the medieval world. By contrast, rural populations outside the centers were surprisingly low, with an average of 15 persons per square mile for the region, approximately one-fifth that of China and Japan, one-third that of Polynesia, and one-half that of Europe. This was due to an agricultural emphasis on low-labor swidden farming of mixed tropical crops and only occasionally high-labor wet rice. The resultant highly urbanized but generally low-density kingdoms were supported through foreign maritime trade and plentiful lands for both intensive and nonintensive agriculture.

In Southeast Asian states that adopted Hindu, Buddhist, and later Islamic religious ideologies, cities were dominated by sacred architectural complexes at their core, but large-scale walls and fortifications, secular palace structures and elite residences, specialized craft-production and market zones, housing for foreign traders, and large water-management facilities were also an integral part of most urban landscapes. The pow-



Standing female divinity (Angkorian Period, Cambodia, 12th century); this sculpture is from the Angkor region, the seat of the Khmer Empire centered in the spectacular city of Angkor. (Arthur M. Sackler Gallery, Smithsonian Institution, Gift of Arthur M. Sackler)

erful Khmer state coalesced along the middle Mekong River in Cambodia in the ninth century out of warring regional chiefdoms and lasted for 600 years until its defeat by a rival Thai kingdom in 1431 C.E. Khmer was centered for most of its existence at the spectacular city of Angkor. At its height in the 12th century the city covered more than 10 square miles and had an estimated 500,000 to 1 million residents. The city was dominated by a series of walled temple complexes and kingly mausoleums built in elaborately carved stone by successive rulers as potent symbols of power. These initially manifested devotion to the Hindu cult of Shiva in the early dynasties and eventually reflected a religious shift to Mahayana Buddhism.

The largest and most elaborate of the more than 60 temples at the site was the Angkor Wat temple complex built by

the Cambodian king Suryavarman II (r. ca. 1113–50) shortly after his ascent to power. An outer wall of 4,900 feet by 3,900 feet and a moat 650 feet wide surrounds a second inner wall encompassing raised terraces, Hindu-style buildings with low-rise pillars, and a central sandstone temple monument with five lotus-bud-shaped towers soaring up to 215 feet above the ground. The inhabitants took advantage of the adjacent Tonle Sap Lake to build an elaborate system of reservoirs, canals, and moats, probably to control flooding and to irrigate large-scale rice fields. One reservoir held an estimated 2 billion cubic feet of water.

While archaeological work has been limited in nonelite residential and commercial areas of the city, dense scatters of broken ceramics, metal fragments, and other household goods suggest that the city housed sizable populations engaged in craft and trade activities. This is supported by Khmer inscriptions and carved bas-relief murals on the walled royal complexes that depict not only kings in royal processions and military battles but also women selling fish and other products at markets, metallurgists and other craftsmen, royal warehouses, tax collectors, and a variety of foreign merchants, providing evidence for an economically vibrant and socially diverse city.

Island cities of the same period in Southeast Asia were organized similarly around the state control of religious, social, and economic matters, but they often were constructed of perishable wooden materials and less tightly compacted. With an economy fueled heavily by foreign maritime trade rather than intensive agriculture or the internal production of luxury goods, cities like Melaka (Malay Peninsula), Ujung Pandang (Sulawesi), Mataram (Java), and Manila (Philippines) were very large capitals of branching regional settlement systems with relatively sparse and ethnically diverse populations in their hinterlands. In 1511 Islamic Melaka (which strategically controlled the narrow straits funneling trade between the Indian Ocean and South China Sea) was a cosmopolitan city of about 200,000 with a spectacular series of mosques, a walled royal core (with buildings for housing royal elephants, storing artillery, and receiving foreign dignitaries), and walled estates for the thousands of wealthy foreign merchants who lived semipermanently in the city. Among the maritime trading polities of the Southeast Asian islands, even those that were not bureaucratically complex enough and too small in total population to be classified as states (such as Sulu, Magindanao, and Manila in the Philippines) were concentrated in substantial fortified cities, suggesting that *states* and *cities* are not necessarily synonymous.

PACIFIC ISLANDS AND AUSTRALIA

Since Australia was inhabited by small-scale, mobile hunter-gatherer bands throughout its precolonial history, it is not

relevant to the discussion of medieval cities and urbanization in the region. Among the Pacific island societies the archaeologically and historically known chiefdoms of Hawaii, Tonga, Samoa, Tahiti, New Zealand (the Maori), the Marquesas Islands, and Easter Island (the Rapa Nui) reached their zeniths between 1200 and 1800 C.E. Although the political boundaries of the multiple chiefdoms in these island archipelagos shifted dramatically over time according to the fortunes of interpolity warfare and the political ascendancy of powerful chiefs, polities with populations ranging between 20,000 and 100,000 were not unusual, well within the range of necessary population densities to create cities.

The richest island archipelagos supported total populations in the hundreds of thousands; Hawaii is estimated to have supported 250,000 to 500,000 people at European contact. Centralized economies on some islands included specialist craft production, prestige-goods wealth, tribute or tax collection, and corvée labor (a tax payable in the form of labor to the state). Despite frequently high population densities, a high degree of social stratification, centralized economies, and political organization on the level of complex chiefdoms or even incipient states, the societies of the Pacific islands had no cities by modern definition. Ecological diversity and an economic reliance on resources adapted to different microenvironments such as fish, root crops, wild forest products, and domesticated pigs and fowl meant that the concentration of populations in large urban centers was impractical.

Most noticeable on the settlement landscape of these island societies are ceremonial and political complexes known as *marae* in Tahiti, *tohua* in the Marquesas Islands, *heiau* in Hawaii, and *ahu* on Easter Island. These stone-faced, earthen platforms or walled courtyards with statuary (such as the enormous heads of Easter Island) and perishable wooden structures served as ritual centers, places where chiefs resided and were buried, and symbols of political authority in the region. At Mu'a on the island of Tongatapu in the Tonga archipelago is one of the largest of these complexes, built by paramount chiefs of the Tui Tonga Dynasty around the 15th through the 17th centuries. The Mu'a complex includes an earthen ditch and bank enclosure measuring 1,300 by 1,600 feet that encompasses numerous raised house platforms for chiefs, other nobility, and priests; a large open space and stone arrangements associated with ritual; stone-faced stepped earthen mounds for elite burial; and other, more irregularly shaped mounds that may have been used for elite amusements, such as bird shooting.

Among the Maori of New Zealand more than 4,000 sites known as *pa* began to appear around 1300 to 1400 C.E. These sites ranged from one-quarter acre to 125 acres in size, were often fortified by ditches and wooden stockades, and were

frequently located on defensible hilltops. These defensively fortified sites on the northern island have yielded evidence of a limited number of habitation structures housing a subset of the population (probably the chiefly nobility) and large subterranean pits for the long-term storage of yams or sweet potatoes, a staple crop for the Maori.

In all these cases the ceremonial and political centers appear not to have housed the population of commoners and may not even have been occupied full time by the chiefly elite, who moved frequently throughout their realms to collect tribute and strengthen their political coalitions. Rather than being concentrated at a geographic center, craft production, trade, collective labor for subsistence, and many political and religious activities took place at widely dispersed villages throughout a chief's domain. Therefore, the complex societies of Polynesia never underwent an urbanization process, and cities were not part of the settlement landscape.

EUROPE

BY JOHN SODERBERG

The division between Roman and medieval cities is clearly marked in popular imaginations, with medieval people living among the ruins of amphitheaters and aqueducts. Historians and archaeologists, however, have found almost as many paths between the two periods as there are regions of Europe, some confirming the popular image and some confounding it. Whether a city endured, collapsed, or grew on fresh ground, however, every medieval European city provides insights into the workings of the society that fostered it. Inhabitants of cities in any period confront the same problem: how to get food and other necessities into a place too densely populated to produce them locally. Town dwellers must form links with increasingly unfamiliar and distant people to obtain necessities and luxuries. As the Roman-era social structures giving life to those links faded, new relationships had to be created with hinterlands and with the wider world.

Defining what constitutes a city is a perennial problem. Early scholars assembled lists of features a settlement must possess to qualify as urban. As more and more urban sites were found to lack some criteria, scholars adopted more flexible definitions of what a city is and shifted their attention to understanding what motivates people to live in crowded conditions. One important thread of explanation emphasizes a growing centralization of power. One theory of the Roman Empire posits that in many areas it did not collapse but instead withered into the hands of local elites, who used the remains of its institutions to consolidate control. Some scholars have found explanations relying solely on elite power unsatisfying and have emphasized that cities embody challenges to

central authority as much as instruments for its development. From that viewpoint cities become what have been called "arguments in stone." Their remains provide a glimpse of the many tensions that ran through societies.

BYZANTIUM

The Byzantine Empire grew out of the division of the Roman Empire in the fourth century C.E. Constantine (272–337) transformed the former Greek colony of Byzantium into his new capital of Constantinople, which occupies a strategic location on a peninsula in the Bosphorus, the straits connecting the Black Sea and the Aegean Sea. Constantine imported art and building materials from around the empire to create his new capital. The new city, consecrated in 324, was rebuilt and expanded considerably over time.

Constantinople is a testament to the entwined processes of continuity and change leading from antiquity to the medieval era. In some respects the city exemplifies continuity. Constantinople benefited from the quintessentially Roman urban amenity: a robust water supply that brought water from as far as 150 miles to feed underground sewers, fountains, massive cisterns, and baths. By the seventh century, however, most public baths had been shut down and turned to other uses. Similarly, Constantine brought the practice of *annona civica* (free distribution of bread baked in city-owned ovens) from Rome when he founded the new capital, but in the seventh century, after the provinces that produced most of the grain were lost, the practice ended.

Perhaps the most striking evidence of change is in the layout of Constantinople. Unlike traditional Greek and Roman cities, which were centered on a forum or acropolis, the focal point of the new city was the imperial palace. Much of the earlier city was cleared for its construction. From the palace the emperors could enter their box at the Hippodrome, a 60,000-seat arena for chariot races. The Hippodrome also provided a stage for the emperor to appear before and be confronted by the populace. As a testament to their importance to civic life in Constantinople, the horse races ran up until the 12th century, long after many Roman-era institutions had faded.

Streets were major features of civic life in Constantinople. The best known is the Mese, which was paved with marble blocks and lined by porticoes and sidewalks where commerce of all sorts occurred. At regular intervals, streets opened into forums and plazas that held triumphal arches and monumental statues. The major streets of Constantinople were wide and straight and had underground sewers. But minor streets, those leading to the homes of much of Constantinople's population were often narrow, winding, and unpaved. The size of the city's population varied considerably over time. Estimates

are that by the early sixth century the city held half a million people; however, following plagues and attacks in succeeding centuries, the population appears to have dropped below 100,000 by the early eighth century. The city saw a resurgence from the turn of the millennium to the 13th century, when the population again declined.

In addition to its role as the political center of the empire, Constantinople served as a crucial center of medieval Christianity. As with most medieval cities, churches and monasteries were spread throughout various sections of town; however, the ecclesiastical landscape was dominated by Hagia Sophia (Church of the Holy Wisdom of God), located northeast of the palace. Considered among the greatest achievements in medieval architecture, Hagia Sophia was originally built at the behest of Justinian I in 537. The enormous central dome is its most stunning feature. Resting 184 feet in the air, it is entirely encircled at its base by 40 windows, making the dome appear to float.

Outside Constantinople the transition from antiquity to the medieval period had dramatic consequences for cities. In antiquity the essential concept of a city was the *polis* (Greek) or the *civitas* (Latin), notions that emphasize the role of the city as the political, religious, and cultural focus of a region. More practically, cities in the Roman Empire were self-governing in many respects and were responsible for the collection of taxes. From the late fourth century the independence of Byzantine cities declined as administration was increasingly taken over by officials of the central government and wealth diverted more and more to Constantinople. With the invasions of the seventh century many cities became little more than places of refuge, often encompassing less than 1,000 square feet. Military and administrative roles became paramount.

WESTERN MEDITERRANEAN

In Byzantium urban merchants played a relatively minor role in maintaining social order and shaping urban development. By contrast, on the Italian Peninsula merchant aristocrats dominated the development of cities. From the fifth century bishops rose to leadership of many towns and extracted concessions from secular aristocrats, leaving most cities largely independent. But as their wealth grew, merchants began to assert control over town government. From cities like Venice and Genoa merchants fueled the development of expansive trade networks that connected western Europe, Byzantium, and Islamic North Africa.

The most powerful of these regional principalities was Venice, which began as a set of settlements on islands in the Venetian lagoon. The sixth-century writer Cassiodorus commented that Venetians lived like aquatic birds, and the city

remains famous for its canals. In the Middle Ages the central thoroughfare, the Grand Canal, was kept wide enough for a 200-ton ship to pass. Economically, Venice began by primarily producing salt and exporting trade goods from the Italian interior. In the early medieval period a doge (duke) elected from among prominent families of the Rialto (Venice's chief island) ruled Venice. Beginning in the 12th century an oligarchy ruled the city. The source of Venice's economic might was the system of trade contacts throughout the Mediterranean. By the 11th century Venice essentially controlled trade between Constantinople and the western Mediterranean. With the Crusades, Venice established trade colonies around the Mediterranean, including the North African coast. By 1300 the population was roughly 100,000. The center of the city was the doge's palace, a central piazza, and a campanile (bell tower) whose lights served as a beacon.

While Venice had little in the way of a legacy from the classical era, Rome's ancient legacy was essential to its medieval development. Following the shift of the imperial capital in the fourth century, Rome entered a period of dramatic decline. Its population was about 500,000 around 400 C.E. and a tenth that size by 700 and through the Middle Ages. Studies of ceramic assemblages have shown that while various types of imported pottery were prevalent to the end of the seventh century, during the eighth century locally produced pottery became prominent. The area around the Coliseum became known as the *campo vaccine* ("cattle field").

During these same centuries, however, the emergence of Rome as the center of western Christianity lent it a new significance both as a physical settlement and as a symbol of the combined achievement of antiquity and the Middle Ages. The admiration for Rome's past and its 12th-century present is colorfully displayed in the text *Mirabilia urbis Romae* (The Marvels of Rome), which describes the emperor Augustus receiving a vision of the Virgin holding the infant Jesus. Similarly, but earlier, Pope Boniface IV (608–615) rededicated the Pantheon, a gem of classical architecture, to the Virgin Mary. These activities fostered the notion of *Roma aeterna*: the pinnacle of civilization destined to endure. While such ideas might seem peripheral from a purely economic view of cities, they were enormously significant for shaping how medieval populations thought of cities and society as a whole. In the seventh century, as far away as Ireland, a monk named Cogitosus used the phrase "little Romes" to describe Irish monasteries with aggregated settlements.

Constantine's elevation of Christianity is evident in the Lateran Basilica. Previously, Christian worship had been held in *titulae*, privately owned buildings and domestic spaces. The basilica, a large public hall for transacting business, was central to the life of Roman towns. The Lateran Basilica adapts

the form to Christian worship, reflecting the changed position of Christianity following Constantine. While the Lateran area continued as the official papal center, from a very early date Saint Peter's grave, on the Vatican Hill, became a center of devotional activity. The basilica was first completed in 329, similar in form to the Lateran Basilica, except that it had a transept inserted between apse and nave.

By the ninth century Saint Peter's became the most significant locale in western Christendom, attracting huge numbers of pilgrims. To serve their needs, a substantial settlement grew up around the basilica, including hostels for pilgrims, monasteries, and a poorhouse. Leo IV fortified the area with a wall in the mid-ninth century, creating the Leonine city (*civitas Leoniana*). In the 11th and 12th centuries, fueled in part by serving the needs of pilgrims, the area became a thriving commercial and tourist area known as the Borgo. In the 13th century papal residences were expanded and rebuilt, further shifting the center of gravity toward the Leonine city.

The core of medieval Rome was known as the Abitato. In the 11th and 12th centuries the vitality of the Borgo drew settlement toward the riverbank and the Ponto Sant'Angelo, the only link across the Tiber to Saint Peter's Basilica. Competition between the settlements became sufficiently intense that innkeepers of the Borgo attempted but failed to establish a monopoly. From the 12th century on an increasingly large portion of the Abitato became densely settled, with narrow winding streets. Aside from the Lateran and Leonine settlements, the outskirts of Rome, also known as the Disabitato, were sparsely settled with farmhouses and mansions until the 12th century, when villages and fortified houses multiplied.

Three groups vied for control of Rome: popes, emperors, and local aristocrats. As was the case in much of Italy, during the sixth century bishops gradually became the primary civil authorities in Rome. The bishop of Rome became responsible for provisioning the city and paying the salaries of troops. The independence of Rome and its bishop grew over time, with Charlemagne defining territory under the pope's control in 781. In the 11th and 12th centuries, with the growth of pilgrimage trade and other commercial activity, Roman families became more powerful. Their increasing power is demonstrated in the construction of hundreds of towers in the city. In 1143 they rebelled from papal authority and refounded the senate as the Roman Commune in the center of ancient Rome: the Capitoline Hill. While the Commune lasted only until 1188, it established local families as significant players in city governance for the rest of the Middle Ages.

The Roman Empire was not alone in being split into eastern and western portions. Significant areas of Mediterranean Europe were in Islamic control during the Middle Ages. The

YORK, ENGLAND

The city of York in the north of England had been the Roman city of Eboracum, visited by the Roman emperors Hadrian, Severus, and Constantius. In 314 a bishop from York went to the Council of Arles, the first representative council of bishops of the Western Roman Empire. The Saxons who arrived more than a century later continued the Roman traditions, converting to Christianity. By the eighth century the city had become a place of such great learning that the scholar Alcuin, the head of the cathedral school of York, was hired by the Frankish king Charlemagne to run the palace school in Aachen.

In 866 the Vikings captured the city. During the Viking period the city changed greatly, with large numbers of Scandinavian migrants settling in and around York, such that when the king of Norway, Harald III Sigurdsson (known as Harald Hadrada), embarked on his invasion of England in 1066, he chose York as the place to launch his attack. He expected to receive much support from the locals. He was, however, defeated and killed at the Battle of Stamford Bridge, and three years later the city was devastated by a fire. The Normans then planned a new city, which covered 263 acres and included within its walls 40 churches, nine chapels, four monasteries, four friaries, 16 hospitals, and nine guildhalls for trade and fraternity guilds. The raising of sheep on the moors around York became a major agricultural occupation, making the city prosperous as the center of the north English wool trade.

history of cities in those areas differs significantly from those discussed so far. In fact, rather than wither, Spanish cities such as Córdoba and Seville flourished. Following the establishment of the caliphate, which ruled most of the Iberian Peninsula and North Africa from 929 to 1031, Córdoba became one of the most magnificent cities in medieval Europe. The mosque of Córdoba, begun in the late eighth century and extended through the 11th century, is often compared to Constantinople's Hagia Sophia as a primary achievement in medieval architecture. Whereas public baths fell into decrepitude elsewhere in Europe, medieval Córdoba maintained hundreds. The population of Córdoba in 1300 is estimated at 250,000. In the 13th century the caliphate broke into constituent kingdoms, and Christian kingdoms to the north began taking control of the Iberian Peninsula.

As in Rome, pilgrimage had a significant impact on cities of the Iberian Peninsula, particularly from the 12th century. Although it was not a major population center, Santiago de Compostela was an enormously significant spot in the imaginative landscape of medieval Europe because it became the end point of a network of pilgrimage routes through France and Spain. Construction of a Romanesque cathedral was begun in 1076, designed in part to accommodate large numbers of pilgrims, and a pilgrim's hospice was founded in 1104. The *Codex Calixtinus* (a 12th-century text also known as *Liber sancti Jacobi*, or the Book of Saint James) describes vendors in the courtyard next to the cathedral selling scallop shells (insignias of Saint James), wine flasks, medicinal herbs, and other items. Moneychangers and innkeepers also worked the area. Estimates are that the population of Santiago de Compostela grew from 1,500 at the beginning of the 10th century to 6,000 by 1300. The Black Death, the Avignonese papacy (a prolonged period of crisis in the Catholic Church), and other turmoil in the 14th century took a toll on the town and the stature of its bishop, though pilgrimage remained significant through the Middle Ages.

NORTHERN EUROPE

Northern Europe provides ample testament to the various paths taken from the ancient to the medieval world. Autun, originally a Roman provincial capital, maintained a Roman-era distinction between the fortress as a *castrum* (land or building reserved for military defense) and the outer settlement as the *civitas* (land owned by the civil government) well into the Middle Ages. Emporia, by contrast, appear on fresh ground. These trade settlements have been important in overturning views of northern Europe as composed of agricultural, isolated, and self-sufficient groups. Birka is one in a sequence of aggregated settlements on Lake Mälaren in central Sweden. At its peak in the 10th century Birka had a population of 500 to 1,000 individuals.

The settlement had stone jetties. As isostatic rebound—the rise of landmasses after glaciers retreat—caused the shoreline to recede, settlement expanded into the new land, and the jetties were extended. Excavations have produced evidence of large-scale manufacturing with bone, antler, leather, metal, and other materials. At Birka 3,000 graves are known, including two distinct groups. One—cremations interred under mounds—is typical of Sweden in this period. The other—burials in coffins and chambers with sumptuous grave goods, such as swords, brooches, textiles, and other imported valuables—is thought to reflect either the burial of foreigners or the adoption of new customs by inhabitants of Birka. Emporia also are associated with exotic trade items. Excavations at Helgö, a predecessor to Birka, produced an

Irish crosier, a Byzantine silver dish, a Coptic ladle, and a Buddha figurine.

A royal manor on a nearby island is thought to have held sway over Birka. The association of many emporia with royal centers and certain features of their layout, such as fixed plot boundaries, have led scholars to see many emporia as products of royal initiatives to secure and enhance their grip on power by controlling long-distance trade. Recent studies, however, have emphasized the importance of local production and the integration of emporia with their surrounding landscapes.

In the 11th century, Sigtuna became the major town in Sweden's Mälaren Valley. But by the 13th century Sigtuna had lost its economic and administrative position to Stockholm. Such discontinuity of urban centers is common to many regions of northwestern Europe in the early Middle Ages.

Paris, which became the leading city of the former Roman province of Gaul, grew from a fortified settlement built around 280 on the Île de la Cité, one of two islands in the Seine. In the early medieval era, as the settlement grew, an enduring distinction appeared between the central fortified nucleus and suburban commercial settlements on the right bank of the Seine. Commercial settlements grew up around the Abby Church of Saint-Denis and other suburban monasteries.

While Paris was home to the Capetian Dynasty (987–1328) from its foundation by Hugh Capet, the city took its place as the primary city of France during the reign of Philip II Augustus (r. 1180–1223). He established a more permanent residence in the palace on the Île de la Cité, paved city streets, and built the Louvre fortress and city walls (still visible from a gallery in the modern Louvre museum). The city population rose to between 25,000 and 50,000 during his reign. By 1300 Paris had 200,000 inhabitants, making it the largest city in northern Europe.

Universities became an important component of city life beginning in the 12th century. Universities provided corps of trained clerics to keep up with the growing reliance on written records for ecclesiastical and secular administration. By 1250 Europe had approximately 25 universities, all in cities and all affiliated with the church. In Paris the Left Bank filled with students and teachers, hence the term Latin Quarter. By 1250 an estimated 10 percent of the city's population was students. In the 12th and 13th centuries the University of Paris became the most prominent institution of learning in Europe.

The incorporation of literate administrators and lawyers into court life also had important ramifications. The use of written records greatly increased the ability to rule at a distance, which in turn increased a sovereign's ability to reside in one location and heightened the logistical difficulty of moving a court from place to place. These changes spurred the development of Paris and other cities as capitals.



Charter of King John, May 9, 1215, granting Londoners the right to choose a mayor (© Museum of London)

Tensions among municipal, royal, and ecclesiastical authorities shaped the development of cities in the later medieval period. Throughout the Middle Ages royal and ecclesiastical lords became increasingly powerful, leaving them in control of the land on which much of the population lived. Although in many respects a town is an instrument of that process, a lord granting a charter to a town gave away at least some jurisdiction. Once on the landscape a town also created a population difficult to control.

One solution was to build a castle overlooking the town: an imposing alteration of urban geography that reflected and asserted power over a populace. One of the best known was built by William the Conqueror (ca. 1028–1087). After forcing London to surrender, one of his first actions was to order construction of the White Tower, the core of what became the Tower of London, and three other castles. William placed the White Tower in a commanding position in 1078, at the southeast corner of the city walls. A curtain wall and moat were added in the 12th century. In the 13th century the tower became a royal residence.

Another means of bringing towns under control—particularly those like London that had existed before the rise of feudal rule—was to create a charter stipulating rights for townspeople and defining the form of government. As often as not, however, a charter was only an opening gambit in an

ongoing struggle among royalty, ecclesiastical powers and various constituencies in a town.

A third method of gaining control of and profit from towns was to create new ones. From the 12th century thousands of “planted towns” were created. Land was set aside, and essential components of a town—such as castles, churches, streets, and marketplaces—were built. Then future citizenry were attracted to settle in burgage plots (lands owned by a king or lord but held by someone else), which would be held on a rental basis. Important concentrations were established in central and eastern Europe with the eastward expansion of German-speaking people and in western Britain and Ireland with the westward expansion of the Anglo-Normans.

An example of a planted town is Ludlow, founded around 1100 as part of a campaign to secure the Welsh borderlands. It contained a castle and fortified courtyards that overlooked the River Teme, with the borderlands beyond. The town had a regular street grid, and a town wall was built in the 13th century. The second charter of the town, dating to 1449, refers to a council of 12 alderman and 25 councilors, elected by burgesses of the town. The lord of the castle, however, retained rights that included holding the court of justice. In return for granting liberties, the lord gained rights to rents and taxes.

Although the economic and political programs associated with planted towns are of primary importance, they were also part of a more fundamental remaking of the cultural landscape in a manner similar to 19th century colonial endeavors. The archbishop of Pecham, for example, opined that the native Welsh could be civilized only by the planting of towns. Pecham’s vision drew from classical Roman ideas about the city, casting the town as the standard bearer for civilized values and practices. Ironically, native Welsh were excluded from being burgesses in 1295.

As urban merchants became increasingly wealthy, they challenged royal and ecclesiastical rule in cities, as happened in Rome and Santiago de Compostela. The nature and extent of the power that urban populations were able to acquire varied considerably from region to region. Similarly, the extent to which townspeople won freedom from feudal authority depended on the socioeconomic circumstances in a given area. But the stories of cities in the later Middle Ages turn on the vicissitudes of these relationships. Before the Norman conquest London was governed by a group of aldermen, each responsible for a section of the city. The aldermen resisted the imposition of royal control manifested in the building of the White Tower. By the 14th century town government was constituted as an elected mayor and council of aldermen elected by guild members (according to a disputed charter of 1319). Particularly in the late 14th century conflicts among guilds led to considerable conflict and rebellion in northern Euro-

pean cities. London was troubled by fishmongers and grocers vying with drapers for power in the 1370s and 1380s.

In addition to relations among guilds within towns, connections among merchants from various places was an important factor in shaping towns in the later medieval era. In central Europe guilds of merchants formed associations that fostered the movement of goods from city to city. The most important of these was the Hanseatic League, a trade federation that established a monopoly over much commercial activity in the Baltic and parts of the North Sea. In addition to fostering international trade and the socioeconomic relationships on which it rested, the Hanseatic League was important for fostering the autonomy of cities as its merchants amassed wealth and political leverage. The league had its center at Lübeck, in northern Germany on the River Trave. The town was an important Slavic capital centered on a citadel first built in 819. In 1143 the town was reestablished several miles upriver, though the basic form of the settlement echoes the earlier town with a castle, harbor and market settlement, and a foreign merchant settlement. The town boasted a water system composed of wood pipes, wells, and cisterns; sophisticated manufacturing of glazed ceramics; and a complex of large baking ovens that supplied oceangoing vessels. In 1227 Lübeck became a free imperial city, which meant that it was freed from local obligations and its officials reported directly to the emperor. Lübeck law allowed merchants to operate under the Lübeck city council in Baltic towns affiliated with the Hanseatic League. The Hanseatic League remained a significant force up to the 16th century.

The Flanders city of Ghent is an appropriate stopping point in a review of medieval European cities for at least two reasons. First, by the late Middle Ages, Flanders had become the most heavily urbanized portion of Europe, with city dwellers comprising 20 to 40 percent of the total population. Ghent and other Flemish cities were also sites of changes in production that prepared the way for the urban centers of the early modern period, when industrial-scale manufacturing became a key engine of growth and social change.

Ghent is located at the confluence of the rivers Scheldt and Lys. By the 10th century a manufacturing center and port had developed in the environs of the castle. Over time the commercial settlement gained considerable freedom from the count of Flanders, including property rights and concessions from tolls at local markets. The population grew quickly as Ghent became the chief Flemish center by the late 12th century, drawing in merchants from around Europe and raw wool from England. Wool was manufactured into cloth and exported throughout Europe. By the early 13th century wealthy merchants dominated the politics of Ghent, and less powerful craftsmen organized into guilds that were often in

conflict with the ruling *echevins* (aldermen), a tension in turn exploited by counts and kings. Ghent declined after 1300, partly because of the rise of the English cloth industry and partly because of the Hundred Years' War.

Through this rise and decline Ghent demonstrated the effects of the shift from a manorial to an industrial economy. In the early 14th century Ghent had 60,000 people, many of whom were originally drawn to the city as they gained freedom from the breakdown of manorial holds on tenants. *Stadt Luft macht frei* ("Town air makes you free") was a common saying of the time. For some the freedoms of city life yielded wealth and membership in a new patrician class, yet the town also imposed strictures, particularly for lesser merchants and those producing cloth. These tensions led to violence and rebellions in the 13th and 14th centuries.

THE ISLAMIC WORLD

BY JUSTIN CORFIELD

During the medieval period the Islamic world covered most of the Middle East; North Africa; and, at times, much of modern-day Spain, Portugal, and eastern Europe. Islamic civilization had an impact on existing great cities such as Cairo, Damascus, and Baghdad and provided opportunities for the creative energy of the new religion of Islam to manifest in every aspect of life—medicine, science, philosophy, art and architecture, agriculture, and commerce. Aided by maritime and overland trade between Asia and Europe, there was also great wealth in the region.

Few of the cities in the Islamic world were founded during medieval times. Most were established centers of population—many operating since ancient times—located on rivers, in bays, or on caravan routes, and many of them had been enlarged during the late Roman and Byzantine periods. The result of the changing patterns of trade meant that some cities, such as Alexandria in Egypt and Sidon in modern-day Lebanon, declined. At the same time, other ports grew considerably, because of their proximity to major inland cities, such as the port of Jeddah (Medina and Mecca) and that of Acre (Jerusalem). Numerous new cities were established, many in modern-day Iraq, such as Baghdad and Mosul. The location of some cities (for example, Medina and Mecca) along caravan routes far from rivers was reliant on wells and occasionally their inhabitants had problems with water supplies in time of drought.

The wealth of the Middle East led to the considerable expansion of cities, and large numbers of cities outgrew the old Roman and Byzantine defenses and needed new ones. Many such cities were protected by defensive walls along rivers or the seafront and also along the landward side. Some of these

walls were used regularly to defend a city against attack, a threat that ensured that the defenses of the city would be well maintained. Some such defensive walls, however, were badly damaged through war or were allowed to crumble. By the end of the medieval period a number of cities had begun to decay, and a reduction in overland trade between Europe and China coupled with a general shift in trade routes to the sea led to significant changes. At the same time, there was a decline in the ability to irrigate fields to provide food for many of the cities, a problem exacerbated in many places by the depredations of the Mongols beginning in the 13th century.

CONFIGURATION OF CITIES IN THE ISLAMIC WORLD

The dominant feature of all the cities of the Islamic world was the mosque in the city's center, typically surrounded by markets and trading areas. The minarets for the mosque dominated the city, and it was from the minarets that the faithful were called to prayer. (In the eastern part of the Islamic world—modern-day Iran, Afghanistan, Turkmenistan and Uzbekistan—the minarets atop the entrances were not used to call the faithful to prayer and are largely decorative.) Many survive to this day. The minarets varied widely, from larger structures, such as those of the Great Mosque at Samarra, in modern-day Iraq, to the more traditional and narrower towers of the Grand Mosque in Constantinople (modern-day Istanbul).

Islamic architectural traditions—arches, hemispherical roofs, and decorations with calligraphic script or flower forms—became common throughout the region, albeit with distinct local variations in style. These elements were used in many important buildings in cities throughout the Islamic world (apart from mosques), such as baths, gardens, public hospitals, bazaars and covered market places, domestic housing, and palaces. Most North African cities had medinas—areas of cities that were largely inhabited by Arabs—featuring terraced houses with plain fronts and with entrances leading into courtyards. Crucial to most of these cities during medieval times were also surrounding walls to protect from attack by European crusaders, other Muslim groups, or the Mongols. Outside the city walls large cemeteries were laid out. When some of the cities expanded, the cemeteries often served to divide the old part of cities, within the medina, from the newer parts.

MAJOR CITIES OF THE MIDDLE EAST

In Arabia the major cities were Mecca and Medina, trading centers located along caravan routes near the Red Sea. Mecca was 45 miles inland from the port city of Jeddah, and Medina was about 110 miles inland. Indeed, Mecca had been a center

of commerce long before the birth of the prophet Muhammad. It was captured by the Umayyads in 692 and sacked by the Qarmatians (members of a Shiite Muslim sect known as the Ismailites) in 930. Medina (called Yathrib in medieval times) was the capital of the Umayyad Dynasty until they moved to Damascus in 661, leading to a decline in the importance of the city until the 19th century.

Elsewhere in Arabia were numerous other important cities. Jeddah, the main port, developed during the later medieval period as a stop for pilgrims going to and from Mecca. In the south of the Arabian Peninsula the city of Sanaa had been founded in ancient times on the plains between the mountains and the desert at the crossroads of several old caravan routes. With the advent of Islam in the early seventh century, the Great Mosque of Sanaa, al-Jama'a al-Kabir, was built in the center of the city. Sanaa had been a walled city before the arrival of Islam, and subsequently the city was enlarged westward. The city suffered several floods, with one in 875 severely damaging the Great Mosque, which sustained further damage in 911 when Sanaa was attacked by the Qarmatians.

On the east coast of the Arabian Peninsula the city of Muscat occupied a strip of land along the Gulf of Oman. From the seventh century, many Arab seafarers preferred to use the nearby island of Hormuz in modern-day Iran, but from the ninth century Muscat began to regain some of its earlier economic power. Two forts were positioned on either side of the city, and the landward side of the city was protected by walls. The rapid increase in the popularity of the city and the safety it afforded meant that it was not long before many of its buildings towered over the city walls.

The city of Jerusalem was captured by the Arabs in 638, and although it was occupied by the crusaders from 1099 until 1187, it remained, in essence, an Islamic city. The city was dominated by the Dome of the Rock, which was constructed on Moriah, a hill in the eastern part of the city, beginning in 688. Christian churches and Jewish synagogues were permitted to remain, and worship continued in them until the end of the 10th century, when many were destroyed under the direction of the caliph Hakim. The brief crusader period saw the defenses of the city massively enlarged, but this did not prevent the Latin Kingdom of Jerusalem from being overwhelmed by the Seljuk Turks almost 90 years after it had been created. For most of the medieval period the city was also a center of pilgrimage for Christians and Jews—the former visiting the Church of the Holy Sepulcher and the latter the Western Wall. There are surviving written accounts by Christian pilgrims who visited the city throughout the medieval period. Numerous hostels in the city catered to them.

North of Jerusalem, the port of Acre had been a major trading center since ancient times and was captured by the Arabs in 636. They held it until 1110, when the crusaders took the city and made it their chief port in the Holy Land. They heavily fortified it with a double series of walls on its landward side for fear that a land attack was a far more serious threat than assault by sea. The city was able to control the bay, and Acre remained in the hands of the crusaders until 1187, when it was captured by Saladin after his victory at the battle of the Horns of Hattin. From 1189 until 1191 it withstood a siege, before being captured by Richard the Lionheart of England and Philip II of France and their English and French crusaders. Jerusalem was refortified, becoming the last outpost of the Latin East until May 1291, when it was captured by the Mamluks, whereupon it reverted to being a Muslim city. The changes during those centuries of fighting saw much of the city destroyed.

Farther north, in modern-day Lebanon, the cities of Beirut, Sidon, and Tripoli were prosperous ports from ancient times, with all being absorbed into the Islamic world beginning in the seventh century. With the rise of Islam came mosques, baths, and medical facilities throughout these cities, along with the establishment of large markets called souks.

Damascus, said to be the oldest continuously inhabited city in the world (and the capital of modern-day Syria), was a major city of the Islamic world. It had been a Christian city, having biblical connections with Saint Paul and also being the reputed burial place of Saint John the Baptist. Captured by the Arabs in 636, it was from 661 until 750 the seat of power of the Umayyad Caliphate, during which time the eastern part of the Cathedral of Saint John the Baptist was transformed into the Umayyad Mosque, with Christians allowed to worship during the seventh century and at various times afterward. The wealth from trade meant that artisans from surrounding areas came to live in Damascus, which quickly gained a reputation for its fine textiles and metalwork.

This prosperity attracted other groups. The Abbasids captured the city in 750, and in 1076 it fell to the Seljuk Turks; it also withstood attacks from the crusaders in 1126. The Mongols briefly occupied the city before the Mamluks from Egypt took the city in 1260. Soon afterward the architectural style of the city led to what became known as the Damascene style, and this rising level of affluence led to attacks by the Mongols for a second time. The Mongols under Timur (also called Tamerlane) captured it in 1401 and sacked the city. Strong defenses were thrown up around the Old City, located around the Umayyad Mosque. This central part of the city was bisected by a road known as the Straight Street, with many of the other paths being no more than alleyways between houses.

This walled city also had a citadel in the northwest corner. The northeastern part of the old city remained the Christian Quarter, and the southeastern part was the Jewish Quarter.

The ancient city of Aleppo, to the north of Damascus, was destroyed by the Persians in 611 and then captured by the Arabs in 637. In the medieval period the city was subject to attacks by the Byzantines, the crusaders, and the Mongols and also suffered from earthquakes. Unlike Damascus, the citadel at Aleppo sits on a hill east of the Old City, where the Great Mosque, al-Jamaa al-Kabir, is located. The citadel thus dominated the city, with its position ensuring that the Byzantines were unable to take it despite laying siege to it in 961 and again in 968. The importance of Aleppo lay in its site, which allowed it to serve as an important trade link between Europe and Asia as well as facilitate contact between Christians and Muslims.

Mesopotamia (present-day Iraq and Kuwait) became the political center of Islamic civilization. The city of Baghdad (meaning “gift of God”) on the Tigris River was founded by the caliph al-Mansur in 762 as the new capital of the Abbasid Dynasty (749–1258), and soon the city was the center of Islamic civilization. Built around previous settlements from the period of Achaemenid Persia (fourth to sixth centuries B.C.E.), the city represented a blend of Persian and Hellenistic traditions. It was not long before many traders, mostly Muslims but also Jews, came to settle in the city, and it subsequently becoming a global commercial center all over the Middle East, with links to eastern Europe and even Scandinavia and eastward to India and the Far East. When the city fell to the Seljuk Turks in 1055, its importance declined considerably. In 1258 Baghdad was sacked by the Mongols, and in 1411 it was taken by the Turkomans.

Other cities in the region included Mosul in the north and Basra to the south. Mosul, founded by the Sassanids, probably on the site of a former Assyrian fortress, in the third century, became a Christian center briefly before being captured by the Arabs in 641. By the 10th century Mosul was widely known as an important center for textiles. It rose in importance when Zangi, the Seljuk governor of Mosul, used it as a base for attacks on the crusaders in the 1130s and early 1140s but declined after being attacked and sacked by the Mongols in the 13th century. Basra also was founded during early medieval times, growing from a military camp established in 637 and gradually attracting the nearby Bedouin tribes.

In Persia (modern-day Iran), the cities of Isfahan, Shiraz, Tabriz, and Yazd were also important in medieval times. Isfahan was only a provincial center when it was captured by the Seljuk Turks in 1055. Under their rule a flourishing trade began in the production of carpets, but in 1222 the city was sacked by the Mongols and did not recover until the end of

the 13th century. By contrast, Shiraz, which had declined after the Arabs captured the city in 747, rose in importance under the Buyids from 945 to 1055 and survived the expansion of the Mongol empire, building up a tradition for literature and art, especially the painting of miniatures.

Farther east, in modern-day Afghanistan, the cities of Herat, Qandahar, Ghazni, and Kabul (captured in 664) were also important centers of the Islamic world, all being located on caravan routes. They were seldom visited by many people, however, owing to their relative remoteness, with the possible exception of Herat, which was closer to the main caravan route from Baghdad to China. Separate routes into India induced more people to pass through Kandahar, and the Silk Road and that trade route were soon connected by another caravan route from Kabul through Ghazni to Kandahar. By contrast with the Afghan cities, those of Samarqand and Bukhara (both captured by the Arabs in 710) and Tashkent in central Asia all lay along the Silk Road from the Middle East to China, where trade in silk and other precious cloth took place. All these cities acquired a distinct Muslim countenance, with the erection of mosques, markets, palaces, and fortified garrison posts.

CITIES OF ASIA MINOR AND THE BALKANS

In Asia Minor the Seljuk Turks captured many Byzantine cities that lay astride the Silk Road, such as Konya, which became the capital of the Seljuk Turkish sultans of Rum. Many, such as Smyrna (Izmir), were attacked by the Arabs, Seljuk Turks, Genoese, crusaders, Mongols, and Ottoman Turks, resulting in major destruction to the city's infrastructure.

In 1453 the Ottoman ruler Mehmed II captured the city of Constantinople, which effectively marked the end of the thousand-year-old Byzantine Empire (also called the Western Roman Empire). The city then became the capital of the Ottoman Empire, from which the empire further expanded into the eastern Mediterranean and the Balkans. Mehmed II set about bringing the city into the Islamic fold. The most noticeable immediate change was the conversion of the Hagia Sophia, formerly a basilica, into a mosque.

In the 14th and 15th centuries the Ottomans conquered large parts of the Balkans and transformed many Byzantine cities there into Islamic ones. In 1371 the Bulgarian czar Ivan Shishman became a vassal of the Ottoman sultan Murad I, and the Ottoman Turks took Sofia in 1382. Bosnia became a part of the Ottoman Empire in 1463, and the rebellion of the Albanian Christians came to an end in 1468. This led to Ottoman domination of the region, with mosques and civic and administrative buildings erected in Sofia, Sarajevo, Mostar, Durrës, and other cities in the region. In most instances mosques were built in the center of cities where churches had stood.

AFRICAN CITIES

The great cities of Egypt, Cairo, and Alexandria saw dramatic changes as they were transformed into Islamic cities. Alexandria, built in ancient times, was conquered during the seventh century, but its importance and also its population ebbed with the enlargement of the nearby port of Rosetta, which had access to both the Mediterranean and the Nile. But the biggest change was the shift of power to the city of Cairo, 50 miles up the Nile. This shift made Cairo the major city in the region and one of the most important in the Islamic world. There was also a gradual shift of power within the city itself, with the new Islamic heart set on the east bank of the Nile at the al-Azhar Mosque, constructed starting in 970. Nearby, the Mosque of Sayyidna al-Hussein is the reputed burial place of al-Hussein, the grandson of the prophet Muhammad. Cairo later came under attack from the crusaders and others. At the center of the al-Azhar Mosque, the sultan Saladin began building a citadel in 1176, which later became a palace used by the Mamluks.

Farther east the main Islamic cities in North Africa were Tripoli in modern-day Libya, Tunis and Kairouan in present-day Tunisia, and Algiers and Constantine (Bone) in modern-day Algeria. The prosperous ancient city of Cyrene was largely deserted during the medieval period, and Benghazi also saw a loss in importance with the emergence of such ports as Ajdabiya. The Arab city of Tripoli sits on a rocky point overlooking the Mediterranean. The mosques have modest minarets dominating the old city; one of them, the Sidi Abdul Wahab Mosque, was built next to the surviving Roman remains of the Arch of Marcus Aurelius. Tunis is situated east of the ancient (and Byzantine) port city of Carthage. Close to the center, the Zaitouna Mosque, also known as the Mosque of the Olive Tree or the Great Mosque, was built beginning in the ninth century and was surrounded by many souks.

In Morocco the cities of Fès, Marrakesh, Meknès, and Tétouan were massively enlarged during medieval times. Fès was by far the largest, with considerable fortifications around what is now Fe'ez-el-Bali, an area that had a significant Christian and Jewish population. The latter group was forced to move west to a new settlement during the 14th century, creating the first *mellah*, or Jewish quarter, in Morocco.

Mention should also be made of the important Islamic cities of western Africa, notably Timbuktu (in present-day Mali), a major center of learning and commerce in early Islam. Despite its surrounding impressive walls, however, the city was unable to withstand attacks by the Tuareg, who sacked it in 1431. On the east coast the port city of Zanzibar (in modern-day Tanzania) had long been the focus of Arab



By the late 15th century the Ottoman Empire extended from modern-day Bosnia to the eastern edge of the Black Sea.

trade with the region, and a significant Islamic city was built on the western, sheltered side of the island.

MOORISH CITIES OF SPAIN

Many Islamic-style architectural developments are evident in Spain, where the city of Granada, in southern Spain, was a major center of the Islamic world from 711. In terms of their cultural and intellectual significance, Toledo, Córdoba, and Seville were more prominent, with Córdoba being perhaps the most prominent center of intellectual activity at the time and Toledo being the key location from where knowledge was

transmitted to Latin Europe. However, the fall of Córdoba in 1236 and the fall of Seville in 1248 led to the migration of Muslims to Granada, and this city remained one of the richest in late medieval Europe and a center of great learning and artistic endeavor. Dominated by the Alhambra, a fortress-palace complex, Granada reached its peak in the 14th century under Yousouf I and Mohammed V (who built the royal palace within the Alhambra). During the late 15th century it started to decline as the result of infighting within the ruling family. A civil war ensued, and the city fell to the Christians 10 years later, in 1492.

See also AGRICULTURE; ARCHITECTURE; ART; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CLIMATE AND GEOGRAPHY; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; FAMILY; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; INVENTIONS; LAWS AND LEGAL CODES; METALLURGY; MIGRA-

TION AND POPULATION MOVEMENTS; MONEY AND COINAGE; NOMADIC AND PASTORAL SOCIETIES; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SACRED SITES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WRITING.

Asia and the Pacific

~ Marco Polo: *The Glories of Kinsay [Hangchow]*, excerpt from *The Travels of Marco Polo* (ca. 1300) ~

When you have left the city of Changan and have travelled for three days through a splendid country, passing a number of towns and villages, you arrive at the most noble city of Kinsay, a name which is as much as to say in our tongue "The City of Heaven," as I told you before.

And since we have got thither I will enter into particulars about its magnificence; and these are well worth the telling, for the city is beyond dispute the finest and the noblest in the world, . . .

First and foremost, then, . . . the city of Kinsay [is said] to be so great that it hath an hundred miles of compass. And there are in it twelve thousand bridges of stone, for the most part so lofty that a great fleet could pass beneath them. And let no man marvel that there are so many bridges, for you see the whole city stands as it were in the water and surrounded by water, so that a great many bridges are required to give free passage about it. And though the bridges be so high, the approaches are so well contrived that carts and horses do cross them. . . .

There were in this city twelve guilds of the different crafts, and each guild had 12,000 houses in the occupation of its workmen. Each of these houses contains at least 12 men, whilst some contain 20 and some 40—not that these are all masters, but inclusive of the journeymen who work under the masters. And yet all these craftsmen had full occupation, for many other cities of the kingdom are supplied from this city with what they require. . . .

Inside the city there is a Lake which has a compass of some 30 miles and all round it are erected beautiful

palaces and mansions, of the richest and most exquisite structure that you can imagine, belonging to the nobles of the city. There are also on its shores many abbeys and churches of the Idolaters. In the middle of the Lake are two Islands, on each of which stands a rich, beautiful and spacious edifice, furnished in such style as to seem fit for the palace of an Emperor. And when any one of the citizens desired to hold a marriage feast, or to give any other entertainment, it used to be done at one of these palaces. And everything would be found there ready to order, such as silver plate, trenchers, and dishes, napkins and table-cloths, and whatever else was needful. The King made this provision for the gratification of his people, and the place was open to every one who desired to give an entertainment. Sometimes there would be at these palaces an hundred different parties; some holding a banquet, others celebrating a wedding; and yet all would find good accommodation in the different apartments and pavilions, and that in so well ordered a manner that one party was never in the way of another.

The houses of the city are provided with lofty towers of stone in which articles of value are stored for fear of fire; for most of the houses themselves are of timber, and fires are very frequent in the city. . . .

Since the Great Kaan occupied the city he has ordained that each of the 12,000 bridges should be provided with a guard of ten men, in case of any disturbance, or of any being so rash as to plot treason or insurrection against him. Each guard is provided with a hollow instrument of wood and with a metal basin, and with a time-keeper to enable them to know the hour of the day or night. And

so when one hour of the night is past the sentry strikes one on the wooden instrument and on the basin, so that the whole quarter of the city is made aware that one hour of the night is gone. At the second hour he gives two strokes, and so on, keeping always wide awake and on the lookout. In the morning again, from the sunrise, they begin to count anew, and strike one hour as they did in the night, and so on hour after hour. . . .

If they see that any house has caught fire they immediately beat upon that wooden instrument to give the alarm, and this brings together the watchmen from the other bridges to help to extinguish it, and to save the goods of the merchants or others, either by removing them to the towers above mentioned, or by putting them in boats and transporting them to the islands in the lake. For no citizen dares leave his house at night, or to come near the fire; only those who own the property, and those watchmen who flock to help, of whom there shall come one or two thousand at the least. . . .

All the streets of the city are paved with stone or brick, as indeed are all the highways throughout Manzi, so that you ride and travel in every direction without inconvenience. Were it not for this pavement you could not do so, for the country is very low and flat, and

after rain 'tis deep in mire and water. But as the Great Kaan's couriers could not gallop their horses over the pavement, the side of the road is left unpaved for their convenience. The pavement of the main street of the city also is laid out in two parallel ways of ten paces in width on either side, leaving a space in the middle laid with fine gravel, under which are vaulted drains which convey the rain water into the canals; and thus the road is kept ever dry.

You must know also that the city of Kinsay has some 3000 baths, the water of which is supplied by springs. They are hot baths, and the people take great delight in them, frequenting them several times a month, for they are very cleanly in their persons. They are the finest and largest baths in the world; large enough for 100 persons to bathe together.

I repeat that everything appertaining to this city is on so vast a scale, and the Great Kaan's yearly revenues therefrom are so immense, that it is not easy even to put it in writing, and it seems past belief to one who merely hears it told.

From: Henry Yule, ed., *The Book of Ser Marco Polo the Venetian concerning the Kingdoms and Marvels of the East*, 3rd rev. ed., vol. 2 (London: John Murray, 1903).

Europe

~ A Letter from Senator Cassiodorus, Praetorian Prefect, to the Tribunes of the Maritime Population (mid-sixth century) ~

It is a pleasure to recall the situation of your dwellings as I myself have seen them. Venetia the praiseworthy, formerly full of the dwellings of the nobility, touches on the south Ravenna and the Po, while on the east it enjoys the delightsomeness of the Ionian shore, where the alternating tide now discovers and now conceals the face of the fields by the ebb and flow of its inundation. Here after the manner of water-fowl have you fixed your home. He who was just now on the mainland finds himself on an island, so that you might fancy yourself in the Cyclades, from the sudden alterations in the appearance of the shore.

Like them there are seen amid the wide expanse of the waters your scattered homes, not the product of Nature, but cemented by the care of man into a firm foundation. For by a twisted and knotted osier-work the earth there collected is turned into a solid mass, and you oppose without fear to the waves of the sea so fragile a bulwark, since forsooth the mass of waters is unable to sweep away the shallow shore, the deficiency in depth depriving the waves of the necessary power.

The inhabitants have one notion of plenty, that of gorging themselves with fish. Poverty therefore may associate itself with wealth on equal terms. One kind of

(continued)

(continues)

food refreshes all; the same sort of dwelling shelters all; no one can envy his neighbour's home; and living in this moderate style they escape that vice [of envy] to which all the rest of the world is liable.

Your whole attention is concentrated on your salt-works. Instead of driving the plough or wielding the sickle, you roll your cylinders. Thence arises your whole crop, when you find in them that product which you have not manufactured. There it may be said is your subsistence-money coined. Of this art of yours every wave is a bondservant. In the quest for gold a man may be lukewarm: but salt every one desires to find; and

deservedly so, since to it every kind of meat owes its savour.

Therefore let your ships, which you have tethered, like so many beasts of burden, to your walls, be repaired with diligent care: so that when the most experienced Laurentius attempts to bring you his instructions, you may hasten forth to greet him. Do not by any hindrance on your part delay the necessary purchases which he has to make; since you, on account of the character of your winds, are able to choose the shortest sea-track.

From: Thomas Hodgkin, ed., *The Letters of Cassiodorus, Being a Condensed Translation of the Variae Epistolae of Magnus Aurelius Cassiodorus Senator* (London: Henry Frowde, 1886).

The Islamic World

~ *Yaqut al-Hamawi: "Baghdad under the Abbasids,"* from *Geographical Encyclopedia* (ca. 1228) ~

The city of Baghdad formed two vast semi-circles on the right and left banks of the Tigris, twelve miles in diameter. The numerous suburbs, covered with parks, gardens, villas and beautiful promenades, and plentifully supplied with rich bazaars, and finely built mosques and baths, stretched for a considerable distance on both sides of the river. In the days of its prosperity the population of Baghdad and its suburbs amounted to over two millions! The palace of the Caliph stood in the midst of a vast park several hours in circumference which beside a menagerie and aviary comprised an enclosure for wild animals reserved for the chase. The palace grounds were laid out with gardens, and adorned with exquisite taste with plants, flowers, and trees, reservoirs and fountains, surrounded by sculptured figures. On this side of the river stood the palaces of the great nobles. Immense streets, none less than forty cubits wide, traversed the city from one end to the other, dividing it into blocks or quarters, each under the control of an overseer or supervisor, who looked after the cleanliness, sanitation and the comfort of the inhabitants.

The water exits both on the north and the south were like the city gates, guarded night and day by relays of

soldiers stationed on the watch towers on both sides of the river. Every household was plentifully supplied with water at all seasons by the numerous aqueducts which intersected the town; and the streets, gardens and parks were regularly swept and watered, and no refuse was allowed to remain within the walls. An immense square in front of the imperial palace was used for reviews, military inspections, tournaments and races; at night the square and the streets were lighted by lamps.

There was also a vast open space where the troops whose barracks lay on the left bank of the river were paraded daily. The long wide estrades at the different gates of the city were used by the citizens for gossip and recreation or for watching the flow of travelers and country folk into the capital. The different nationalities in the capital had each a head officer to represent their interests with the government, and to whom the stranger could appeal for counsel or help.

Baghdad was a veritable City of Palaces, not made of stucco and mortar, but of marble. The buildings were usually of several stories. The palaces and mansions were lavishly gilded and decorated, and hung with beautiful tapestry and hangings of brocade or silk. The rooms were lightly and tastefully furnished with

luxurious divans, costly tables, unique Chinese vases and gold and silver ornaments.

Both sides of the river were for miles fronted by the palaces, kiosks, gardens and parks of the grandees and nobles, marble steps led down to the water's edge, and the scene on the river was animated by thousands of gondolas, decked with little flags, dancing like sunbeams on the water, and carrying the pleasure-seeking Baghdad citizens from one part of the city to the other. Along the wide-stretching quays lay whole fleets at anchor, sea and river craft of all kinds, from the

Chinese junk to the old Assyrian raft resting on inflated skins.

The mosques of the city were at once vast in size and remarkably beautiful. There were also in Baghdad numerous colleges of learning, hospitals, infirmaries for both sexes, and lunatic asylums.

From: William Stearns Davis, ed.,
*Readings in Ancient History: Illustrative
Extracts from the Sources*, Vol. 2: *Rome
and the West* (Boston: Allyn and Bacon,
1912–1913).

FURTHER READING

- James Aldridge, *Cairo: Biography of a City* (London: Macmillan, 1970).
- Gina L. Barnes, *The Rise of Civilization in East Asia: The Archaeology of China, Korea and Japan* (New York: Thames and Hudson, 1999).
- Helen Clarke and Björn Ambrosiani, *Towns in the Viking Age*, Rev. ed. (New York: St. Martin's Press, 1995).
- Basil Davidson, *The Lost Cities of Africa*, rev. ed. (Boston: Little, Brown, 1970).
- William M. Ferguson and Richard E. W. Adams, *Mesoamerica's Ancient Cities: Aerial Views of Pre-Columbian Ruins in Mexico, Guatemala, Belize, and Honduras*, rev. ed. (Albuquerque: University of New Mexico Press, 2001).
- Besim S. Hakim, *Arabic-Islamic Cities: Building and Planning Principles* (New York: KPI, 1986).
- Masashi Haneda and Toru Miura, eds. *Islamic Urban Studies: Historical Review and Perspectives* (London: Kegan Paul International, 1995).
- Richard Hull, *African Cities and Towns before the European Conquest* (New York: W. W. Norton, 1976).
- Richard Krautheimer, *Rome: Profile of a City, 312–1308* (Princeton, N.J.: Princeton University Press, 2000).
- Ira M. Lapidus, *Muslim Cities in the Later Middle Ages* (Cambridge, U.K.: Cambridge University Press, 1984).
- Richard M. Leventhal and Alan L. Kolata, eds., *Civilization in the Ancient Americas: Essays in Honor of Gordon R. Willey* (Albuquerque: University of New Mexico Press, 1983).
- David Nicholas, *The Growth of the Medieval City: From Late Antiquity to the Early Fourteenth Century*, History of Urban Society in Europe Series (New York: Longman, 1997).
- David Nicholas, *Urban Europe, 1100–1700* (New York: Palgrave Macmillan, 2003).
- Norman Pounds, *The Medieval City*, Greenwood Guides to Historic Events of the Medieval World (Westport, Conn.: Greenwood Press, 2005).
- Jeremy A. Sabloff, *The Cities of Ancient Mexico: Reconstructing a Lost World*, rev. ed. (New York: Thames and Hudson, 1997).
- Desmond Stewart, *Great Cairo: Mother of the World* (London: Rupert Hart-Davis, 1969).

- Glenn Storey, ed., *Urbanism in the Preindustrial World*. (Tuscaloosa: University of Alabama Press, 2006).
- Gene S. Stuart, *America's Ancient Cities* (Washington, D.C.: National Geographic Society, 1995).
- Romila Thapar, *Early India: From the Origins to A.D. 1300* (Berkeley: University of California Press, 2002).
- Adriaan Verhulst, *The Rise of Cities in North-West Europe* (Cambridge, U.K.: Cambridge University Press, 1999).

► climate and geography

INTRODUCTION

The effect of climate and geography on human history is often the subject of controversy. Sometimes the effect seems obvious, such as how the Himalayas have acted as a barrier between India and other parts of Asia. Still, neither climate nor geography can explain why the Islamic Near East became one of the most technologically and scientifically advanced places on earth until the 1100s, when the peoples of the region seem to have renounced many of their achievements. It seems easy to account for China's rise as a cultural power when one looks at the fertile valleys of the Yellow and Yangtze rivers and notes how the land could support millions of people, but the matter becomes complicated when one also observes that the China of the Tang (618–907) and Song (960–1179) dynasties was the most technologically advanced society on earth, yet trailed Europe by the end of the medieval era. It is also hard to explain why the deserts of southwestern North America saw the rise of city-building cultures and the deserts of Australia did not.

Thus, both climate and geography should be seen as factors in human history but not factors that by themselves propelled events. Instead, they shared their influence with such factors as religious faith, nationalism, diseases, and natural

disasters. It may be wise to remember that human beings have the capacity to choose behavior that is not in their best interest, to impose themselves on their environment, and to make their own history, sometimes in defiance of the natural world.

Climatologists believe that at present humanity is living in an “interglacial period.” They have used many sources of evidence to outline changes in the world’s climate over the past few hundred thousand years and have noted the arising and then disappearing of glacial periods, often called “ice ages.” Strictly speaking, an ice age is a period in which glaciers spread out over land. The most recent ice age is known as the Last Glacial Maximum. It ended in about 12,000 to 11,500 B.C.E. Evidence gathered by geologists and paleontologists indicates that the world’s average temperature rose by 16 degrees Fahrenheit within 50 years. This resulted in the retreat of the great glaciers that had covered much of the landmass of the Northern Hemisphere and a dramatic shift in the migration patterns of game animals, thus both opening up new ranges of land and inviting human beings to migrate into those ranges, following game herds.

Climatologists believe that there have been three main factors in the changes in climate worldwide. One is volcanic activity. Volcanoes can fling debris high into the atmosphere, and the part of the debris called *volcanic aerosols* can reflect sunlight away from the earth, causing the earth’s temperature to fall. Long periods of volcanic activity could create an ice age. Even so, volcanoes often emit large amounts of carbon dioxide, which can allow sunlight through the atmosphere to the earth but prevent heat from radiating away. When the carbon dioxide enters the oceans, temperatures can become cooler, but enough carbon dioxide in the atmosphere can result in warming. Interglacial periods have had higher amounts of carbon dioxide in the air than have glacial periods.

The changing in intensity of the sun’s light can be another factor in climate changes. How changes in the sun’s light occur is being debated by astronomers, but the sun has differing periods of brightness. During peak periods of sunlight the earth warms. During low periods of sunlight the earth cools. Yet another factor in climate change is the relation of the earth to the sun. The earth has an eccentric orbit, meaning that its orbit goes through a 100,000-year cycle of moving closer to the sun and moving farther away from the sun. Another eccentricity is a 41,000-year cycle of changes in the earth’s tilt relative to its orbit, changing how parts of the earth face the sun.

Volcanic activity can have a powerful short-term effect on climate. For instance, in the early 500s, there may have been a one- to three-year period in which global temperatures dropped, causing failed crops, which led to social break-

downs in many parts of the world. A prominent explanation for this event is that the volcano Krakatau (in the Sunda Strait between Sumatra and Java) exploded in about 514, throwing so much volcanic aerosol into the atmosphere that it blocked enough sunlight to lower the world’s average temperature by a couple of degrees.

Not all climatologists agree, but many believe there was a period of global warming called the Medieval Climate Anomaly, lasting from about 900 to about 1400. There seems to have been an increase of carbon dioxide in the air and an increase in the sun’s intensity. This period is often used to explain mysteries in human history such as the disappearance of the Vikings of Greenland. In theory, they settled southern Greenland during the Medieval Climate Anomaly and then saw their crops fail as the earth cooled. From about 1500 to about 1850 was a period called the Little Ice Age, although it was not a true ice age, with growing glaciers. During that period the average global temperature was about 2 degrees lower than before and after.

Geography has played a role in the climate. Mountains alter air currents; ocean currents carry warm water, warming coasts, and cold water, cooling other coasts; and the effects can change because ocean currents shift their courses. For a time the meeting of cold air with warm air resulted in rains that made the Sahara rich in wildlife, with vast grasslands where people tended herds of cattle. The Sahara is sometimes cited as an example of how human beings can alter climate and geography. The dense forests of western and central Africa cause an updraft in moist air that flows north. Overgrazing and the felling of the forest south of the desert have produced less moisture and a weaker updraft, resulting in loss of rainfall and the expansion of the desert. It may be one of humanity’s triumphs that it learned to alter geography. In the medieval era people dug canals and changed the courses of rivers to bring water to make wastelands fertile.

Mountains and oceans were barriers to be overcome, not surrendered to. In this there is a source of hope for modern peoples, because the story of climate and geography of medieval times speaks of human beings using their ingenuity to find ways to live with and manage the great forces of nature that make the land they stand on, the oceans they sail, and the rivers they fish.

AFRICA

BY LEAH A. J. COHEN

Many of the terrestrial and climatic features that distinguish Africa in the modern era were also important in medieval times. Africa is a large continent, representing approximately one-fifth of the world’s land surface area, with several major

geographical features. One of Africa's unique characteristics is that it straddles the equator, with large expanses of land on either side.

In the north the African coast borders the Mediterranean Sea, where the winter rains are dependable. To the south this coastal region borders the great Sahara, which over the course of the planet's long history has fluctuated between savanna and desert; by medieval times the Sahara had returned to being desert, and in the early 21st century it was the largest hot desert in the world, spanning approximately 1,700 miles north to south and 4,000 miles east to west, from the Atlantic Ocean to the Red Sea. The Sahara is far from static in size, having been observed to expand and retreat in its boundaries from tens to hundreds of miles within a decade. The Sahara separates North Africa from sub-Saharan Africa to the south. By no means uniform in terms of physical features, the desert features oases and river valleys (such as the great Nile River valley) as well as higher-altitude areas that provided water and more lush vegetation to inhabitants and travelers in medieval times. The Sahel region, running east to west just south of the Sahara, is characterized by semidry savanna grasslands and forests. Farther south, the land gradually comes to feature more lightly wooded savanna areas, which feed into the central African rain forests. Rain forests are also found on Africa's western coast. The central part of the continent thins from east to west down to the southern tip of the cape.

Africa's ecological zones are more closely correlated to altitude to the south of the equator than to the north. In the east mountains and plateaus begin in Ethiopia and run southward into present-day South Africa. During at least the first part of medieval times this area was savanna grassland and woodland, and much of it was home to the tsetse fly, which limited the herding of large animals until consistent and substantial forest clearing transformed the landscape. The principal deserts in the south are the Kalahari and Namib deserts.

While mountainous areas are present, Africa is not known for grand mountain ranges. However, one of the continent's major features is the Great Rift Valley, which has long been a bed of volcanic activity, running north to south in eastern Africa from the Red Sea to Mozambique. Elongated lakes, such as Lake Malawi, Lake Turkana, and Lake Tanganyika, characterize this region. Several mountainous areas disrupt the raised plateau spanning much of the continent to the sides of the rift, including the Atlas Mountains in the northeast, the Ethiopian Highlands in the east, and the Drakensberg in the south. Principal peaks include Mount Kilimanjaro, at 19,340 feet, in present-day Tanzania; Ras Dashen, at 14,872 feet, in Ethiopia; and Mount Cameroon, at 13,435 feet, in Cameroon. Most of Africa's highland areas were produced by volcanic activity; exceptions include the Atlas and

Drakensberg mountains, in the north and south, respectively. Little folding or merging of tectonic plates has occurred in Africa because the continent is positioned atop one relatively stationary tectonic plate.

The continent's major rivers include the Nile River in the northeast, the Niger River in the west, the Congo River in west-central Africa, and the Zambezi River in south-central Africa. Since much of the continent (especially in the east and south) is characterized by plateau landscape, many of the major rivers reach the ocean with dramatic waterfalls that drop down the steep escarpments characterizing much of the coastline. The coastline itself is relatively smooth, with few coves that serve as good natural harbors, and provided relatively little opportunity to access the interior during medieval times.

CLIMATE

The major factors, primarily terrestrial, that influenced climate in Africa during medieval times have indeed been influential throughout the continent's long history. These factors included topography, location, and the size of the continent. Such characteristics remained constant throughout the medieval period and contributed to the ecological patterning of tropical rain forest, open savanna grassland, desert, and the coastal Mediterranean terrain.

Owing to Africa's location straddling the equator, such that it lies mostly between latitudes 35 degrees north and south and receives a great deal of solar energy, one of the dominant climatic concerns across much of the continent is the amount of rainfall. The long boundary between the Sahel and the Sahara is based on rainfall and is therefore not fixed. The Sahara sometimes is defined as the area that receives less than 8 inches of rainfall annually, while the Sahel receives up to 20 inches of rainfall annually. South of the Sahel is moister savanna, which receives up to 40 inches of rainfall each year. This ecological zone transitions into more forested areas and tropical rain forests in the Congo River basin, where the annual rainfall can reach approximately 200 inches. Such rain forests also are found along Africa's west coast. Rainfall and associated ecological factors vary based on elevation, and in the early 21st century some of the mountain peaks in Africa were snow covered year round.

Ocean currents and associated air currents play a substantial role in regional climatic variation in Africa, since they alternately bring moisture and warmth from the equatorial Atlantic or dryness and cold from the north. The Guinea Current brings rainfall and a warm climate to western Africa and the warm Mozambique Current does the same in southeastern Africa. The Canary Current carries dry, cool air to the western coastal area of the Sahara Desert, while the Benguela

Current creates cool, dry conditions in the southern Africa desert areas on the west coast.

Many climatologists argue that the medieval period in Africa is part of a long-term trend of increasing dryness that began around 4000 B.C.E. Still, the medieval period did witness small-scale increases and decreases in moisture and temperature, with regional variations. Other climatic factors that were influential during this period included surface winds, volcanic activity, and solar radiation.

The dominant climatic phase during this period was the Medieval Warm Period, which began as what some scientists believe was a generalized global trend sometime between 800 and 950 and ended with a comparatively consistent dropping of temperatures throughout the 1300s. As a result of Africa's largely tropical location, relatively little variation in temperature is found, in contrast to most landmasses farther north or south. Northern Africa, in particular, features a vast interior (noncoastal) area; since land heats and cools more quickly than does water, the interior portion of northern Africa—much of which is the Sahara—gets both colder and hotter than the coastal areas. Some African locales may have been between 5 and 7 degrees Fahrenheit warmer at the peak of the Medieval Warm Period than they are in the modern era, with record highs in the interior well above 130 degrees Fahrenheit. In association with the added heat, much of Africa was drier during the Medieval Warm Period, although climate change was gradual, did not begin coincidentally throughout Africa, and did not necessarily follow the same trends in all regions on the continent.

Nile River data show minimal flows during some of the Medieval Warm Period. For parts of the upper Nile basin, in eastern Africa, scientists have observed that rainfall progressed from relatively high levels during the second half of the first millennium C.E. to much drier conditions sometime between 900 and 1200. Data from Lake Hayq, on the eastern edge of the Blue Nile (in northern Ethiopia), show that rainfall dipped between 750 and 1200 C.E. Around or after 1000 C.E. substantial agricultural settlements in the inner Niger delta disappeared, perhaps because of decreased rainfall in the region. Lake Naivasha and the basin of Lake Victoria, in eastern Africa, and (at least immediately before 1300) the Lake Bosumtwi area, in western Africa, were also much drier during this period.

While the Medieval Warm Period was generally a time of increased dryness in Africa, evidence indicates that some locales may have experienced increased moisture. Timbuktu received increased rainfall during this period, and parts of the Chad River basin that do not support expansive settlement in the modern era owing to lack of moisture were populated from around 200 to 1100. Also, between 800 and 1300, parts of the modern Sahel region experienced higher rainfall.

Variations in rainfall during the Medieval Warm Period may have been caused by differences in the patterns of surface winds. In the areas closest to the equator, rainfall is largely controlled by the Intertropical Convergence Zone. This zone is a low-pressure belt that represents the colliding of winds from the Northern Hemisphere—such as the Harmattan, a dry northeast trade wind—and the Southern Hemisphere—such as the monsoon, a wet southeast trade wind. This belt moves north and south around the equator, and as it passes over land the moist winds of the monsoon bring rainfall. The north-south movement of the Intertropical Convergence Zone occurs twice yearly, meaning that places in equatorial Africa generally have two rainy seasons. Areas farther from the equator and on the outside edges of the swing of the Intertropical Convergence Zone experience only one rainy season each year. The shifting boundaries between the Sahara, Sahel, savanna, and rain forests—which are based on annual rainfall—have been attributed in part to changes in the location of the Intertropical Convergence Zone. Periodic droughts, including decreased annual rainfall and the delayed onset of seasonal rains, have been a normal aspect of climate patterns in Africa throughout its history.

Evidence indicates that during the Medieval Warm Period the Intertropical Convergence Zone experienced a more northerly swing, while during the Little Ice Age (a period of cooling that followed the Medieval Warm Period) it traveled a more southerly course. This would have meant that the rains associated with the Intertropical Convergence Zone fell on areas farther to the north (such as Timbuktu and Lake Chad, compared with Lake Naivasha and Bosumtwi) and that the boundary between the Sahara and the Sahel would have been north of where it was during the Little Ice Age.

The Medieval Warm Period came to a close as temperatures began to drop gradually starting in the 1300s. This extended phase led into the Little Ice Age, which lasted from 1550 to 1850. During this period temperatures in interior southern Africa are thought to have been almost 2 degrees Fahrenheit cooler on average than they are in the modern era.

Regarding the phase leading up to the Little Ice Age, data show that parts of the Sahel experienced increased dryness from 1300 to 1450. Lake Malawi's water level fell during the end of the warm period, from 1150 to 1250, and then again from 1500 to 1850. The corresponding decrease in rainfall for the later dates represented a severe drought for this area of southern Africa. However, as was true for the warm period, patterns were far from consistent. Data from some areas of the Sahel-Sahara border and from eastern Africa indicate that during the Little Ice Age rainfall actually increased: Lake Chad was higher, Nile River flows were high, and the water level of Lake Naivasha was rising.

The termination of the Medieval Warm Period may have been in part caused by variations in solar radiation, or energy coming from the sun. Short-term and long-term variations in solar radiation have always occurred, as associated with numbers of sunspots, and the Little Ice Age has been associated with a 70-year period of minimum sunspots. Another contributing factor may have been an increase in volcanic activity. The sulfur dioxide released during volcanic eruptions travels high into the stratosphere and forms sulfate aerosol, which acts to reflect solar radiation back into space before it has a chance to warm the earth, resulting in cooler global temperatures. Thus, even if no increase in volcanic activity in Africa near the end of the Medieval Warm Period has been observed or recorded, volcanic activity elsewhere on the globe could have triggered cooler temperatures in parts of Africa; indeed, one such event took place in Iceland in 1175.

HUMANS WITHIN THE ENVIRONMENT: THE EFFECT OF TRADE

Human settlements molded and were molded by their environments with regard to numerous geographic and climatic factors during medieval times. Such factors included rainfall, soil type, ecological variations, and availability of natural resources. Interactions between humans and their environments were largely shaped by increases in the number of and contact among cultures that were growing increasingly complex and sophisticated.

One of the major human activities of the medieval period in Africa was the trans-Saharan trade. This extensive network was driven by the continent's wealth of valued natural resources, including gold, salt, and ivory, as well as by the transport and exchange of slaves. As the Sahara had returned to desert conditions long before the medieval period, nomadic Berber people who were native to the Sahara region had extensive knowledge of survival in that climate and landscape. The brief and minor humid phase that began in the middle of the first millennium C.E. led humans living in the Sahel to move north toward the Sahara, where they interacted more intimately with Berbers and Arabs, who were in turn traveling farther and farther south, ultimately reaching Sahel regions by the year 600. During this period population centers developed in the drier regions, serving as stopover locales for the long-distance Saharan caravans.

Berbers became essential contributors to trans-Saharan trade, leading the long and large camel caravans that crossed the desert to trade Africa's natural resources with Arab, Mediterranean, and eventually European peoples. The original introduction of the camel into regional trade activity in the third or fourth century C.E. dramatically changed human patterns in the context of the very harsh landscape. In the centu-

ries that followed, trade routes blossomed and allowed for the rise of great civilizations based on the exploitation of Africa's natural resources. The economies of the medieval Ghana Empire (eighth to mid-13th centuries), from which arose those of the Mali empire (beginning ca. 1100), from which arose those of Songhai (mid-15th to late 16th centuries), were based on the wealth gained from the trade of gold, salt, slaves, ivory, kola nuts, copper, leather, rubber, iron, cloth, and other items. Trade across the Red Sea with Arabia also expanded during this time period. The civilization of Axum, in northeastern Africa, traded in ivory, slaves, and other natural resources with Arab seamen.

RISE AND FALL OF CIVILIZATIONS

The rise and fall of great African empires often can be attributed to geographic and climatic causes. The moderately sized trade city of Adulis, on the Eritrean coast, outgrew its water resources and was moved to the nearby highlands of northern Ethiopia, becoming the city of Axum. This city prospered in part as the result of favorable climatic conditions that graced the area with two rainy seasons, allowing for two farming seasons each year. As the population expanded, forests were cleared for settlement, agriculture, and iron smelting. Over time, excessive cropping led to soil erosion and declining soil fertility. The final blow to the region was a decline in rainfall around 750. These factors led to the demise of the civilization by 800.

The Ghana Empire, in present-day Mauritania and Mali (and bearing no connection with present-day Ghana), was founded and flourished based on the region's rich gold mines during the first millennium C.E. Many factors have been cited as contributing to its fall, including population growth that stripped the region of natural resources, drought, and conflict with outside groups. The people of Ghana enjoyed relatively favorable rainfall between 300 and 1100. However, a regional drought in 1100 made the successful raising of cattle and sheep difficult. Furthermore, economically Ghana relied on its control of gold in the trans-Saharan trade; around 1200, gold mines opened up elsewhere, also contributing to the civilization's decline. By 1235 the Ghana Empire no longer existed.

As Ghana declined, the Mali Empire became a main force in the trans-Saharan trade of gold and salt. At its height in the 14th century the empire stretched from the Atlantic outlet of the Senegal River some 1,250 miles inland, east of Timbuktu. Climate change assisted growth in trade and wealth for the empire: During the dry period from 1300 to 1450 Malian peoples were able to access areas rich in gold that had previously lain well within the wet habitat of the tsetse fly, which carries a deadly disease known as sleeping sickness. At

the time, this habitat was limited to tropical Africa's savanna-woodland border.

Climatic conditions that produced a moist, warm period in southern Africa from approximately 900 to 1300 allowed for the development of the Mapungubwe civilization (ca. 1075–ca. 1270) in present-day Botswana and Zimbabwe. This herding and trading civilization boomed during the moist period but disappeared in the mid-13th century, just as the climate began to change. Shona pastoral settlements then developed in the highland areas to the north, around the city of Great Zimbabwe, between 1275 and 1450. This Shona civilization collapsed during the latter half of the 15th century, but the impact of the great numbers of humans that had lived in the area left the landscape forever changed, denuded and stripped of many of its native trees.

CLIMATE AND DISEASE

Disease shaped human settlement and migration patterns throughout the African continent during the medieval period. The rainfall boundary of 40 inches was then quite important to humans, because it represented the lower limit of the tsetse fly habitat. Herders tended to live farther north, where rainfall levels were lower, to prevent infection of their herds by sleeping sickness, which was particularly fatal to large livestock. Since the Intertropical Convergence Zone moved farther to the north during part of the Medieval Warm Period, so also did the pastoral inhabitants who made their livelihoods in the grasslands free from the tsetse fly. Although rainfall was sufficient to grow certain cereal crops in the area just south of the Sahel, inhabitants of this area could not use large plow animals to cultivate the soil, also due to sleeping sickness, which limited the expansion of farmland. Sleeping sickness further necessitated the use of human porters, rather than large domestic animals, for trade in areas where the tsetse fly was common.

Another African disease that affected human societies was bilharziasis, or schistosomiasis, which was transferred to humans through contact with bodies of water that were home to the disease's snail hosts. Malaria and measles were also common concerns, though low population densities served to limit the capacity of these diseases to become endemic during the medieval period. The threat of widespread endemic diseases accompanied the increases in population densities seen from this time period onward, as the rising of the great medieval civilizations led to the growth of urban areas and more frequent use of close living quarters.

LIVELIHOODS

Many of the common livelihoods of the medieval period were closely related to and shaped by the climate and by the geo-

graphic nature of the land. Farmers were constrained by the need for rainfall sufficient to grow crops; after the decrease in rainfall between 1100 and 1400, farmers largely remained below latitude 18 degrees north. Pastoralists, again, were geographically constrained by sleeping sickness. Human groups in the central rain forests tended to maintain their hunter-gatherer livelihoods because the soils could not sustain long-term fertility if cleared for farming. As such, population densities were lower in this region.

Pastoralists from dry areas of the Sahel-Sahara border region tended to engage only in herding, rather than making livings through a variety of occupations, because entire communities needed to possess particular specialized skills to ensure the survival of their herds and themselves. In the Great Lakes region of eastern Africa, on the other hand, pastoralists found the raising of cattle and other animals much easier owing to the plentiful rainfall and kinder environmental conditions. They were therefore able to devote additional time to the development of agriculture, establishing productive banana and fishing industries. The nature of the ocean currents off the shores of Africa, in fact, produced certain areas with rich fishing grounds. Cool currents provided particularly plentiful ocean harvests near the shorelines of present-day Morocco, on the western Sahara coast, and Namibia, on the western Kalahari and Namib desert coasts.

Trade through both the Arabian and trans-Saharan networks developed, and it was sustained because of Africa's rich supplies of natural resources. Thus, social interdependence only grew during this time period, both within communities and between communities. In turn, increased opportunities for trade allowed persons to specialize more frequently in one particular skill, such as craft work. Greater supplies of goods, in turn, fostered further increases in trade and specialization as well as the development of castes based on professional trades and of hierarchically organized social systems.

NATURAL RESOURCES

Many African groups had the technology to smelt copper and iron long before the start of the medieval period. This technology had reached southern Africa by the turn of the 11th century. The process of iron smelting required the harvesting of grand numbers of trees for the production of charcoal. As such, the clearing of forests transformed the landscape, exposing the soil to the elements, which led to increased erosion and decreases in soil fertility. However, this process also aided human settlement because forest clearing opened up land for farming—at least until the soil nutrients were sapped—and eliminated the habitat of the disease-carrying tsetse fly. Furthermore, the invention of iron tools increased agricultural

production, allowing for increased population densities, since more food could be produced on smaller areas of land.

Arab and Indian traders and explorers had long been interested in Africa's rich natural resources, traveling over the Sahara and by sea on predictable ocean currents between India and eastern Africa. From approximately 700 C.E. onward a well-established Arab slave trade was present on the east coast. Toward the end of the medieval period European explorers also became interested in Africa's various resources. In the 1400s the Portuguese became the first Europeans to travel to the continent and engage in the exportation of goods and slaves. The exploration and colonization of Africa was limited to certain coastal areas during this period owing in part to the harsh physical conditions. For example, many of Africa's rivers were not ideal for navigation because of rapids and steep drops over cliffs. Exceptions included rivers in western Africa, such as the Niger, which was an important trade route in medieval times. European traders also found few natural harbors on the continent's coastline.

THE AMERICAS

BY MICHAEL J. O'NEAL

During the centuries before European contact, the culture and history of the numerous peoples who inhabited the continents of North and South America continued to be shaped by the elements. The Americas offered inhabitants a wide range of geographical and climatic conditions, from tropical heat to Arctic cold, from lowlands and plains to mountain highlands, and from densely forested regions to sparsely covered deserts and tundra. The process of continually adapting to unique geographical conditions gave shape to the material cultures of American peoples. In some cases, relatively abrupt climate change forced Americans to adapt, move to other areas, or die out.

NORTH AMERICA

For most people in the modern world the geography of North America has an east–west orientation. A sub-Arctic band stretches east–west north of Canada. Both Canada and the United States are visualized as occupying east–west bands of territory. (Mexico, too, is part of North America but is considered separately.) To a geologist, however, North America consists of largely north–south zones, including at least five: the Canadian Shield, which underlies the northeast portion of the continent; the Appalachian Mountains, which extend from northern Quebec to Alabama; the Atlantic–Gulf Coastal Plain, which extends from southern New England to Mexico; the Interior Lowlands, which extend from northern Canada through the North American Great Plains; and, finally, the

North America Cordillera, a system of mountains, plateaus, and basins that stretches from Alaska to Mexico. Accompanying these geological features is a rich network of lakes and waterways, including major river systems such as the Mississippi and its main tributary, the Missouri River, along with bodies of water such as the Great Lakes that were carved during the last ice age.

These geographical features shaped the cultures of medieval Americans. To the north the Inuit culture of Alaska, northern Canada, and Greenland, the descendants of what is called the Thule culture, spread eastward from Alaska beginning about 1000 C.E. They displaced the earlier Dorset culture, largely because the latter did not have boats, sled dogs, or other innovations that gave the Inuit an advantage over them. By about 1300 the Inuit had arrived in western Greenland. The Inuit were nomadic and occupied regions north of Canada's timberline. Because they lived in regions with little or no vegetation and not suited to agriculture, they lived primarily by hunting game, fishing, and whaling and supplemented their diet with seaweed. Their first contact with Europeans was probably with the Vikings, who created settlements in Greenland and eastern Canada.

Even in the cold of the Arctic North climate changes had a profound impact on the Inuit. Beginning around 1350 (although climatologists and others disagree about the date) the so-called Little Ice Age hit North America. This was a 300-year period, perhaps longer, during which temperatures in the Northern Hemisphere became noticeably cooler. Because temperatures dropped in the high Arctic regions, the Inuit had to leave their whaling and hunting sites to move south. The Inuit culture depended heavily on whaling for fuel (whale oil), bones for tools, and especially food, without which the Inuit diet became poor. While the culture had always been nomadic, the Inuit found themselves forced to move more often and even to set up semipermanent settlements. Rather than using sod and whalebone to construct dwellings, they turned to less-permanent houses made of ice, commonly known as igloos. They moved into the edges of the Canadian timberline, where they were forced to coexist with other Indian groups.

Climatologists note that the Little Ice Age was preceded by a period variously referred to as the Medieval Warm Period or the Medieval Climate Optimum. On either side of the North Atlantic temperatures were unusually warm from roughly 800 to 1300. Some climatologists believe that the phenomenon was global, others think that it was restricted to the Northern Hemisphere, and still others consider it to have been a phenomenon of little importance (although this group is in the minority). In any event, the period coincided with a period of peak solar activity called the Medieval Maximum,

a period that lasted for about 150 years beginning in 1100. Archaeological evidence shows that temperatures increased in eastern North America during this time. Even Alaska grew measurably warmer. The period also coincided with extreme droughts in western North America, particularly in the Great Basin area of the western United States.

These climatic changes had a profound impact on numerous North American cultures. One of these cultures was that of Greenland, now politically part of Europe as a Danish territory but geographically part of North America. Between the third and the 10th centuries Greenland was essentially uninhabited; some earlier Eskimo cultures had died out by about 200. In the 10th century, however, Danish explorers established colonies on Greenland, the world's largest island. These settlements were in deep fjords on the southern part of

the island, which was much warmer and more lush than it is in the 21st century, probably because of weather associated with the Medieval Warm Period. The relative warmth permitted hunting and agriculture. These colonies, which contained a mixture of Danes and Inuit, lasted for about four or five centuries and then died out as Greenland became colder during the Little Ice Age. When agriculture became impossible, famine struck.

Geography and climate likewise shaped the culture of Native American peoples elsewhere throughout the continent. Numerous examples could be cited; each Native American group and confederation adapted itself to the geographical niche it occupied. For example, Plains Indians such as the Sioux occupied primarily the steppes, or vast, open grasslands, that dominated the center of the continent from

HOW DO ARCHAEOLOGISTS KNOW ABOUT CLIMATE?

In the modern world, scientists use sophisticated instruments to measure current temperature and other climatic conditions. Even ordinary people can get fairly accurate temperatures simply by consulting a thermometer positioned on a tree or post outside the home. But historians, archaeologists, climatologists, and environmentalists are vitally interested in learning everything they can about temperatures and other climatic conditions during historical periods when accurate records were not kept and people did not have the tools for measuring these conditions. So the simple question is this: How do these investigators know what temperatures were in any particular region of the world a thousand years ago?

Investigators have developed a number of tools to answer that question. One is the science of palynology, or the study of plant pollen. Pollen from plants can survive in numerous sets of conditions. It has been found in pottery, burial artifacts, and deep peat bogs, for example. By studying plant pollen, scientists can learn which plants grew in an area at a particular time. This information offers insight into the region's climate, particularly how the climate changed over time. Another science is that of geomorphology, or the study of landforms. Again, the emphasis is on how landforms changed over time, often as a result of changes in climate. A third science is that of paleoethnobotany. Paleoethnobotanists study how plants were used in the past; in this sense, their focus is similar to that of palynologists, for plant use provides clues about such factors as temperature and moisture conditions.

These sciences, though, measure relative conditions over time. They can tell scientists that a particular plant, for example, grew in a particular region at a particular time. Such knowledge can provide evidence about relative temperatures and other climate conditions. But is it possible to measure actual temperatures? The answer is yes. One technique for doing so is called obsidian hydration. Obsidian is a type of volcanic glass found, among other places, in the western United States. Obsidian absorbs water on its surface, but the rate at which it does so depends on temperature. The outer layer of a piece of obsidian is called the hydration layer. By measuring the thickness of the hydration layer, scientists can accurately determine temperature conditions at the time the layer formed.

Numerous other techniques exist as well. Climatostratigraphy is a science that enables investigators to trace ice movements, providing clues about temperatures and changing climatic conditions. The examination of seabed deposits enables scientists to measure the amount of oxygen contained in shells and skeletal remains, which varies depending on temperature conditions at the time. Similarly, lakebed deposits yield what are called varves, or alternating layers of coarse and fine sediment, determined by climate. The size of tree rings is dependent on climate; rings are examined by scientists called dendrochronologists. Ice cores are drilled from glaciers in places such as Greenland. The different crystalline structures of the ice can provide evidence of temperature conditions at the time the ice formed, and a long core can provide a narrative of changing conditions over time.

central Canada down through Minnesota and the Dakotas and into the Great Plains. These areas were too dry to support forests but were wet enough not to become deserts. The grasslands supported large game animals, including buffalo, elk, and deer. Accordingly, Native American cultures in this region adapted to the resources provided by geography. These groups—including the many that made up the Sioux—lived largely nomadic lives following the herds of buffalo, although certain northern Sioux led more settled lives, where agriculture provided a portion of their living.

In contrast, the groups of the Eastern Woodlands, who lived in the eastern United States and Canada in a region stretching westward to the Mississippi River, lived a very different kind of life, again largely as a function of geography. Among the earliest groups were those of the Adena and Hopewell cultures, which flourished until about 800. They occupied niches with a relatively moderate climate and rich soils. Thus, although they hunted and gathered, they supplemented their diets with agricultural products, including beans, corn, pumpkin, and squash. Abundant forests provided wood and wood products for a host of items, including dugout and birch-bark canoes, fencing for villages, and log dwellings.

In contrast to the Plains Indians, the Eastern Woodland cultures, with abundant resources at their disposal, lived more settled lives, for they did not have to move about in search of food. Thus, they built more permanent homes, including those made of clay and poles in cooler regions and those made of thatched palmetto leaves in the hotter southern regions. Because they led a more sedentary existence with more fixed territorial boundaries, their societies, rituals, religious beliefs, and class systems became more complex. While Plains Indians relied on buffalo hides for clothing, Eastern Woodland Indians used deerskin. Even religious beliefs were shaped in part by geography. More northerly nations held that the world was formed out of mud; groups in hotter, more southerly regions placed their religious emphasis on the sun and fire as the source of creation.

Native Americans in mountain regions faced a different set of challenges. The Ute, for example, developed a culture shaped by geography in the millennium before the arrival of the Spanish in the region. The Ute never formed a fully organized, centralized culture. Rather, they consisted of a number of bands that occupied different niches of the mountains of Utah, Colorado, and New Mexico. Thus, for example, the Mouache band inhabited the eastern slopes of the Rocky Mountains; the Capote lived in the San Luis Valley of Colorado; the Tabeguache, sometimes called Uncompahgre, occupied the valleys of Colorado's Gunnison and Uncompahgre rivers; and the Uintahs lived in the Great Salt Lake basin. Other bands occupied different parts of the region.

In contrast to the Plains Indians, the Ute bands did not inhabit a broad, open region, where movement and communication were relatively unimpeded, and, in contrast to the Eastern Woodland groups, they were not surrounded by lush forests and highly arable land. In the numerous river valleys, canyons, and mountain ridges of this region, the bands remained largely separated from one another, and each adapted to geographical conditions in its own way. Geography had a profound impact on the social organization of each band. Because these mountain regions were sparsely vegetated, a large amount of land was needed to support a group of people through hunting and gathering. Accordingly, the unit of social organization was the family rather than the band or the group. Bands came together during the winter months, when festivities were held and marriages were contracted. During the summer months the families that made up the band separated to hunt, gather, and perhaps plant crops in mountain meadows.

To the north, Native American groups in the centuries before the arrival of French trappers and traders occupied ground similar to that of the Ute in a region that consisted of numerous canyons, mountain ranges, and valleys. However, conditions were different. Winters were longer, with more snow, but the region was also moister, with numerous rivers and river valleys and denser vegetation. Thus, peoples such as the Nez Percé, Spokane, and Coeur d'Alene had a broader range of resources. Crops were planted in the more arable soil, timed to mature with differences in temperature caused by variations in elevation, so essentially the people moved uphill as temperatures warmed. Hunters pursued game throughout the varied geographical terrain, often wearing snowshoes to hunt in the snow; during the spring, they turned to salmon fishing in the region's numerous rivers and lakes. Fishing, hunting, and gathering took place during the warmest summer months at the highest elevations, and then the people moved back downhill for the autumn salmon runs. Because resources were denser the groups of the Pacific Northwest were able to live in more concentrated communities rather than being spread out like their neighbors to the south.

In the Southwest of the present-day United States one of the most intriguing cultures for archaeologists is that of the Anasazi, a commonly used term but one that some historians tend to avoid in favor of Ancient Pueblo or Ancestral Pueblo (to distinguish them from still-living Pueblo groups). The Ancient Pueblo inhabited a region centered in the Colorado Plateau that extended into New Mexico and Nevada and portions of Arizona and Utah. The terrain of this region included high plateaus (up to 8,400 feet in elevation), mesas, some woodlands (with primarily pines, junipers, and piñons), steep canyons, basins with desert grasses, and mountains. Water

was not plentiful. Streams ran off the mountains, and there were occasional summer rains, but these were undependable. The Ancient Pueblo therefore relied on snowmelt and on springs where erosion had caused seeps beneath layers of sandstone. Although there are rivers in the region, the Ancient Pueblo did not make use of them; rather, they settled near small streams and tributaries, which were more easily diverted for irrigation purposes.

The Ancient Pueblo are perhaps best known for their cliff dwellings. In the canyons erosion created bridges and windows in the rock. In some parts of the region shale rock, which erodes more easily than sandstone, was hollowed out by erosion, leaving behind sandstone overhangs. These dwellings remain, and tourists and historians continue to visit them in several U.S. national parks.

The Ancient Pueblo provide a striking example of the interactions of climate, geography, and human populations during the medieval period. From 700 to 1130 the population of the Ancient Pueblo communities increased rapidly. This increase was probably the result in part of reliable rainfall, leading to increased fertility and decreased mortality. Some historians use the term *golden age* to refer to the period from 900 to 1130, when a warm climate and regular rainfall led to larger communities, which in turn gave rise to trade, local pottery and architecture, better food-storage technologies, and the domestication of the turkey. But after about 1150 significant climate change occurred in North America, with a 300-year-long dry period. Ancient Pueblo farmers tried to stave off disaster by using dams and terraces to control and store water, but evidence shows that many people abandoned settlements under environmental stress. Simultaneously, and unrelated to rainfall patterns, the water table in the region dropped, compounding the drought.

Ultimately, the Ancient Pueblo culture disappeared in the 12th and 13th centuries, although some historians argue that it did not actually disappear but was absorbed by other cultures. Historians are also not in complete agreement about the reasons behind this apparent disappearance. The collapse of the Ancient Pueblo probably came about through a combination of circumstances, including crop failure resulting from drought, the erosion of topsoil, and deforestation. These environmental stresses, caused by climate change, weakened the Ancient Pueblo culture, rendering it helpless in the face of invasions from the north by Ute, Shoshone, and Paiute, who were themselves under stress because of the drought. Archaeological evidence suggests, for example, that communities moved from canyons, where water was still adequate, to mesas, where water and arable land were scarcer, probably for defensive purposes. Warfare became common as communities turned to raiding and theft for food and other supplies.

Climate change also had effects on Ancient Pueblo religious beliefs. Many ceremonial centers were closed up with rock and mortar, and huge fires were set in underground chambers called *kivas* in the belief that the people could thereby appease the gods that controlled nature.

The Anasazi are the most intensely studied of the Pueblo peoples, but they were not the only culture that inhabited this area—a region sometimes referred to as Oasisamerica. The Hohokam people occupied the desert lands of Arizona and the Mexican state of Sonora. The area was extremely dry, but it was bounded by two rivers, the Colorado and the Gila. To grow crops, they constructed canals, and to protect themselves from the intense sun, they formed underground dwellings during the earliest phase of the culture's development, up to about 550. The culture lasted until about 1400, when it collapsed under the same climatic stresses that affected the Anasazi. The Mogollan people, who lived in Arizona and New Mexico, attained their height from about the 11th through the 15th centuries. They lived in mountainous regions that were not suited to agriculture, so they made their living through ceramics and minerals, which they traded with Mesoamerica to the south.

MESOAMERICA

The geography of Mesoamerica is as complex as that of the rest of North America. Mesoamerica includes central Mexico, the Isthmus of Tehuantepec, the Yucatán Peninsula, the countries of Guatemala and Belize, and parts of Nicaragua, El Salvador, Honduras, and Costa Rica, although these last are often regarded as a transitional zone between Mesoamerica and Andean South America. Despite this complexity, geographers and climatologists divide Mesoamerica into two broad parts. One is the lowlands, which feature tropical climates. The other is the highlands, which include both dry tropical and cold mountainous climates. Overall, however, Mesoamerica offered a warm, temperate climate with abundant rainfall and arable soil. The climate during the medieval period was similar to that in the 21st century, and some archaeologists have argued that it was even more hospitable, especially in the highlands.

The chief climatic problem that Mesoamericans faced on an ongoing basis was water—either too much or too little. In the highlands water tended to be scarce. Accordingly, highland farmers learned to channel water from mountain runoff to their fields. One technique, used extensively during the middle of the Postclassic Period (ca. 1150–ca. 1350), was the *chinampa*, a word that comes from the Nahuatl language and means “square made of canes.” The *chinampa* was a rectangular plot of fertile land made of silt, mud, and decaying vegetation in the shallows of highland lakes in the Basin of

Mexico to ensure that crops planted in them had sufficient water. In contrast, people in lowland regions had too much water from heavy tropical rainfall. These people constructed systems of drainage to get rid of excess water.

Climate and geography helped shape a number of Mesoamerican cultures during the centuries before the arrival of Europeans. The area referred to simply as Central Mexico comprised primarily high plateaus with moderate to cool temperatures and little rainfall; what rainfall there was fell during a rainy season between May and October. Because of the lack of moisture the peoples of this area, notably Classic Period Teotihuacán (ca. 1–ca. 650) and Postclassic Period Tula (ca. 900–ca. 1200) and Tenochtitlán (ca. 1200–1521), built canals that connected the rivers with hillside reservoirs for holding water. These water supplies enabled the people to cultivate maize and other crops. Teotihuacán, the chief city during the Classic Period, reached the height of its power around 450 and eventually collapsed. Some historians blame the climate changes of 535–536 for the city's collapse. During this year observers throughout the world noted a large number of climatic aberrations, including a lack of sunlight, low temperatures, dark clouds, and crop failures. Historians suspect that a comet or meteorite or perhaps a massive volcanic eruption filled the atmosphere with dust that created an artificial winter. Whatever the cause might have been, buried bodies at Teotihuacán show evidence of malnutrition, which may have led to unrest, rebellion, invasion, and the abandonment of the city.

The Maya region, which encompassed the Yucatán Peninsula of Mexico, Guatemala, and Belize, had different geographical features. The northern Yucatán consisted of lowlands that were hot and frequently battered by hurricanes. The area had little surface water, but its porous limestone rock contained many sinkholes where water could be found. Southward the Maya area was composed of tropical forests, highlands, and finally a lowland coastal region. In contrast to the highlands of Central Mexico, the Maya highlands experienced abundant rainfall.

The large region of northern Mesoamerica, between the Sierra Madre Occidental mountain range to the west and the Sierra Madre Oriental range to the east, was flat, hot, and dry. Again, the people of this region had to construct canals and store rainwater for agricultural purposes.

SOUTH AMERICA

In many respects the geography of South America is one of extremes. The continent contains the world's southernmost city, Ushuaia, Argentina. The world's highest waterfall, at more than 3,200 feet, is Angel Falls in Venezuela. The world's largest river by volume is the Amazon—nearly 80 million

gallons per second flow into the Atlantic Ocean during the rainy season—and the Amazon's drainage basin, at 2.7 million square miles, is the largest in the world. The Andes is the world's longest mountain range, at 4,400 miles. The Amazon rain forest is the largest rain forest in the world. Chile's Atacama Desert is the world's driest, with some parts receiving an average of just 0.04 inches of rain each year; one portion of the desert went 400 years with absolutely no rainfall.

A major climatic condition that historically has had a profound effect on South America is commonly called El Niño. The word means "child" in Spanish and refers to the Christ child, for the phenomenon tends to begin around Christmastime. About every two to seven years the waters of the eastern Pacific Ocean grow warmer. The phenomenon begins in the western Pacific, but by the time it reaches South America it causes warm air to rise off the coast of Peru, leading to rainfall in areas that are normally desert. This heavy rainfall dries the air so that eastern South America gets less rain than normal.

Additionally, the El Niño effect has an impact on winds. Normally the trade winds of the Pacific, so called because they powered sailing ships engaged in trade, blow in a westerly direction. These winds move warmer surface water away from South America, allowing cooler water from below to well up. This cooler water is rich with nutrients, supporting fisheries along the western coast. During an El Niño episode, the trade winds die down and even blow in an easterly direction. These winds blow warmer water into the western coast of the continent, causing immense disruption in fish populations. In turn, fewer fish means fewer seabirds, reducing the amount of natural fertilizer produced by the birds.

Overall, an El Niño episode is associated with wet summers in Peru and Ecuador (remembering that summer in the Southern Hemisphere runs from December to March), causing major flooding into March and April. Argentina and Brazil likewise become wetter during the spring and early summer. The winter in central Chile is milder than normal, with a great deal of rain. The Amazon River basin, Colombia, and Central America become much hotter and drier.

The Moche culture (ca. 100–ca. 700) of northern Peru provides a good example of how these changes in climate affected early South Americans. The Moche, who lived primarily in river valleys near the Pacific Coast, depended on agriculture for their livelihood. The culture also produced a great deal of highly sophisticated pottery, with an enormous amount of variation in shapes and themes. While historians are uncertain what caused the demise of the Moche culture, many pin the blame on a super El Niño, which lasted about 30 years beginning in about 563. (Normally the El Niño effect lasts only a year or two.) After 30 years of persistent and

torrential rainfall the region experienced 30 years of extreme drought, and sand dunes engulfed many communities. These climatic events disrupted the Moche way of life and may have caused the people to lose faith in their religion, since they offered sacrifices to the gods to ensure stable weather. By roughly 700 the Moche had disappeared. Some historians believe that weather was the direct cause. Others think that it was an indirect cause, creating tension and competition for ever-scarcer resources, which led to civil war.

One of the most famous empires of South America before the arrival of the Spanish was that of the Inca. Although the Inca Empire had reached its peak at the time of the Spanish conquest in the 16th century, the empire's roots extended back to about 1200. In time, the empire stretched some 2,500 miles from Ecuador to Chile. The Inca Empire occupied a large portion of the Andes. The climate and terrain were difficult. But with a genius for organization, the Inca overcame these difficulties and developed an advanced civilization. For example, Inca engineers found numerous ways to develop agriculture in the mountainous terrain, creating elaborate and monumental terraces, drainage systems, and irrigation systems. They learned to use fertilizers to boost the productivity of the thin mountain soil. They created a network of roads to foster communication and trade, no small feat given the changes in climate and elevation throughout the empire.

The mountains created numerous chasms over which the Inca constructed suspension bridges, some up to 200 feet long. A messenger system enabled runners to carry messages a distance of 150 miles a day—again, no mean feat given the difficulties of the terrain. Textiles became a major industry because the high mountainous land could support populations of llamas and other wool-bearing animals. Finally, a major source of Inca wealth was copper, gold, silver, and tin, mined from the mountains and converted into a host of products.

ASIA AND THE PACIFIC

BY BRADLEY A. SKEEN

Eurasia is the largest of the earth's continents. It is the main landmass in the eastern portion of the Northern Hemisphere. It includes the subcontinents of India, Arabia, and Europe and is bounded on the north by the Arctic Ocean, on the east by the Pacific Ocean, and on the south by the Indian Ocean and Africa. Asia covers about 17 million square miles. Straddling both hemispheres, the Pacific Ocean is the world's largest and deepest body of water, covering more than 169 million square miles and comprising 42 percent of the world's water surface.

From the point of view of plate tectonics, the principal landmass of Asia is on the Eurasian plate, and the eastern-

most part of Siberia is on the North American plate. These two plates are drifting apart and forming a rift valley east of the Verkhoyansk mountain range. The Arabian, Indian, and Australian plates are impacting the Eurasian plate from the south and being subducted, or drawn under, the larger plate. This makes the southern portion of Asia exceptionally mountainous. In particular, the Indian Subcontinent is separated from the rest of Asia by the Hindu Kush and Himalaya mountain ranges, the highest on earth. To the east of the Eurasian and Australian plates, the Pacific plate is being subducted under the Eurasian and Philippine plates. This action has led to the so-called Ring of Fire along the Pacific Rim, the earth's most active area of volcanism, producing large chains of islands (Japan, Taiwan, the Philippines, Indonesia, and New Zealand) off the eastern coasts of Asia and Australia. Subduction of the Pacific plate also causes frequent and destructive earthquakes throughout the region. Off the coast of Asia the Pacific Ocean has widely dispersed island chains, including the Hawaiian island chain near the center of the Pacific plate. The Hawaiian Islands and some other Pacific chains like the Society Islands, including well-known Tahiti, have come about from a hot spot of magma welling up from deep within the earth to produce a shield volcano. In Hawaii this has produced a chain of islands as the Pacific plate moved across the hot spot, from the most recent and largest of Hawaii itself, moving east to Midway, which has nearly been eroded away, and continuing in a range of underwater peaks that have eroded from older island peaks. Because these volcanically formed islands have rich volcanic soils and permanent water sources, they have significant agricultural potential and generally have supported large human populations. Other Pacific islands were formed out of the buildup of uplifted coral reefs and, without permanent water sources, have more limited farming and have supported smaller populations that are largely dependent on marine reef resources.

SIBERIA

The region of Siberia extends from the Ural Mountains in the west on the border with Europe eastward to the Pacific Ocean. The southern limit of Siberia roughly coincides with the Altai mountain range, Lake Baikal, the Stanovoy mountain range, and the Amur River valley. Baikal is the deepest freshwater lake in the world at 5,371 feet and the fourth largest in surface area. Because of its immense volume, it contains more water than any other lake—in fact, one-fifth of all the freshwater in the world, as much as the North American Great Lakes combined. Western Siberia is extraordinarily low in elevation, averaging about 165 feet, but the east is mountainous, with many peaks reaching heights of nearly 10,000 feet. Siberia is cut through by a series of great rivers that rise in the moun-

tains on its southern edge and run northward into the Arctic and Pacific oceans. From west to east these rivers are the Ob, the Yenisei, the Lena, and the Amur.

The northern fringe of Siberia is tundra, sparsely inhabited by human beings. South of this is a wide belt of ancient coniferous and deciduous forest. Agriculture is difficult in Siberia for several reasons. The summers are not particularly warm, and the winters are the coldest of any large landmass that is not actually glaciated (such as Antarctica or Greenland). Because of this, much of the land has permafrost at a depth of less than a yard; these lands are forested only by the Siberian larch, which has specially evolved a shallow root system to adapt to this condition. Average rainfall is less than 20 inches (except in the Kamchatka Peninsula at the extreme eastern edge of Siberia, which is a temperate rain forest). Thus Siberia was inhabited in medieval times by tribal peoples who lived by hunting and gathering in the forest with only very limited agriculture. The tribes were monarchical and loosely federated under the khan of Sibir, who submitted to the Mongols in the 13th century, but these arrangements probably made little practical difference in the lives of the widely scattered families and clans.

INNER ASIA

Inner Asia extends south from Siberia in the west as far as the chain of mountain ranges that separate the Indian Subcontinent from Asia proper and in the east to the fertile plains of China. It includes the modern territories of Mongolia, western China (including Tibet), the former Soviet central Asian republics, Afghanistan, Kashmir, and northern Pakistan. The climate varies from steppe to desert, probably with ever-increasing desertification throughout the Middle Ages resulting from natural climate changes and human activity (deforestation). The driest region is the Gobi Desert in Mongolia. Farther west are a number of large, shallow freshwater lakes (Lake Balkash, the Aral Sea, and at the extreme western limit the Caspian Sea). These lakes are fed by large rivers flowing from the southern mountains, including the Amu Darya, the Syr Darya, and the Hari Rud.

Tibet is the southernmost part of inner Asia. At the beginning of the Middle Ages (629–842), the Tibetan monarchy dominated inner Asia and even controlled the Chinese western capital of Xian. But Tibetan power was broken through civil war, and Islamic invaders and Chinese empires divided the area between themselves. In the 13th century conquerors from the northern extreme of inner Asia, the Mongols, unified virtually the whole Asian continent under their rule.

The only practical way of life in the grasslands and deserts of inner Asia is nomadic horse breeding. Local tribes lived by controlling large numbers of horses through a continuous

wandering of many hundred or thousands of miles each year. The nomadic way of life was so different from that of settled agricultural civilizations like China and western Europe that, once he had conquered northern China, the Mongol ruler Genghis Khan considered massacring the entire population of farmers because he could not imagine what use they served in society. Trained by their way of life on the steppe, the populations of inner Asia produced the finest cavalymen in the world. The steppe tribes usually had little trouble attacking and overcoming more settled populations when they wished. The Great Wall of China was built and maintained as a not entirely successful means of containing them. Iranian horsemen from inner Asia in the first millennium B.C.E. had conquered the Near East and southern Russia and occasionally raided China. But the stirrup was developed in this area during the early Middle Ages, making nomadic life on horseback much easier and cavalymen still more effective as soldiers. Thereafter, migrations of peoples from this area, such as the Huns, Magyars and Turks, led to the collapse of the western Roman Empire, the general collapse of civilization in western Europe known as the Viking Age (850–1500), the collapse of the Byzantine Empire (1453), and the conquest of much of eastern Europe by the Turks.

The last great wave of invading tribesmen from inner Asia consisted of the Mongols under Genghis Khan (ca. 1162–1127 B.C.E.). Genghis Khan and his immediate successors conquered an empire that endured throughout the later Middle Ages and stretched from China to include all of inner Asia, Iran, the Near East as far as Baghdad, European Russia, and India. Except for a call from the central Mongol government in China to turn resources inward, Mongol forces that were preparing to attack western Europe and had probed as far as the border of the Holy Roman Empire (1241–42) may well have succeeded, changing the entire course of world history. The Mongol Empire was essentially a unification of the various states connected by trade along the Silk Road. India, protected by its mountainous borders, had long been spared invasion from the inner Asian steppe, but in the 14th century Tamerlane (1336–1405), a Mongol nobleman, conquered northern India, and his successors in the Mongol Dynasty later overran nearly the entire subcontinent.

From late in the first millennium B.C.E. a trade network developed in inner Asia that is now usually known as the Silk Road. The name derives from its being the main way that silk reached western Europe from China. It was a caravan trade between Xian, the western capital of China, and Roman or Byzantine port cities on the Mediterranean. Desert tribesmen brought huge caravans of camels and other pack animals across two principal routes: one all the way overland across the whole of inner Asia to Iran and the second to ports in

India. This was possible because of the vast stretches of desert and grassland in inner Asia that lacked settled inhabitants and so could be crossed without local resistance or having to pay local taxes or tariffs. The main items exported from China were silk and later porcelain. But the West did not produce anything that was compact enough to transport by caravan and was desired in China, so the return traffic was mostly in gold.

Technology also flowed along the Silk Road: not only the secret of silkworm cultivation (which reached the Byzantine Empire in the mid-sixth century) but also gunpowder and the spinning wheel, which were Chinese inventions. On the other hand, the bubonic plague, or Black Death, was also endemic in inner Asia and probably traveled to the West along the Silk Road to spark the pandemic in western Europe (1348–50) that killed one-third of the population. The religions of Buddhism and Manichaeism also traveled along the Silk Road and became dominant in inner Asia before the arrival of Islam.

Conflict between the Muslim states of inner Asia and China disrupted trade on the Silk Road after the eighth cen-

tury, but it was restored in the later Middle Ages when the Mongol conquest of the whole area between China and Baghdad in the 13th century unified the area and again ended barriers to trade. The famous visit to China by the Venetian merchant Marco Polo was along the Silk Road and took place at this time, though it is far from clear whether he actually made this journey or composed his published account of it based on other extant reports of travels through inner Asia and China. The second collapse of the Silk Road after the end of Mongol domination in inner Asia stimulated the search for new trade routes with China in western Europe.

EAST ASIA

The heartland of China is the fertile plain dominated by river valleys stretching along the coast from Korea to Southeast Asia. The main rivers (from north to south) are the Yellow, the Yangzi, and the Pearl. The abundant waters of these rivers and excellent soils in their floodplains led to the development of agriculture by about 7000–5000 B.C.E. and early states by about 2000 B.C.E. However, China's rivers are more prone to



Fujiyama from Okitsu, by *Yoshida Hiroshi*; woodblock print, Japan, 1928 (Arthur M. Sackler Gallery, Smithsonian Institution, Purchase and partial gift of H. Ed Robison, S1988.254)

disastrous flooding than those that watered early civilizations in the Near East and India. As a consequence, from very early times large-scale centralized government was necessary in China to deal with the maintenance of the water system, including dams, dikes, and canals. The scale and efficiency of these works reached their height in the Middle Ages under the Sung (960–1279 C.E.) and Yuan (1279–1368) dynasties. These works included the Grand Canal, a network of artificial inland waterways more than 11,000 miles long connecting central and northern China and allowing barge traffic to move at right angles to China's generally eastward-flowing river systems.

Korea is a peninsula divided from the Chinese mainland by the Yalu River. It is mountainous, though few of the peaks reach 6,500 feet. Because of its position, it was inevitably influenced culturally and politically by China and, in turn, developed in interaction with Japan. Because Korea was characterized by smaller, distant river valleys separated by mountains, during the Middle Ages it was divided among several states usually at war with one another. Imperial Tang (618–907) and Sung China alternated tactics of diplomacy with military intervention against the smaller-scale and more vulnerable Korean states, but in 1231 the Mongols conquered Korea outright.

Located just off the Korean coastline, the islands of the Japan archipelago are separated from mainland Asia by the Sea of Japan. While more than 3,000 islands are in this group, the main islands are (from south to north) Kyushu, Shikoku, Honshu, Hokkaido, and Sakhalin. The most southerly three of these islands are the core areas for the emergence of rice agriculture about 1000 B.C.E. and the first Japanese states around the fourth through the seventh centuries of the Common Era, with earlier hunting-and-gathering populations known as Jomon peoples pushing northward into northern Hokkaido by around the seventh century C.E. The islands of Japan are volcanic and extremely mountainous. They are also subject to frequent powerful earthquakes with attendant landslides, making much of the land unsuitable for farming even though the climate is temperate. As a result, throughout the medieval period most of the mountainous land area was forested and remains so today, but the limited lowland alluvial plains were used intensively for wet-rice agriculture, allowing the population to grow dramatically in the early kingdoms and through the medieval shogunate period. Japanese culture has been deeply influenced by that of China. Isolated by an arm of the Pacific Ocean, however, Japan did not fall under the political domination of China in the Middle Ages. The Mongol Empire sent invasion fleets to Japan in 1274 and 1281, but both were repelled, at least partly because of severe damage

to attacking Mongol ships from two of the typhoons typical of the weather in that area.

INDIA

The Indian Subcontinent, consisting of the modern countries of India, Pakistan, Bangladesh, and Sri Lanka on the island of Ceylon, surrounded by the Indian Ocean, is cut off from the rest of Asia by a ring of the world's highest mountains: the Hindu Kush, the Karakoram range, and the Himalayas. These mountain ranges contain peaks such as Mount Everest (29,030 feet) in the Himalayas and K-2 (28,250 feet) in the Karakoram, the highest and second-highest mountains in the world, respectively. These ranges have generally protected India from invasion from inner Asia since prehistoric times, except for the invasion of the Mongols begun by Tamerlane in the late 14th century. Runoff from these mountains feeds two great rivers in the northern plain of India: the Indus (home to one of the earliest centers of civilization), emptying into the Arabian Sea, and the Ganges, emptying through a massive delta of mangrove swamps in Bangladesh into the Bay of Bengal. South of these river valleys most of India is taken up by the mountainous territory of the Malwa, Deccan, and Chota Nagpur plateaus. To the west of the Indus Valley lies the Thar Desert.

Protected from most cold fronts moving from the north by its encircling mountains, India is far hotter than other areas of the world lying at the same latitude. In the summer months (March through June), the average temperature on the Gangetic plain (where the bulk of the population lived in the Middle Ages as in modern times) is 104 degrees Fahrenheit. Given these conditions, droughts are quite common. Nearly the entire year's rainfall is concentrated in the monsoon or rainy season (June through September). At this time a series of storms moving from west to east breaks over the subcontinent from the Arabian Sea.

Aside from making agriculture practical, if relatively uncertain, in India the monsoon has had an important effect on world history. The prevailing winds during the monsoon season made it unusually easy for sail-powered ships leaving the mouth of the Red Sea (between Africa and Arabia) to travel directly to the island of Ceylon, laying off the southeast tip of the Indian Subcontinent just above the equator. Once the monsoon was over, the return trip from Ceylon to the Red Sea was made just as easily on the winds blowing back to the west of the so-called retreating monsoon. This exceptional condition made the voyage possible for ancient and medieval ships that otherwise rarely left sight of land because they lacked even rudimentary navigational technology like the compass. This weather system was first systematically exploited for trade in antiquity by the Ptolemies

(304–30 B.C.E.), the Greek dynasty that ruled Egypt after the conquests of Alexander the Great, and then by the Romans. It became as important as the Silk Road for the transfer of goods and ideas between East and West. In the early Middle Ages control of this trade passed to the East African state of Axum in Ethiopia, but by the ninth century, with much of the Indian Ocean coast in Islamic hands, the monsoon trade was monopolized by Arab merchants (who greatly improved its efficiency through the invention of modern sails and riggings on their ships). After losing this trade, the empire of Axum quickly collapsed.

The great European trading states such as Portugal, Genoa, and Venice were highly dissatisfied with the Arab monopoly, because the high fees and taxes charged by Arab merchants and governments cut into their profits when they transshipped Indian and other oriental goods across the Mediterranean. This condition was made worse as the breakup of the Mongol Empire in the late 14th and 15th centuries disrupted trade along the Silk Road. An effort to break the Arab stranglehold on Far Eastern trade was behind the efforts of the European trading powers to find other sea routes to India and China. Their explorations led to such discoveries as those of Vasco de Gama (who rounded the horn of Africa in 1497–98) and Christopher Columbus (who discovered America in 1492 while trying to reach the Orient) and to Ferdinand Magellan's circumnavigation of the globe (1519–22).

SOUTHEAST ASIA

Southeast Asia consists of a large peninsula south of eastern China and the numerous nearby islands of the Indonesian and Philippine archipelagos. This includes the territory of the modern states of Myanmar (Burma), Thailand, Laos, Vietnam, Cambodia, Malaysia, Indonesia, and the Philippines as well as a number of smaller polities like the Sultanate of Brunei on the island of Borneo. The region is separated from southern China by high mountains ranges that to the south give way to several broad, flat river valleys. From west to east the principal rivers (most of which have their sources in the Himalayas) are the Irrawaddy, Salween, the Chao Phraya, and the Mekong. The region has a tropical monsoon climate (much wetter than India, with the rainy season lasting from May to October) and was originally covered in rain forest, with mangrove swamps in the lower elevations and bamboo forests in the mountains. The area has a long history of rice farming, however, and in the Middle Ages the conversion of forest to cultivated land quickly accelerated.

The Indonesian archipelago consists of more than 13,000 islands, including five large ones: (from west to east) Sumatra, Java, Borneo, Sulawesi, and New Guinea. New Guinea and Borneo are the second- and third-largest islands in the

world, respectively. Located directly on the equator, they are extremely mountainous, with many peaks above 10,000 feet and more than 150 active volcanoes and frequent major earthquakes. In the ninth century C.E. the Mataram kingdom had to build a new capital after its former royal residence was destroyed in a volcanic eruption. The Philippine archipelago to the northeast of Indonesia consists of another roughly 7,000 volcanic islands (Luzon and Mindanao being the largest), equally mountainous and sharing the tropical monsoon climate of the area.

One of the most expansive states in medieval Southeast Asia was the Khmer Empire. Begun about 800 C.E., it reached its height in the early 13th century (controlling much of modern Thailand, Cambodia, Laos, and Vietnam) and was overthrown by 1431. Like any organized imperial state, it depended on wealth from large agricultural surpluses. Rainfall was sufficient to sustain a rich production of rice agriculture in the region throughout the Middle Ages, but the complex irrigation system also needed to grow rice was neglected because the empire tended to devolve into civil war. The collapse of the system for managing the climate for agriculture led eventually to the collapse of the state.

AUSTRALIA

Southwest of Asia is Australia, the second-smallest continent. It extends over more than 4.5 million square miles. Most of Australia is a desert, with nearly half of the continent covered by sand dunes. The northern fringe is rain forest and is subject to the same tropical monsoon climate system as Southeast Asia. The eastern and southern coasts, separated from the rest of the continent by the Great Dividing Range (whose highest peaks are only about 6,500 feet), enjoy a more temperate climate with abundant rainfall. The world's largest coral reef, the Great Barrier Reef, lies off the east coast of Australia.

Hunter-gathers from Asia either crossed then-extant land bridges from Asia or made short sea voyages to occupy Australia about 45,000 years ago. These were the ancestors of the current Aborigine population, and the character and development of their culture were only minimally disturbed by outside influence (sporadic trade with island Southeast Asia) until Europeans arrived in Australia well after the medieval period (ca. 1600 C.E.). Although they possessed only the simplest technology and did not practice agriculture, the Aborigines may well have had a tremendous impact on the climate of Australia. By introducing campfires, they probably started grass and forest fires at a much faster rate than the fragile forest ecosystem that existed then could absorb, resulting in the deforestation and desertification of much of the continent.

POLYNESIA AND THE PACIFIC OCEAN

The South Pacific Ocean has large numbers of relatively small islands of volcanic origin, their climate tropical and prevailing vegetation thick forests. Because of the islands' isolation, the number of species of plants and animals that migrated to them from mainland Asia is quite small. Consequently, large numbers of new species developed on each island. Most South Pacific islands are within a few hundred or at most a few thousands miles of the Indonesian archipelago or Australia. The deep-ocean archipelagos nearest New Guinea (Fiji, Tonga, and Samoa) were occupied by colonists from that island in antiquity. Those settlers developed into the Polynesian culture remarkable for its great seafaring tradition. In the early Middle Ages they began to sail farther from the mainland and colonized more-distant areas. They reached the Hawaiian Islands by about 400 C.E. and New Zealand (by far the largest Polynesian island) off the southeast coast of Australia in about 1000. The millennium also began with the Polynesians reaching Easter Island across the greater part of the Pacific, only about 2,300 miles from South America. The presence of South American sweet potatoes in Polynesian agriculture and of Asian chickens at some pre-Columbian archaeological sites in South America has been variously interpreted by scholars. Some researchers view these foreign resources as evidence that Polynesian explorers reached as far as South America, even if there is no archaeological evidence for permanent settlements. Other researchers provide compelling evidence that exotic plants and animals can migrate long distances across the Pacific without human intervention, owing to natural rafting in the strong currents and storms typical of the region.

The Polynesians never developed a metallurgical technology for agriculture or warfare, owing to the lack of metal resources on the islands, and the ready availability of wood and other perishable resources eliminated pottery from their technological repertoire on all but a few western Polynesian islands, which has caused some early scholars to view them as technologically "primitive" or "backward." This negative assessment by early scholars was rationalized through the idea that living in a so-called paradise without the need for struggle against nature made Polynesian culture stagnant, in contrast to areas like eastern China, where adverse climates and the difficulties involved in agriculture spurred rapid technological growth. However, in the Hawaiian archipelago and in some other areas of the Pacific, societies developed very sophisticated irrigation systems and artificial fishponds to mass-produce the staples of their diet (root crops and fish) and to support high population levels. In the realm of a technology that was vital to Polynesian culture—navigation—Polynesians

were by no means backward compared with other medieval cultures. They were the only sailors in the world who routinely ventured far out of sight of land.

Moreover, the Pacific Islanders were not immune to the problems of overpopulation and environmental degradation that plagued medieval populations elsewhere in the world. While it is true that initially low population densities and abundant resources on newly discovered islands previously unexploited by humans might well confer initial benefits of a wide range of resources, better health, longer lives, and higher birthrates with lower infant mortality. However, as populations grew and technological limits for intensified food production were reached, many Polynesian island populations faced significant pressures in the form of overpopulation and environmental degradation by the few centuries prior to European contact. On some islands, agricultural land tended to be worked past its sustainable limits to meet the demand for food. This led to deforestation as more and more land was brought under cultivation and to other forms of agricultural degradation, making it even harder to meet the needs of an expanding population on a limited amount of land. On some islands, like the Hawaiian Islands, this crisis was met with the development of ever more efficient means of irrigation agriculture that managed to keep up with both explosive population growth and the increasing demands of aristocratic chiefs for feasting foods, and looming disaster was averted up until European contact. In other island chiefdoms it led to terrible massacres and civil wars over the available food supply whose casualties (and sometimes cannibalism) drastically reduced the demand for food. The most dramatic example of the latter kind of disaster was the near depopulation of Easter Island around 1600 C.E. as several chiefdoms battled over dwindling land and resources, destroying the medieval culture that had made the world famous Easter Island statues. So, in fact, Polynesian culture was under geographic and climatic pressure as severe as in China or anywhere else in the world.

EUROPE

BY TOM STREISSGUTH AND BRADLEY SKEEN

The majority of people in medieval Europe would have lived and died within a few miles of their birth places and would have had more familiarity with the exotic foreign lands mentioned in the Bible than with their own continent. Travel in medieval Europe was dangerous, and many people were tied by bonds of family and feudal obligations to the homes where they lived. The geographical learning of the Roman Empire was mostly lost in western Europe, though it began to be recovered from contact with Islamic culture in Spain in the 12th century. The exploration undertaken for commercial

purposes, especially by the Portuguese, at the end of the Middle Ages, however, soon gave Europe the most sophisticated geographical science in the world.

GEOGRAPHY

Although distinct on linguistic and historical grounds, Europe is a subcontinent of the larger Eurasian continent from a purely geographical point of view. The continent of Europe extends from the North Atlantic Ocean east to the Ural Mountains and from Scandinavia (well above the Arctic Circle) south to the Mediterranean Sea. The southernmost parts of Europe are the islands of Crete and Malta at approximately 35 degrees north latitude. (For comparison, this is the same range of latitude as between Point Barrow, Alaska, and Memphis, Tennessee, in North America.) By convention, Europe ends at the shores of the Caspian Sea and the Caucasus Mountains in the extreme southeast. The narrow straits (varying between 2,297 feet and 4 miles) of the Bosphorus and Dardanelles, with the larger Sea of Marmara lying between, divides the Balkan Peninsula from Asia Minor. In the extreme southwest Europe is separated from Africa by another narrows, the Straits of Gibraltar, which is as little as 8 miles wide. The European landscapes are extremely diverse, with tundra and boreal forest in the far north; regions of mountains and elevated plateaus in the center; and coastal lowlands, bays, and narrow inlets along more than 20,000 miles of winding seacoast.

Broadly speaking, Europe consists of a vast fertile plain that extends from Ireland to the Urals, some elements of which are low lying enough to be submerged under the Irish and North Seas, the English Channel, and the Baltic Sea. This area is bound by two mountainous regions. The northern region consists of the mountains of Scotland and Scandinavia, and the southern peninsulas extending off Europe are extremely mountainous. The limits of this southern zone are marked by the ranges of the Pyrenees, the Alps, the Carpathians, and the Caucasus. The dormant volcano of Mount Elbrus in the Caucasus is the highest mountain in Europe at 18,510 feet.

Communication across the ranges of the Pyrenees and Alps is generally possible through passes or narrow valleys that link the heads of rivers in the northern and southern watersheds. Aside from the coastal plains, there are only two important passes in the Pyrenees: Col de la Perche and the Col de Somport. In the Alps the Romans had already extensively used the Col de l'Argentière, the Col de Montgenèvre, the Great and Little Saint Bernard passes (all between Italy and France) as well as the Splügen and Brenner passes between Italy and Germany. As the importance of commerce and communications between Italy and Germany increased in the Middle Ages, new pass routes were opened up, includ-

ing the Simplon, the Saint Gotthard, and the San Bernardino. The Mont Cenis pass between France and Italy seems also to have been first used extensively in the Middle Ages. The modern names for these passes are still essentially the medieval ones. So many of them are named after Saint Bernard because it was precisely isolated, desolated areas such as passes that Christian monks sought out in order to live in a constant state of struggle with the world, away from the distractions of human society. The Alpine passes contained monasteries of the Cistercian order that had been founded by Saint Bernard (1090–1153).

The southern peninsulas are themselves quite mountainous. The major ranges in Spain are (from north to south) the Cantabrian Mountains, the Sierra de Guadarrama, and the Sierra Nevada. South of the Po valley, the Apennines extend down the whole length of Italy. There are a number of active volcanoes in Italy, including Vesuvius near the city of Naples, Etna on the island of Sicily, and Stromboli, a small volcanic island just north of Sicily. The chief mountain ranges in the Balkans are the Dinaric Alps, the Pindus range (extending into northern Greece) and the Balkan Mountains in Bulgaria.

The European plain is traversed by several major rivers that rise in the southern mountains. From west to east these rivers include the Garonne, the Loire, the Seine, and the Rhine (820 miles). The Elbe and the Vistula (650 miles) continue this pattern but rise from the Bohemian mountains, a plateau in central Europe. The largest rivers in Europe are located in the east. The Danube (1,777 miles) rises from sources in the Alps but runs southeast through the Hungarian plain and cuts through a gap in the Carpathians (the Iron Gate) to reach the Black Sea. The Dnieper (739 miles) is the largest of several rivers that descend from the Russian steppes to empty into the Black Sea, while the largest river in Europe, the Volga (2,293 miles), traverses the steppes to empty into the inland Caspian Sea. The principal rivers in Spain are the Tagus, the Ebro, and the Guadalquivir, while the North Italian Plain is traversed by the Po. The largest rivers in the Balkans, the Sava and the Drava, are tributaries of the Danube.

Europe includes several prominent peninsulas: the Balkan Peninsula in the southeast, the Italian peninsula in the central Mediterranean, Iberia (modern-day Spain and Portugal), Brittany, Jutland (now a part of Denmark), and the Scandinavian landmass that includes the nations of Norway, Sweden, and Finland. Several large islands in the Mediterranean Sea, including the Balearics, Sardinia, Corsica, Sicily, and Crete, have been inhabited for thousands of years. The islands of Great Britain and Ireland lie off the northwestern coasts of the continent. The large North Atlantic island of Iceland (an English misunderstanding of its native name, which

is simply “island” with the “s” pronounced), along with the smaller groups of the Faeroe and Shetland islands, is usually considered part of Europe. The Arctic Ocean islands of the Svalbard archipelago are technically part of Europe but are virtually uninhabited.

THE DEVELOPMENT OF CULTURAL REGIONS

After the fall of the Western Roman Empire in the fifth century C.E., Europe was divided into several major cultural regions. In the former Roman provinces of Spain, Gaul (modern-day France), and Italy, Romance languages descended from Latin continued to be spoken. The differentiation of Latin into discrete local languages was fostered by the geographical isolation of the various regions from each other. Germanic languages dominated in the territories to the north (including Britain, which had been the least Romanized imperial province). Later, Slavic peoples, migrating from an uncertain homeland, came to dominate all of eastern Europe, from the borders of Germany to the steppes of southern Russia and Ukraine and south into the Balkan Peninsula. There were also a number of cultural enclaves that survived the invasions of the Middle Ages. The Basque peoples sheltered in the mountains of northern Spain seem, in fact, to have preserved a language and culture that are not Indo-European and which must date back to prehistoric times. On the northwestern fringe of Europe, on the Brittany peninsula in France, on Ireland, and in Cornwall, Wales, and Scotland in Britain, pre-Roman Celtic languages and cultures survived throughout the Middle Ages. In Transylvania (northwest Romania) a group of Romance speakers survived, surrounded by Slavic peoples.

Western Europe underwent two periods of intense invasion that seriously damaged political and cultural infrastructure. In the fifth and sixth centuries Germanic and Asiatic tribes, such as the Goths, Huns, and Lombards, caused the dissolution of the Roman Empire in the West. In the ninth and 10th centuries renewed invasions by Vikings from Scandinavia and Magyars and Arabs from Asia left the map of western Europe fragmented into hundreds of small principalities. Roads fell into disrepair and communications were poor or nonexistent. In western Europe small communities organized around fortified hills or strongholds ruled by a local nobleman. The insecurity of the times forced ordinary people to gather for their own protection within the walls of these strongholds, the precursors to feudal estates that dominated the political life of medieval Europe.

The mountainous terrain of Scandinavia gave rise to a way of life dependent on hunting and herding that was generally healthier than the cereal crop-based agriculture of many other areas of Europe. This produced a lower rate of infant mortality and thus a consequent population explosion

after the year 750 C.E. The Scandinavian way of life, moreover, produced young men naturally fitted for war by their superior diet and the hazards of their existence as hunters in the mountains. Since inland communications were impossible in the densely forested mountains of Scandinavia, the population was well acquainted with seafaring. As a result of this combination of conditions, the Scandinavians—called Vikings in the West and Varangians by the Byzantines—set out on a remarkable series of raids and exploratory voyages. Besides the destructive character of their raids, the Vikings also colonized many areas of western Europe and founded states in northern France (Normandy) and Sicily. Not limited by the learned geography of western Europeans, which held that there were no islands or continents across the Atlantic, Vikings settled the Faeroe Islands, Greenland, Iceland, and even North America (Newfoundland in modern Canada). In the east the Varangians settled in the Baltic Sea region and moved inland along the natural highways of the south-flowing rivers of Russia, including the Volga and the Dnieper, to trade ultimately with Constantinople and Islamic states on the fringe of Europe. Forming a ruling elite among Slavic peoples native to the area, they founded the state of Kiev Rus, the ancestor of modern-day Russia.

The Eastern Roman Empire, also known as the Byzantine Empire, survived the fall of the Western Roman Empire and slowly contracted throughout the Middle Ages in the face of Arabic and Slavic invasions. Its capital and last surviving city (captured by the Ottoman Turks in 1453) was Constantinople, located on the Bosphorus at the frontier of Europe and Asia Minor. In the early Middle Ages the Byzantine emperors controlled the eastern Mediterranean and the Balkan Peninsula as well as Asia Minor. They maintained the defensive strategy of the Roman Empire, relying on rivers and fortified passes as a means of defense.

LAND AND RESOURCES

Europe's fertile soils, moderate climate, and wealth of mineral resources attracted the waves of new settlers in the fifth and sixth centuries. At that time gold and silver deposits were common in central Europe, while the Baltic coasts produced amber, a fossilized tree resin used to make decorative amulets, brooches, and other adornments. Deposits of tin (used in making bronze) were worked in Cornwall, in southwestern England, and Sicily was an important source of sulfur. In the Mediterranean region quarries were worked for stone and marble deposits for use in building construction; in the north, people relied on the abundant timber resources to provide fuel and building material.

Iron, the most valuable single mineral resource in Europe, came in the form of iron ore deposits in Scandinavia,

northern England, and western Germany. Europeans had been forging iron weapons and tools since well before the rise of Rome. Iron was collected from mines and bogs, smelted in a furnace to get rid of impurities, and then hammered and shaped while it cooled. The crafting of iron ore into useful tools in this manner was a long, complex process that could be mastered only by specialists. Iron mines and workshops made up the foundation of large-scale industry, which would play a central role in transforming Europe from the medieval to the modern age.

Europe's high water table and abundance of wells and springs also helped shape the medieval economy. The network of streams provided hydropower for medieval mills. Most medieval villages were raised on or near a source of running water, which powered the heavy equipment used for the grinding of grain to make flour for bread. The mills were commonly the personal property of the landowners and in some places were used as income-producing property. Medieval milling technology was based on Roman precedents but was constantly improved to become far more efficient and useful than in Roman times. The circular motion easily made by running water in natural streams was adapted by increasingly complex mechanical devices, such as cams, to make rope, to run looms for weaving cloth, to cut wood, to process mined and quarried stone, and to generate air currents through bellows and other means to make hotter furnaces for working metals. All of these advances helped point toward the later Industrial Revolution and were possible because of the medieval willingness to exploit the natural geography of mountainous regions. As often as not, the pioneers in these areas and kinds of technologies were monasteries rather than secular villages.

A belt of low-lying and fertile plains, which runs from Poland west to Germany, the Low Countries, and northern France, became the most densely settled region of Europe. At the dawn of the medieval period this region was covered by a heavy forest, impassable in many places, which effectively isolated human settlements. Within the North European Plain, the Rhine, Seine, Elbe, and Loire rivers provided the principal trade routes between coastal ports and the cities of the interior. Craft industries developed in the earliest major trading ports of northern Europe, known as the "emporia," including the island of Birka (Sweden), Hedeby (northern Germany), and York and Hamwih (modern-day Southampton) in England. In later centuries European merchants began trading with the Middle East via the Mediterranean Sea and with east Asia via the Silk Road, a route that crossed from the Russian steppes east through central Asia and to China. Cities grew at important points along these trade routes, with many of them rising among the remains of ancient Roman

fortresses and settlements. Others, like Novogord in Russia, were medieval foundations.

Geographical features, climate, and soil conditions shaped the local economies. In the mountains timber cutting and pasturing of sheep, goats, and cattle were the principal means of livelihood. As in Scandinavia, this kind of life produced more fit young men than the land could support, and such regions often became sources of mercenary soldiers. A disproportionately large proportion of the Roman soldiers fighting the barbarian invasions at the beginning of the Middle Ages came from the region of the Dinaric Alps in modern Croatia and Bosnia, while in the later Middle Ages, Swiss mercenaries became the most sought-after military force in Europe. Lowland plains gave rise to settled agriculture, while coastal regions thrived on fishing, salt making, and merchant trade. Trade also brought a few imported crops, such as citrus, rice, and cotton, from North Africa and the Arab world. These crops required the warm weather and irrigation works that were available in Spain, southern Italy, and Greece. Olives, grapevines, figs, and flax had arrived from the Near East and Egypt before the medieval period and remained essential southern European crops.

The city of Venice, which had been built on a series of sandy barrier islands by refugees from the Lombard invasion of Italy, depended on trade for survival. Venetian ships roamed the eastern Mediterranean and the Adriatic coasts, linking Europe with the Ottoman Empire and the Levant. Venetian merchants supplied luxury goods in high demand among the nobility and the monarchs of Europe, and through its "value added" trading economy, the Venetians built the wealthiest state in Europe. Many of the trade goods brought to Europe by the Venetians (and by their close competitors the Genoese) originated in China and were brought first into the Islamic world along the Silk Road or through the Indian Ocean trade. It was the desire to get around this Islamic monopoly (which resulted in huge increases in prices) on Oriental luxuries that drove the European age of exploration, just beginning at the end of the Middle Ages.

THE RISE OF NATIONS

The fall of Rome left a divided political and social map of Europe. The collapse of Rome and its successor states was often conditioned by geographical factors. The migrations (from the western European point of view, invasions) of peoples from the steppes and from Scandinavia was motivated and facilitated by the geographical conditions of their homelands. The only unifying factor in early medieval Europe was the new religion of Christianity. Missionaries moved north to convert the pagan societies of Germany, Denmark, and the Low Countries. Ireland converted to the faith in the fifth century,

and Britain followed in the sixth and seventh centuries. The Scandinavians, living in the forests and mountains north of the Baltic Sea, took up Christianity in the 10th century; distant Finland and Estonia were the last to convert. In many places the conversion of pagans to the new faith involved a transformation of culture, language, and social and political institutions and did not always progress smoothly.

In 711 Islamic armies crossed the Mediterranean to establish a Moorish state in Spain. They were finally stopped north of the Pyrenees in the middle of the eighth century but would remain in Iberia until the end of the Reconquista campaign in the 15th century. The conversion of northern Europe was conditioned by geographical factors. The regions of Germany and Scandinavia had lain outside the Roman Empire and so had been unaffected by the imperial conversion to Christianity. However, Ireland was converted early. Christian monks on that island lived a sort of ascetic life that often caused them to cast their fate into the hands of god and go to sea in a coracle, a kind of small boat made of wooden spars with a leather hull, quite similar to an upside-down umbrella and not much larger. Prevailing currents took the monks who survived through the North Sea to the shores of Germany or southern Scandinavia. There, the Irish monks began the missionary work of converting the Germanic tribes.

In the late eighth century, as Christianity was unifying isolated states and principalities under the authority of the pope, a powerful military leader emerged among the Franks: Charlemagne, also known by his Latin appellation Carolus Magnus, or Charles the Great. This monarch mastered a huge realm north of the Alps, unifying the largest state since the fall of Rome, and was crowned by the pope as the Holy Roman Emperor of all Christianity in 800. The Frankish empire of Charlemagne was held together by a single man's political and military skill. After his death, his short-lived "Carolingian" realm was split among three heirs, laying the foundation of the modern states of France, Germany, the Low Countries, and Italy. The society of early medieval Europe was too fragmented for a single ruler or administration to govern effectively. Instead of reviving the empire in the name of imperial Rome, which had been the dream of Charlemagne and the popes, western Europe soon divided into small principalities. The conflicts among these states left Europe vulnerable to the raids of northern Vikings and eastern Magyars, which continued until the 10th century.

To the south the ancient Greeks had built an enduring legacy with their language, customs, and far-flung colonization, which reached from the Black Sea to the coasts of France and Spain. The invasions of the "barbarians" (a word originally coined by the Greeks) left the Greek-speaking Eastern Roman Empire relatively unscathed after the fall of Rome.

While western Europe remained politically weak and economically primitive, the eastern Byzantine emperors ruled a thriving state that incorporated cultures of ancient Greece, the Slavic peoples, and the Mediterranean societies coasts of the Levant. Justinian I, a Byzantine emperor of the sixth century, sought to bring former Roman domains in North Africa and Italy back into the empire, but he failed in his goal of rebuilding the Roman Empire from Constantinople. Over the centuries to come the Byzantine Empire would be greatly weakened by rivalry between the Eastern Orthodox Church and Christian sects of Egypt and the Levant as well as by a hard-fought campaign against Persia that would leave the treasury drained of money and resources.

Under the rulers who followed Charlemagne in western Europe, feudalism became the dominant economic system. Western Europe fragmented into tiny discrete geographical areas under the impact of repeated invasions that destroyed the political and physical infrastructure (such as roads and established trade routes) that had tied the Roman world together. The manorial system bound feudal domains in a system of mutual obligation, with loyalty, service, and protection exchanged between serfs, knights, and landowners. As new areas were settled and new land was cultivated, the landscape of Europe was tamed into small strips of land, divided by hedges and furrows and gradually spreading into the shrinking areas of untamed forest wilderness. Little by little market centers developed, where peasants could bring surplus livestock and crops for sale and trade goods with neighboring communities. As communications improved, royal dynasties emerged to challenge the autonomy of the landed nobility. The struggle to unify nations out of the far-flung duchies and counties consumed western Europe in long centuries of conflict and invasion.

The endless fighting that tore at the economy and social fabric of Europe worried emperors as well as the popes. A schism between the eastern and western Christian churches occurred in the middle of the 11th century, further weakening the church's authority. In an attempt to heal the divisions, Pope Urban II called on Europeans to undertake a crusade to Jerusalem and to recapture the holy city from the Muslim "infidels." The first crusade began in 1095; over the next two centuries several more crusades arrived in the Middle East. Crusaders either marched through the Balkans and Asia Minor to reach the Levant or sailed in fleets from Mediterranean ports in Italy and France: Venetian and other European traders were happy to support the Crusades as one strategy of breaking the Islamic monopoly on trade with the Far East. Although they were unsuccessful in the end, the Crusades brought Europeans into contact with new regions of the world and greatly expanded the horizons of European trade and culture.

CLIMATE

Along with a diversity of landscapes comes a wide variation in Europe's climate. The climate of eastern Europe is generally cold and dry because it is dominated by Arctic air masses sweeping down from Siberia. Western Europe has moderate temperatures, heavier rainfall, and longer growing seasons. Both eastern Europe and western Europe have the familiar four seasons of spring, summer, fall, and winter. But the southern peninsulas, which are surrounded by the Mediterranean, share the climate of North Africa and Western Asia, with two seasons: hot, dry, agriculturally unproductive summers and cool, rainy winters that allow a crop to be planted.

The climate of western Europe is noteworthy, especially for its fluctuations during the Middle Ages. Western Europe is far warmer than other areas of the earth at similar latitudes. The reason for this begins with a tropical current that flows from Africa toward South America. The current is deflected up the coast of the American continents and returns eastward in the form of the Gulf Stream, a wind-driven current that goes about as far as the island of Bermuda. The tremendous amounts of warm water delivered by the Gulf Stream continue until it washes up against the shores of western Europe because of a mechanism known as the North Atlantic Drift. The water from the tropics cools as it travels north and at the same time evaporates, making the remaining water denser because of the greater concentration of salt.

When the cooler, saltier water sinks in the North Atlantic, it sets up a circular current within the ocean that draws more warm water behind it. This system of currents makes western Europe warmer and rainier than any other comparable area of the world. Over time there can be considerable variation in this system, with a corresponding variation in the climate of western Europe. One such time is known as the Medieval Warm Period, which lasted from the ninth to the 14th centuries. At this time harvests and the range of crops grown in northern Europe increased (which also was helped by improvements in technology). Wine grapes, for example, were grown as far north as southern England. The retreat of field ice from the northern seas allowed the Scandinavian Vikings to send out colonizing expeditions to Greenland, Iceland, and, in the late 10th century, North America.

The Medieval Warm Period proved a temporary variation and was followed by the Little Ice Age, a period of cooling that brought longer, more severe winters and shorter growing seasons. As the continent cooled, regions of the far north again became uninhabitable. The last Viking colonies in Greenland died out in the 15th century, though the people of Iceland survived as a distinct society. Nevertheless, the increasingly favorable climate that resulted in greater agricultural produc-

tion throughout the later medieval period undoubtedly promoted economic recovery from the devastation of the Viking incursions and the disruption that followed. In addition, it no doubt contributed to the spirit of self-confidence and innovation that would carry western European culture across the world after the end of the Middle Ages.

THE ISLAMIC WORLD

BY BRADLEY A. SKEEN

Islam came into being in the deep desert of Arabia and quickly spread from one end of the Old World (Eastern Hemisphere) to the other, from the straits of Gibraltar between Africa and Europe on the Atlantic to Indonesia and the Philippines in the Pacific Ocean, and from the deserts of central Africa to those of central Asia. Thus, the Islamic world comprised every kind of climate from desert to rain forest.

ARABIA

Arabia was the cradle of Islam. Islam arose in the year 610 when Muhammad ibn Abdallah (ca. 570–632) was said to have received revelations from God in the city of Mecca in western Arabia. Proclaiming himself God's messenger and prophet, Muhammad gained followers and also decriers, eventually migrating to Yathrib (modern-day Medina) to escape persecution. By the time of his death the Islamic religion had spread to the entire peninsula.

The Arabian Peninsula is a large body of land between Africa and Asia, though it is technically part of the latter continent. It sits on a separate tectonic plate that is pulling away from Africa, making the deep rift valley of the Red Sea. As a result, there is a ridge of mountains along the western edge of the peninsula. The highest peak, at 12,028 feet, is Jabal al-Nabi Shoaib in the extreme southeastern corner (present-day Yemen). The eastern edge of the Arabian plate is being subducted under (falling below) the Eurasian plate and closing the Persian Gulf. To the south lies the Arabian Sea, an arm of the Indian Ocean.

The climate of the entire peninsula is dry, and the Rub al-Kahli (Empty Quarter) in the southern part of Arabia is one of the driest deserts on earth, with dune seas up to 1,083 feet deep. Some areas receive no measurable rainfall and have temperatures as high as 130 degrees Fahrenheit. The process of desertification increased during the Middle Ages, making the ancient caravan route across the Rub al-Kahli impossible to traverse. The Nedj, or central plateau, however, had considerable areas of pasturage, and the local tribes of Arabia lived by herding horses and camels through a cycle of nomadic migration between oases and other fertile areas. Once the tribes were unified and no longer spent their military efforts

in private feuds and as proxies fighting along the border controlled by either the Byzantine or Sassanid empires, the Arab horsemen proved a formidable and highly mobile military force, enabling the rapid spread of Islam on the back of their military conquests.

Arabs also participated in the east–west trade between the civilizations of eastern Asia and Europe, taking caravans across the Syrian Desert between Mesopotamia and the Mediterranean coast and sailing in the Persian Gulf and Red Sea. Muhammad's own family had a background in this kind of trade, and he himself had been a merchant in his early life. Arabia itself was also productive of luxury goods that were widely traded; among them was frankincense (commonly used as an incense and well known as one of the gifts of the magi offered to the infant Jesus in the infancy narrative of the Gospel of Matthew), which comes from the gum of trees that grow only in the southwestern corner of Arabia.

NEAR EAST

Between 632 and 642 the forces of the Rashidun Caliphate conquered the entire Middle East, from Egypt to the farther limits of the Persian Empire in inner Asia. The Near East (comprising the modern states of Syria, Lebanon, Jordan, and Israel-Palestine) has an arid climate, but the fringe of mountains along the Mediterranean coast promotes a rainy season that makes settled agriculture possible; indeed, this is the area where the first permanent agricultural settlements—cities—were founded in prehistoric times.

Maritime mountains extend all the way down the eastern Mediterranean coast from the Nur Mountains (called Amanus in ancient times) in Syria to the volcanic mountains of the Sinai Peninsula. Important peaks in this range are Mount Lebanon (10,131 feet) and Mount Carmel (1,789 feet). Mount Lebanon has permanent snow cover and a large cedar forest on its lower slopes, the primary source of timber in the region in ancient and medieval times, giving rise to the phrase in the Semitic languages “Cedars of Lebanon” as a metaphor for something exceptionally strong. Mount Carmel figures prominently in the religious traditions of Judaism, Christianity and Islam. Immediately east of the coastal range is an arm of the Great Rift Valley formed by the tectonic separation of Africa and Arabia, which extends from central Africa through the Red Sea and finally ends in the Levant. This valley contains the lowest points on the earth's surface, including the Dead Sea, a salt lake whose surface is 1,378 feet below sea level. The Dead Sea is also unique in having a high concentration of mineral salts, making the water buoyant enough for bathers to float. The Arab tribes in the area developed a mythical explanation for the low elevation of the land in the Middle Ages. Based on a garbled account

of the story of Sodom and Gomorrah in the biblical book of Genesis, they explained that God had punished the patriarch Lot by striking down the whole land his tribe inhabited. Farther east across this valley is another mountain range, called the Anti-Lebanon (including the Golan Heights), which runs parallel to the maritime range and in the remote past was part of the same mountains before they were driven apart by tectonic forces.

The Temple Mount (Mount Zion) in Jerusalem is actually a rather low rise in the maritime range, but one with considerable cultural significance. It was the traditional site of the main Jewish temple in antiquity. As such, it was the spot from which the Islamic prophet Muhammad is thought to have ascended to heaven and returned, according to the Islamic sacred scripture the Koran. Because of its importance in Islam, the Muslim conquerors of Jerusalem quickly built (ca. 700) two important religious structures on the remains of the Jewish temple (which had been destroyed by the Romans in 70 C.E.): the Dome of the Rock and the al-Aqsa Mosque. Possession of Jerusalem and the ancient site of the Jewish temple was also an important goal of the European crusading armies that briefly conquered much of the Near East in the 12th century C.E. Under that regime, control of the Temple Mount was placed in the hands of a religious order of crusading knights, the Knights Templar.

EGYPT

Egypt has been undergoing increasing desertification since prehistoric times and is an exceptionally dry desert. Egypt receives the smallest amount of rainfall of any similarly sized tract of land in the world; away from a narrow coastal band the average rainfall is less than 0.2 inches per year, and many years see no rain at all. However, the whole of Egyptian civilization was concentrated during the Middle Ages, as in antiquity, in the narrow valley of the Nile River (except for a few oases in the Western Desert, such as Siwah, whose inhabitants, incidentally, resisted Islamic conversion until the 12th century). The Nile is the longest river in the world (4,160 miles). Its source, however, was a mystery until the 19th century, when it was discovered in a system of lakes in central Africa (which also comprised Lake Victoria and Lake Albert, among others) by the British explorers Richard Francis Burton and John Hanning Speke.

The Blue Nile is a tributary that joins the Nile at Khartoum in the Sudan. This branch of the river is fed by rain in the Ethiopian highlands, where rainfall accounted for much of the Nile flooding. The peculiar feature of the Nile was to flood its valley in Egypt every year with remarkable regularity. The crest of the flood usually occurred on July 21. Far from being destructive, the flood made agriculture possible

by inundating the earth in the valley with water and by laying down a new deposit of rich topsoil. As a result, whereas most agriculture in the medieval world might return seven grains for each seed planted, fields in Egypt routinely returned 20:1, making Egypt the most agriculturally productive area in the world.

MESOPOTAMIA

Mesopotamia (modern-day Iraq and Kuwait) became the political center of Islamic civilization. The city of Baghdad (meaning “gift of God”) was founded in 762 as the new capital of the caliphate, the central government nominally in charge of the whole Islamic Empire. The name *Mesopotamia* comes from the ancient Greek meaning “between the rivers.” The “rivers” are the Tigris and Euphrates. Like the Nile in Egypt, they carried water to an essentially desert region to make very productive agriculture possible and enabled the emergence of one of the world’s first civilizations (Sumer and Akkad) in antiquity. But unlike agriculture in Egypt around the Nile, agriculture in Mesopotamia depended on a very complex and delicate system of canals and irrigation, and the rivers’ frequent flooding was destructive rather than beneficial. The irrigation system had always used waterwheels and other machinery to regulate the flow of water and generate mechanical power, but these systems were considerably improved by engineers such as al-Jazari (fl. 1206). His machines tended to replace human and animal power with flowing water and used devices such as cranks; he was one of the first engineers to realize how to convert circular motion into reciprocal motion (such as the up-and-down motion of a pump). The high level of technology achieved was a real advance on Greek models inherited from antiquity and far more sophisticated than contemporary European technology.

IRAN AND INNER ASIA

The Plateau of Iran lies between the Persian Gulf and the Caspian Sea. It has been thrust up by the subduction of the Arabian underneath the Eurasian tectonic plate. The Zagros Mountains run along the southern edge of the plateau and serve as the border with Mesopotamia. This range has peaks above 14,764 feet. Most of the land is arid, with the only well-watered plain lying at the southern end of the Caspian Sea. Hence the country is much better suited to pasturage than agriculture. Accordingly, the national way of life in Iran was horse breeding, and the country’s military might consisted of its well-mounted and highly trained cavalry. The Caspian Sea is the world’s largest inland body of water, with an area of 143,244 square kilometers. Fed at its northern end by the Volga River, the area around the Volga delta is fresh water, but much of the Caspian is highly saline.

To the east of the Caspian Sea and the north of the Plateau of Iran lie the inner Asian steppes. This vast area of grassland supported many peoples who lived from horse breeding and who consequently made highly effective cavalry and were repeatedly able to successfully raid and conquer more settled peoples in Europe, India, and China. The stirrup, which makes riding and especially fighting from a horse much easier, was invented in this area at the very beginning of the Middle Ages. To some degree this development triggered an outward migration from inner Asia that eventually overwhelmed the Roman Empire.

The first great conquerors from inner Asia were the Iranians themselves, who in antiquity gained an empire that stretched as far as Egypt in Africa and Thrace in Europe. They were followed by Huns and Turks and eventually by Mongols from the desert regions somewhat farther east. The latter two groups in general converted to Islam. In the Middle Ages the population of inner Asia was made up of various Turkic and Iranian peoples. Originally the area was marked by religious diversity, with many nations following traditional religions and others embracing ancient world religions, such as Manichaeism and Buddhism. But by the end of the Middle Ages the entire region was almost uniformly Islamic.

The nature of the inner Asian steppes—vast expanses of grassland with no major rivers or settled populations to impede travel, made the area a major trade route between East and West. This was the so-called Silk Road, actually a network of caravan routes by which silk, porcelain, and other precious items were shipped from China to Europe, mostly in exchange for gold and silver. Without actual roads or other infrastructure to support trade, the caravans consisted of large strings of horses or camels carrying relatively small loads on their backs without the aid of wheeled vehicles such as carts or wagons, which could not easily be dragged through the tall grasses. The caravan routes passed either north of the Caspian Sea to end in ports on the Black Sea or to the south to end in cities on or near the Mediterranean coast, such as Damascus or Beirut.

INDIA AND THE INDIAN OCEAN

Islamic military operations to conquer India were attempted shortly after the conquest of the Sassanid Empire (651), but the greater part of the Indian subcontinent did not fall to Islamic rule until the establishment of the Mughal Empire in India in the 15th and 16th centuries. The Muslim heartland in India has always been the Sind (modern-day Pakistan), the valley of the Indus River. This was the host to another ancient civilization, as were the Nile and Tigris-Euphrates valleys.

Islamic control of India together with central Asia produced a monopoly over the two major east–west trade

routes: the caravan trade through inner Asia and the annual monsoon trade across the Indian Ocean between India and East Africa (for which prevailing winds made it easy for a fleet of trading vessels to sail from the mouth of the Red Sea to southern India and back once a year). This led first to the collapse of the Christian kingdom of Axum in Ethiopia, which had briefly controlled the Indian Ocean trade during the disruptions caused by the Islamic conquest of Egypt and much of the Byzantine Empire (seventh to ninth centuries C.E.). The prices of all goods delivered to western Europe were also systematically raised by taxation because of hostility between the Islamic regimes in the Mediterranean and the Christian civilization of western Europe. The desire to get around this Islamic monopoly led, at least in part, to the European age of exploration at the very end of the Middle Ages with the discovery, between 1480 and 1520, of new routes to India around the southern tip of Africa; the discovery of the Americas; and the first circumnavigation of the globe.

NORTH AFRICA

Cyrenaica and Tripolitania in Libya (on the North African coast just west of Egypt) were conquered by Muslims in the original expansion of the caliphate under Muhammad's successors. The rest of the North African coast was conquered by the Umayyad Dynasty before 750 C.E. In Roman times the North African coast had enjoyed a temperate climate similar to Italy's and had supported many large and prosperous cities. However, deforestation caused by excessively intense agricultural exploitation of the land by the Romans allowed the Sahara to spread as far as the coast in many places. The Maghreb—the coastal plain between the Atlas Mountains and the Mediterranean in modern-day Morocco, Algeria, and Tunisia—was not as badly affected by this process as Libya. The Berber groups native to the area, suppressed under the earlier Visigothic and Roman rulers, already lived a manner of life similar to that of the Arabs because of the desert character of the land, which was comparable to Arabia. They enthusiastically converted to Islam and adopted the Arabic language, making the conquest of North Africa easier.

The main geographical feature of North Africa is the Sahara Desert. The Sahara is the second-largest desert in the world (after only Antarctica) at 3.5 million square miles (approximately the same size as the continental United States). The Arabian Desert, though separated from the Sahara by the Red Sea, is part of the same climate system. The Sahara has been expanding both north and south since the last ice age, approximately 8,000 years ago. As a desert, the Sahara was, like inner Asia, devoid of settled peoples or geographic barriers to trade in the medieval period and so became the home

of an extensive caravan trade between the Mediterranean and the peoples of central Africa. The trade was conducted by Berbers and Arabs from North Africa but also by the Taureg and other groups native to the Sahara itself. The main items traded were salt (vital for life in the dry, hot conditions of the desert), gold, and especially slaves taken in central Africa and sold at the slave markets in Islamic North Africa.

A hub of the trade across the Sahara was the city of Timbuktu. Located in the modern-day nation of Mali, the city stands on the river Niger (which empties into the Atlantic on the eastern African coast) at the edge of the Sahara. It was thus a natural transshipment point between river-borne and caravan traffic. Founded in the 10th century by the Tauregs, Timbuktu became the major city of the successive central African empires of Ghana, Mali (after 1324), and Songhai (after 1468). The madrasa of the Sankore mosque there became an important center of learning renowned throughout the Muslim world and a center for propagating Islam along the African trade routes deep within the continent. Because Europeans were not directly involved in the Sahara trade and because no Christian European ever visited the city before the 19th century, Timbuktu became in Europe a byword for the foreign and the unreachable. The city declined sharply at the end of the Middle Ages when the slave trade shifted south to Portuguese trading centers established on the African coast.

SPAIN

The mountainous Iberian Peninsula, today comprising Portugal and Spain, was conquered by Moors from North Africa in 711 and became not only part of the Islamic world but also a leading cultural center. Although the climate is arid compared with that of western Europe (except for the northwestern coastal strip), it has a far wetter and more temperate climate than much of the rest of the Islamic world. Spain is separated from North Africa by the Strait of Gibraltar, a stretch of ocean only 9 miles wide.

Iberia is cut through by the valley of rivers that flow from central mountains into the Atlantic, such as (from south to north) the Guadalquivir, the Tagus, and the Duero. In the northwest the Ebro runs from the Pyrenees into the Mediterranean. The heart of Islamic civilization in Spain was in the Guadalquivir valley in the southern province of al-Andalus. The main cities in this region were Córdoba and Seville. Toledo, farther north on the Tagus, was also an important city. After the Guadalquivir valley was lost to the Christian kingdom of Castile in the 14th century, Islamic culture survived until 1492 in the city of Granada in the southern mountains of al-Andalus (Sierra Nevada), with peaks of about 11,483 feet.

ASIA MINOR

In the first decades of the 11th century a small group of Turks (called Seljuks after their first ruler to convert to Islam) conquered much of inner Asia. At the battle of Manzikert in 1071, they defeated the Byzantine Empire and annexed all of Asia Minor (or Anatolia, approximately the Asiatic portion of modern Turkey), bringing that area, previously shielded by the barrier of the Taurus Mountains, under Islamic rule for the first time (and coincidentally giving the impetus to the First Crusade when the Byzantine emperor Constantine appealed to Pope Urban II for military assistance). Asia Minor, though mountainous, was a rich agricultural area and, because it was the western terminus of the inner Asian caravan trade, constituted the wealthiest portion of the Byzantine Empire. Accordingly, the Seljuk state founded in the area called itself the Sultanate of Rum (that is, Rome).

EASTERN EUROPE

During the later Middle Ages approximately the eastern half of Europe became controlled by Islamic states. The Balkans is a large peninsula in southeastern Europe, and its territory is extremely mountainous. The highest peaks in the region are Musala in modern-day Bulgaria (9,596 feet) and Mount Olympus in Greece (9,560 feet). The Danube, which flows through the Balkans, is the longest river in Europe outside Russia. North of the Danube lies the Carpathian Mountains and the fertile Hungarian plain. The Ottoman Turks crossed into Europe through the straits at Gallipoli into the Balkans in the 1360s and began to conquer Byzantine territory in Europe as well as the Slavic and Hungarian states beyond, eventually reaching as far as Vienna in the Holy Roman Empire. Ottoman encroachment into Europe caused many Byzantine scholars to move to Italy, helping to spark the cultural movement of the Renaissance. The Ottoman capture of the Byzantine capital of Constantinople in 1453 is an important marker of the end of the Middle Ages. The burning of the city resulted in the irretrievable loss of a great deal of ancient Greek literature. The Turks made the captured city their own capital, gave it its modern name of Istanbul, and constructed important architectural landmarks there, such as the Blue Mosque and the Topkapi palace.

The early state of the Kiev Rus (in the modern-day Ukraine and Russia) was conquered by the Mongol Golden Horde, which quickly converted to Islam. The vast steppe regions of Russia allowed the nomadic Mongols to maintain their traditional way of life. This isolation ultimately proved fatal, since their Russian subjects maintained contact (however limited) with western Europe and adopted more modern forms of social and military organization, which eventually allowed them to overthrow Mongol rule.

The Volga, the largest river in Europe, empties into the northern end of the Caspian Sea. The surrounding region as far as the Caucasus Mountains, which mark the border between Europe and Asia, was occupied in the early Middle Ages by a Turkic people called the Khazars. While most of the peoples of inner Asia converted to Islam, the Khazars converted to Judaism beginning in the late eighth century. They seem to have been influenced by the Jewish merchant class of the area, many of whom had fled persecution in the Byzantine Empire.

EAST AFRICA AND THE FAR EAST

Trade along the eastern, or Indian Ocean, coast of Africa was taken over in the Middle Ages by Arabs and Persians. They founded many trading colonies (with Zanzibar being the most important), and Islam spread, especially to local ruling elites; the area, however, was not conquered as part of the Islamic or Turkish worlds. Islam was also spread along trade routes to the eastern Asian archipelagos of Indonesia and the Philippines, beginning intensively in the 13th century. Islamic merchants routinely traded as far east as Canton in southern China.

CONCLUSION

The phenomenal expansion of Islam in the generation after Muhammad was conditioned by the Arabian desert climate in producing a marvelous force of light cavalry for the work of conquest. At the same time the rapid spread of Islam was equally facilitated by the geographic realities of the time. Existing large political units like the Sassanian Empire or Byzantine provinces could be conquered and occupied by exploiting the administrative structures already in place, while missionary work proceeded along existing trade routes such as the Silk Road and the annual Indian Ocean monsoon merchant fleet.

See also AGRICULTURE; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES; ECONOMY; EMPIRES AND DYNASTIES; EXPLORATION; FOOD AND DIET; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; INVENTIONS; LANGUAGE; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MILLS AND MILLING; MINING, QUARRYING, AND SALT MAKING; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

Africa

~ Ibn Battuta: Excerpt from *Travels in Asia and Africa (1325–54)* ~

THE GREAT RIVER NILE

The Egyptian Nile surpasses all rivers of the earth in sweetness of taste, length of course, and utility. No other river in the world can show such a continuous series of towns and villages along its banks, or a basin so intensely cultivated. Its course is from South to North, contrary to all the other great rivers. One extraordinary thing about it is that it begins to rise in the extreme hot weather at the time when rivers generally diminish and dry up, and begins to subside just when rivers begin to increase and overflow. The river Indus resembles it in this feature. The Nile is one of the five great rivers of the world, which are the Nile, Euphrates, Tigris, Syr Darya and Amu Darya; five other rivers resemble these, the Indus, which is called Panj Ab [Five Rivers], the river of India which is called Gang

[Ganges]—it is to it that the Hindus go on pilgrimage, and when they burn their dead they throw the ashes into it, and they say that it comes from Paradise—the river Jun [Jumna or perhaps Brahmaputra] in India, the river Itil [Volga] in the Qipchaq steppes, on the banks of which is the city of Sara, and the river Saru [Hoang-Ho] in the land of Cathay. All these will be mentioned in their proper places, if God will. Some distance below Cairo the Nile divides into three streams, none of which can be crossed except by boat, winter or summer. The inhabitants of every township have canals led off the Nile; these are filled when the river is in flood and carry the water over the fields.

From: Ibn Battutah, *Travels in Asia and Africa 1325–1354*, trans. and ed. H. A. R. Gibb (London: Broadway House, 1929).

Asia and the Pacific

~ Benjamin of Tudela: Excerpt from *The Itinerary of Benjamin of Tudela (12th century)* ~

Thence one returns to the land of Khuzistan which is by the river Tigris, and one goes down the river which falls into the Indian Ocean unto an island called Kish. It is a six days' journey to reach this island. The inhabitants neither sow nor reap. They possess only one well, and there is no stream in the whole island, but they drink rainwater. The merchants who come from India and the islands encamp there with their wares. Moreover, men from Shinar, El-Yemen and Persia bring thither all sorts of silk, purple and flax, cotton, hemp, worked wool, wheat, barley, millet, rye, and all sorts of food, and lentils of every description, and they trade with one another, whilst the men from India bring great quantities of spices thither. The islanders act as middlemen, and earn their livelihood thereby. There are about 500 Jews there.

Thence it is ten days' journey by sea to Katifa, where there are about 5,000 Jews. Here the bdellium is to be

found. On the twenty-fourth of Nisan rain falls upon the water, upon the surface of which certain small sea-animals float which drink in the rain and then shut themselves up, and sink to the bottom. And about the middle of Tishri men descend to the bed of the sea by ropes, and collect these shell-fish, then split them open and extract the pearls. This pearl-fishery belongs to the King of the country, but is controlled by a Jewish official.

Thence it is seven days' journey to Khulam which is the beginning of the country of the Sun-worshippers. These are the sons of Cush, who read the stars, and are all black in colour. They are honest in commerce. . . . From Passover to New Year, that is all during the summer, no man can go out of his house because of the sun, for the heat in that country is intense, and from the third hour of the day onward, everybody remains in his house till the evening. Then they go forth and kindle lights in all

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the market places and all the streets, and then do their work and business at nighttime. For they have to turn night into day in consequence of the great heat of the sun. Pepper is found there. They plant the trees thereof in the fields, and each man of the city knows his own plantation. The trees are small, and the pepper is as white as snow. And when they have collected it, they

place it in saucepans and pour boiling water over it, so that it may become strong. They then take it out of the water and dry it in the sun, and it turns black. Calamus and ginger and many other kinds of spice are found in this land.

From: Benjamin of Tudela, *The Itinerary of Benjamin of Tudela*, trans. and ed. Marcus Nathan Alder (New York: Philipp Feldheim, Inc., 1907).

Europe

~ The Venerable Bede: Excerpt from The Ecclesiastical History of the English Nation (731) ~

BOOK 1, CHAPTER 1

Britain, an island in the ocean, formerly called Albion, is situated between the north and west, facing, though at a considerable distance, the coasts of Germany, France, and Spain, which form the greatest part of Europe. It extends 800 miles in length towards the north, and is 200 miles in breadth, except where several promontories extend further in breadth, by which its compass is made to be 3,675 miles. To the south, as you pass along the nearest shore of the Belgic Gaul, the first place in Britain which opens to the eye is the city of Rutubi Portus, by the English corrupted into Reptacestir. The distance from hence across the sea to Gessoriacum, the nearest shore of the Morini, is fifty miles, or as some writers say, 450 furlongs. On the back of the island, where it opens upon the boundless ocean, it has the islands called Orcades. Britain excels for grain and trees, and is well adapted for feeding cattle and beasts of burden. It also produces vines in some places, and has plenty of land and waterfowls of several sorts; it is remarkable also for rivers abounding in fish, and plentiful springs. It has the greatest plenty of salmon and eels; seals are also frequently taken, and dolphins, as also whales; besides many sorts of shellfish, such as mussels, in which are often found excellent pearls of all colours, red, purple, violet, and green, but mostly white. There is also a great abundance of cockles, of which the scarlet dye is made; a most beautiful colour, which never fades with the heat of the sun or the washing of the rain; but the older it is, the more beautiful it becomes. It

has both salt and hot springs, and from them flow rivers which furnish hot baths, proper for all ages and sexes, and arranged according. For water, as St. Basil says, receives the heating quality, when it runs along certain metals, and becomes not only hot but scalding. Britain has also many veins of metals, as copper, iron, lead, and silver; it has much and excellent jet, which is black and sparkling, glittering at the fire, and when heated, drives away serpents; being warmed with rubbing, it holds fast whatever is applied to it, like amber. The island was formerly embellished with twentyeight noble cities, besides innumerable castles, which were all strongly secured with walls, towers, gates, and locks. And, from its lying almost under the North Pole, the nights are light in summer, so that at midnight the beholders are often in doubt whether the evening twilight still continues, or that of the morning is coming on; for the sun, in the night, returns under the earth, through the northern regions at no great distance from them. For this reason the days are of a great length in summer, as, on the contrary, the nights are in winter, for the sun then withdraws into the southern parts, so that the nights are eighteen hours long. Thus the nights are extraordinarily short in summer, and the days in winter, that is, of only six equinoctial hours. Whereas, in Armenia, Macedonia, Italy, and other countries of the same latitude, the longest day or night extends but to fifteen hours, and the shortest to nine.

Ireland, in breadth, and for wholesomeness and serenity of climate, far surpasses Britain; for the snow scarcely

ever lies there above three days: no man makes hay in the summer for winter's provision, or builds stables for his beasts of burden. No reptiles are found there, and no snake can live there; for, though often carried thither out of Britain, as soon as the ship comes near the shore, and the scent of the air reaches them, they die. On the contrary, almost all things in the island are good against poison. In short, we have known that when some persons have been bitten by serpents, the scrapings of leaves of books that were brought out of Ireland, being put into water, and given them to drink, have immediately expelled the spreading poison, and assuaged the swelling. The island abounds in milk and

honey, nor is there any want of vines, fish, or fowl; and it is remarkable for deer and goats. It is properly the country of the Scots, who, migrating from thence, as has been said, added a third nation in Britain to the Britons and the Picts. There is a very large gulf of the sea, which formerly divided the nation of the Picts from the Britons; which gulf runs from the west very far into the land, where, to this day, stands the strong city of the Britons, called Aicluith. The Scots, arriving on the north side of this bay, settled themselves there.

From: Bede, *The Ecclesiastical History of the English Nation* (New York: E. P. Dutton, 1910).

FURTHER READING

- Peter Beaumont, Gerald H. Blake, and J. Malcolm Wagstaff, *The Middle East: A Geographical Study*, 2nd ed. (New York: Halsted, 1988).
- George Brooks, *Landlords and Strangers: Ecology, Society, and Trade in Western Africa, 1000–1630* (Boulder, Colo.: Westview Press, 1994).
- Neville Brown, *History and Climate Change: A Eurocentric Perspective* (London: Routledge, 2001).
- R. A. Butlin and R. A. Dodgshon, *An Historical Geography of Europe* (New York: Oxford University Press, 1998).
- Stéphen Chauvet, *Easter Island and Its Mysteries*, trans. Ann M. Altman. Available online. URL: <http://www.chauvet-translation.com/>. Downloaded on May 26, 2007.
- Kent C. Condie, *Earth as an Evolving Planetary System*, rev. ed. (Boston: Elsevier Academic Press, 2005).
- David Ditchburn and Angus Mackay, *Atlas of Medieval Europe* (New York: Routledge, 1997).
- Fekri A. Hassan, ed., *Droughts, Food, and Culture: Ecological Change and Food Security in Africa's Later Prehistory* (New York: Kluwer Academic/Plenum Publishers, 2002).
- Martin Rhys Jones and Michael Woods, *An Introduction to Political Geography* (London: Routledge, 2004).
- Hugh Kennedy, *An Historical Atlas of Islam*, 2nd ed. (Leiden, Netherlands: E. J. Brill, 2002).
- David Nicolle, *Historical Atlas of the Islamic World* (New York: Checkmark Books, 2003).
- Donald Edgar Pitcher, *An Historical Geography of the Ottoman Empire from the Earliest Times to the End of the Sixteenth Century* (Leiden, Netherlands: E. J. Brill, 1972).
- E. C. Pyatt, *The Passage of the Alps: From Hannibal to the Motorway* (London: Robert Hale, 1984).
- Emily W. B. Russell, *People and the Land through Time: Linking Ecology and History* (New Haven, Conn.: Yale University Press, 1997).
- Malise Ruthven, *Historical Atlas of Islam* (Cambridge, Mass.: Harvard University Press, 2004).

► clothing and footwear

INTRODUCTION

The wearing of clothing is a distinctively human trait. It is not preordained by nature; it is not required by human genes. Instead, it is an artificial custom that developed to help people cope with difficult climates and evolved over the ages into social customs for many but not all cultures. Frequently, the wearing of clothing is a form of self-expression—a way for a person to show individuality by displaying his or her personal taste in cuts of garments, colors, and shoe styles. In cultures in which powerful social groups fear or just resent individuality, the kind of garments worn sometimes has been fixed by government decrees or religious prohibitions.

There were a variety of reasons for not wearing clothing in some cultures. One was the lack of suitable materials for making clothing. Among those peoples who had no textiles, animal skins, tree bark, or leaves might be the only sources of material for garments, and a lack of any of these items could leave people with limited choices in clothing and footwear. Another factor is climate. A hot climate could account for why some medieval Australians, Africans, and Americans wore few clothes most of the time. Among nomadic Australians, most clothing would have been too much of a burden to carry. In warm, moist climates, such as tropical forests, clothing could be very uncomfortable when muddy or wet, and clothing could foster skin diseases such as those caused by fungi. In many cultures scanty clothing could be a sign of poverty or misfortune. The poverty could be deliberately chosen, as was the case with many Indian ascetics, but more often it was a sign of a society's failure to care for its poor.

The most obvious reason for wearing clothing is for warmth. In northern Asia people were often nomadic, but the wearing of animal skins was a necessity for survival. Their domestication of beasts of burden aided in the carrying of the clothes they needed. In searing hot sunlight in open territories such as deserts and grasslands, clothing could be worn as protection from the damage sunlight could cause. Even so, someone who labored hard in hot weather outside might have to minimize clothing that was close to the skin, for the same reason people in tropical forests would do so: to avoid skin infections. Hence, loose robes were common in the Near East and North Africa.

As societies became more complex, the purposes of clothing often became more complex, too. In medieval cities there might be bakers, blacksmiths, tanners, launderers, and other specialized workers who would require special clothing such as aprons or gloves to protect themselves from the everyday hazards of their tasks. Thus it would be possible to recognize the livelihoods of people just by what they wore.

In many societies clothing carried political messages. Even in a small central African community, a leader could be recognized by his or her robes, or the status of the daughter of a chief might be acknowledged by the sandals she wore. During the Han Dynasty (202 B.C.E.–220 C.E.) of China laws were made governing what kind of clothing people could wear. These laws stemmed from resentment by the rich of poor people who wore nice clothes; commoners were restricted to dull colors and unimposing cuts of garments. At times during the medieval era yellow was the color that distinguished Chinese commoners from their social superiors. Emperors were required to wear certain types of robes at specific times of the year to influence the changes in the seasons. In India outcastes were often required to wear only torn, well-used clothes—sometimes only animal skins, which were considered very impure and identified them as the lowest of the low in society.

The availability of certain kinds of animal skins or fabrics could affect what people wore. For instance, the history of cotton fabrics is one of adoption by societies over hundreds of years, first in India and North Africa, then in the Far East, then in much of the rest of Asia, and eventually in Europe. Cotton was a light fabric, well suited to wearing in warm weather, but Europeans went without it because for centuries it was unavailable to them. Much trade in the medieval world involved clothing and the materials for making clothes. The silk and cotton wraps used in India and western Africa became fabric for shirts in other lands. The zori, a thronged sandal, of Japan, became popular footwear not only in eastern Asia but eventually far to the west.

AFRICA

BY AMY HACKNEY BLACKWELL

Each of the various peoples of Africa created unique clothing cultures and traditions. Further, each people created a distinctive weaving style, which was passed from generation to generation. As a ruling class emerged in Africa, weavers and tailors developed luxury versions of their products. The clothing of kings and nobles was rich and elaborate, serving to separate them from the common people over whom they ruled.

People wore clothing for various reasons. Wealthy people used clothing to show their status, but for most people clothing was functional. Except at high elevations, the climate in Africa was generally warm, so people did not require clothing to protect them from extreme cold. Protection from heat and sun was a larger concern. Thus tropical African clothing was often made of lightweight cloth and in light colors to reflect sunlight away. Because the weather was so hot, people could wear very little clothing and still remain comfortable.

Woven cloth first arrived in North Africa in Phoenician times, early in the first millennium B.C.E. During the ancient period weaving technology traveled south across the Sahara, such that by the fifth century C.E. many African peoples were wearing clothing made of woven cloth. Most cloth was made of cotton, which grew well in North Africa, the Middle East, and India and, by the beginning of the medieval period, was also grown in much of sub-Saharan Africa. The use of cotton clothing traveled gradually through the African continent over the next millennium.

Cotton was not the only fabric available for African clothing. Wealthy people wore imported clothes made from silk. In tropical Africa people used the fibers of the raffia palm to make a woven textile called raffia. Garments made from raffia included hats, capes, loincloths, and shirts. Many African peoples of the medieval period had no woven cloth of any kind. Whatever clothing they wore had to be made of leather or available plant materials. Leather and skins and other similar substances also could be used as a fashion statement. Many people wore animal skins as decoration and to show their courage or status. The people of central and eastern Africa wore the black and white skins of the colobus monkey. Chiefs might wear lion skins to show their courage and strength.

Different African peoples used different colors when making their clothing. The Masai of eastern Africa favored red in their clothing and tried always to wear at least a small amount of that color. The people of Ghana chose bright shades of gold, yellow, green, red, blue, and black, with each color having a distinct meaning. Only people of the highest status could wear gold clothing. Yellow was the color of fertil-



Clothing patch (leather, cloth, gilt, and paint); Egypt, ca. 250–ca. 650
(Los Angeles County Museum of Art, Gift of Jerome F. Snyder, Photograph
© 2006 Museum Associates/LACMA)

ity, green evoked renewal and the cycle of birth and decay, red was the color of passion and political will, blue was the color of the sky and a pure spirit, and black symbolized spiritual awareness and communion with ancestors. Different colors also had various ceremonial meanings. For example, in western Africa some people wore white clothing for happy occasions, such as naming ceremonies, and dark clothing in black, brown, or red for funerals.

The Bambara people of Mali made a fabric called *bogolanfini*, a cotton cloth dyed with fermented mud to form elaborate patterns in black, brown, and white. Common motifs included squares, fish bones, and stars. The Bambara women made shirts, trousers, and wraps out of this cloth. The seamstress would make sure that the patterns on the cloth fitted together correctly so that a finished garment would have an attractive appearance.

As people traded with one another and traveled across the continent, the same basic garments became common throughout much of Africa. These clothes included wraps made of rectangular pieces of cloth, loose shirts of varying lengths, trousers and shorts, and gowns. Each group had its own distinctive ways of making and wearing their clothing. Common people wore the simplest forms of these garments and had the scantiest wardrobes. The wealthy and the nobility wore the most complicated and elaborately sewn and decorated versions and owned more clothing.

Medieval Africans showed tremendous ingenuity in wrapping and tying rectangular sheets of cloth into garments.

Ethiopians wore long rectangular cloths wrapped around their bodies and tied over the shoulders and around the hips with straps. The entire garment fell to the feet. The front was cut longer than the back, which allowed the wearer to drape it into graceful folds. Masai of both sexes dressed in loose garments with cloaks wrapped around their shoulders.

Women throughout much of Africa often wore wrappers similar to Asian sarongs. They could put long rectangular strips of cloth to a variety of uses. A wrapper could be made into a dress in several ways. A wearer could hold one end of the cloth under her arm in front of her chest and then wrap the cloth around her body twice, passing it under her breasts and around her back and then tying the ends in front of her chest. Women often left their breasts bare out of custom and so that their babies could nurse freely. A woman might use a second long piece of cloth to secure her baby to her body, either on the side of her hip where the child could reach her breasts or on her back to be out of the way while she worked or traveled. Women also wrapped cloth around their heads for decoration and to keep the sun off. Some of the many methods of wrapping were very elaborate and decorative.

Most men and some women in western Africa wore long, flowing robes known as boubous. Adapted from Islamic styles of the Middle East and North Africa, the boubou had long, wide sleeves and fell to the wearer's ankles. It was basically a long shirt constructed from a large square of cloth; the large amount of cloth allowed ample airflow within the garment. The sleeves of the boubou were very long—long enough for a man to place them over his shoulders when sitting. Sometimes a man would wear drawstring trousers and a shirt underneath it. The shirt and pants would be made of the same material as the robe, typically a silk fabric, with embroidery decorating fancy versions.

Apparently, the boubou appeared in the Ghana Empire around the eighth century and was adopted by the men of the Mali Empire in the 13th century. The first wearers were Islamic Africans who had contact with the camel caravans that traveled to western Africa across the Sahara from the Middle East or North Africa. Many of the conventions for wearing the boubou were adopted from the Berber people of the Sahara.

A colorfully patterned fabric called kente cloth was first made in Ghana in the 12th century. It was originally fabricated as clothing for the kings of the Ashanti people. The king decided who else could wear kente cloth. At first only the royal household and officials were granted permission, but over the years the privilege extended to more people, and eventually it became widespread throughout the region.

Kente cloth is made by weaving strips of cloth in bright colors and patterns and then sewing the strips together into

a patchwork design. The designs were not merely decorative. Patterns had specific meanings that communicated status, religion, and historical and cultural meanings. Some patterns were worn only by men and others only by women. A man would usually drape the kente cloth over his shoulders as a shawl or wrap, leaving his right shoulder and arm uncovered. A woman would wrap the kente cloth around her body as a kind of dress. The kente indicated the wearer's status and wealth and often had a ceremonial significance.

The groups of small people who inhabited the forests of central Africa typically wore very little clothing, and their children wore none. Adults sometimes covered their genitals with small garments, though they, too, often went completely naked. Men occasionally wore loincloths made of the skin of animals, such as deer. Women would make themselves little aprons of green leaves, which had to be fashioned anew daily because the leaves dried out.

The various Bushmen who inhabited the deserts of southern Africa often wore nothing at all. Infants and children went completely naked, and diapers did not exist. People of the desert did not make cloth, so any sort of clothing they wore had to be made of leather or gathered plant material. Adults of both sexes might cover their genitals with loincloths or aprons made of leather. Women with babies secured them to their bodies in leather slings.

Some groups of pastoralists in eastern Africa likewise wore very simple clothing. Men wore brief loincloths made of pieces of leather tied around their waists with leather thongs. Women might wear the same type of garment. A woman might also wear an entire goatskin or sheepskin dyed black or red and tied around her body with a leather thong. Both sexes typically wore no clothing on their torsos. Children went naked.

Nakedness was, in fact, fairly common among adults in much of Africa throughout the medieval period. In the 15th century, for example, a North African historian visited Mali and reported to his horror that women of the Mali Empire, from slave girls to the sultan's daughters, went about naked. He also reported seeing men dressed in fine clothes and described men washing their clothes so that they would have good white garments to wear on Friday for religious services.

Throughout Africa many people went barefoot for their entire lives. Those who did wear shoes typically wore simple sandals made of leather. The shoes had leather soles cut in the shape of the wearer's foot. The straps might be in a thong design, with a piece of leather between the big toe and second toe to hold the shoe steady in front. The leather straps could be made from plain leather or from many narrow strips of leather braided together in a decorative pattern.

THE AMERICAS

BY JULIA MARTA CLAPP

In Mesoamerica clothing was symbolically and socially significant, as were most other aspects of native cultural production. Much of our current knowledge comes from art produced by Mesoamericans, such as manuscripts, murals, and sculpture. Textiles are an especially perishable material, so evidence comes less often from actual artifacts, except in more arid climates, such as Peru in South America, where textiles have survived in greater quantities.

Mesoamerican garments from this period were generally formed by single pieces of cloth that were draped over the body, tunics that slipped over the head through a hole cut in the center, pieces of cloth that were sewn together to form a garment, and cloth sewn in order to sheath the arms and legs. The four basic types of clothing were the loincloth, the hip cloth, the cape, and the wraparound skirt. Garments were woven from plant and animal fibers (such as cotton or the wool of the llama). Weaving was generally (but not always) performed by women.

Information about the Aztec (ca. 1200–1521) is particularly rich because of the records of the civilization itself as well as those of the Spanish conquerors and missionaries who recorded aspects of Aztec life. (Of these, one of the most prolific was the Spanish missionary Fray Bernardino de Sahagún [1499–1590], whose 12-volume *Florentine Codex* is an invaluable resource.) There were dozens of different types of garments worn by the Aztec. These were distinguished by their use, such as garments used in ritual or war, by rulers, by gender, or in everyday life. They were also distinguished by their decoration; garments were woven with colors and patterns and at times were trimmed with materials, such as leather or feathers.

An example of Aztec clothing made to be draped over the body was the loincloth, which was worn by men. Second in this category was the hip cloth, also a male garment, which was a triangular piece of cloth worn around the waist and tied on the side. The mantle, or cloak, was a garment that indicated high social status and that could be worn by royalty, warriors, or common people who had earned the right. While mantles indicated social status or deeds recognized by the ruler, they could also be used in trade and tribute.

Aztec women wore skirts, which were often decorated with colorful woven patterns or images. Different skirts would be worn for different activities, such as ceremony, mortuary practice, and daily duties, such as cleaning. Garments that slipped over the head but were not sewn were worn only for ritual. These garments would be worn alone or with another item of clothing underneath.

Some sewn articles of clothing were generally worn open in front, in the manner of an unbuttoned coat. They could take various forms: as armor for warriors or as fringed jackets for men. A second type of sewn clothing was joined with seams and pulled over the head instead of worn open in front. This second type was worn primarily by warriors. (It is interesting to note that Spanish conquerors in both Mesoamerica and South America adopted the custom of wearing woven fabric armor in favor of their much heavier metal protection.)

The Maya of the Yucatán peninsula in the late Postclassic period (ca. 900–1517) incorporated many of these same principles in their clothing. Many of the details are similar, such as feather decoration and the triangular hip cloth or quilted armor. In addition—as with the Aztec—these articles of clothing were worn by humans and (representations of) deities alike.

One article of clothing that art historians have identified as uniquely Mayan is the kilt. The kilt was worn ceremonially during the five days just before the New Year, which the Maya considered to be unlucky. Kilts were usually woven or made of plant leaves. Mayan women wore hip cloths or skirts cinched at the waists. Over the skirts they wore slip-on garments, which covered the breasts and the back and were open at the arms. Evidence suggests that the lowland Maya of this era did not seem to wear ornate ritual costumes. It is important to remember that these findings (and any findings) are not definitive but rather reflect the extent to which archaeological research has been able to provide information.



Four-cornered hat; camelid fiber, Peru, ca. 600–ca. 850 (Los Angeles County Museum of Art, Costume Council and Museum Associates purchase, Photograph © 2006 Museum Associates/LACMA)

South America before the Spanish conquest has an exceptionally rich history in textile production. All clothes worn by inhabitants of modern-day Peru, Bolivia, Chile, and Argentina were constructed out of woven cloth. In the Middle Horizon Period (ca. 500–ca. 1000) artisans from the Wari state (now Peru) made cloth with an astonishingly high number of threads per inch. (The greater the thread count, the better the quality of the cloth.) Tunics made from this fabric were worn as ritual attire by elite citizens (as were mantles) and also were included in burials. They were woven with brightly colored geometric designs or depictions of abstract animals and occasionally were decorated with feathers. One particularly extraordinary tunic from around 1000 to 1500 is made of cloth with bright, tropical feathers sewn onto it, creating an entirely feathered surface. The fact that this tunic has survived is a testament to the dry climate of this area, which can preserve delicate materials. Other kinds of tunics and mantles as well as loincloths and head cloths were worn by society as a whole. The elite also wore the unique square (four-cornered) hats. These were boxlike, woven hats with a nub of woven material at each corner. They were decorated with colorful images of animal-like creatures and were worn perched atop the head.

During Inca times (ca. 15th and 16th centuries) textile production was at the heart of social control and economic exchange. Clothing was the means by which an individual expressed his or her social status. Because the empire was so geographically large, manner of dress was also a way of identifying local affiliation with a particular region. Dress further could reflect particular situations, such as a warrior's victory in battle (for which he would be rewarded with luxurious clothing) or a war prisoner's humiliation (in which he would be required to wear a long red tunic indicating his defeat by the Inca).

Tunics were the most common form of everyday dress and—like everything else in the Incan civilization—were strictly regulated by the government. Measurements were standardized: 33.27 inches long and 30.71 inches wide. In general, the tunic was decorated not with intricate imagery but rather with geometric pattern. (However, it is important not to underestimate the symbolic significance of geometric design in Incan society.) All woven clothing was worn as a single piece: The Inca (as contrasted with the Spanish) did not sew together pieces of cloth to form a garment.

The mantle was also an important part of Incan clothing and, unlike the tunic, was frequently decorated with fantastical images of birds and beasts woven into the fabric. These were very abstract or were mythical animals not found in life. One side of the mantle was usually smooth and “finished,” while the other side was less so; the finished side would have

been exposed to the outside. The mantle generally was worn draped over the shoulders.

Regretfully, there is still much work to be done in Native North American art of this period. Our knowledge of clothing from the era before the invasion by Europeans is very limited in comparison with all we know about Mesoamerica and South America. What we can surmise comes mostly from figurative representations in art and artifacts retrieved from burials. Each has limitations. In burials we cannot be sure whether the garments were for burial purposes only or were worn in real life as well. In sculpture we can only make an educated guess as to the type of figure represented and the meaning or function of its garments.

For example, there are art objects from the Mississippian Period (ca. 750–1500) in the midwestern, eastern, and southeastern United States that probably represent elites—either rulers or priests who wore ornate costumes. These costumes often take animal form, essentially transforming the wearer in what is thought to have been a ritual ceremony. Other figures are depicted wearing simpler clothing of skirts, shirts, and loincloths.

People in the Caribbean during this era were known as the Taíno. Knowledge of their clothing styles and traditions is also relatively limited, for several reasons. As with the Native North Americans, this era is understudied in history. Second, the Taíno, living in an especially warm environment, did not wear many clothes. Last, the common problem related to perishable materials persists in the Caribbean: The materials simply have not withstood the effects of time and the environment.

We do believe that in general, young men and women who were unmarried spent their everyday lives naked. The few remaining artifacts of exquisite beadwork suggest that Taíno royal and ceremonial costume was just as elegant as that of other native civilizations and was similar in the decorative use of beads and feathers. Otherwise, as did other Americans before the Spanish conquest, the Taíno wore skirts and mantles.

ASIA AND THE PACIFIC

BY CARYN E. NEUMANN

The fragility of the clothing and footwear worn in the distant past makes the study of historical costumes difficult. While medieval textiles have largely disintegrated, information about dress can be found in several sources. Travelers often gave detailed accounts of the costumes they saw. Sculpture and paintings also serve as mirrors into a distant past, as do governmental and religious rules. The popularity of certain fashions in India is implied by the Buddhist and Jain regula-

tions forbidding monks to use materials deemed impure or to wear clothing or footwear considered provocative. All these sources reflect the social and cultural practices of the period.

The history of clothing and footwear in the medieval Asian world must begin with China, sometimes called the kingdom of costumes. The Tang Dynasty (618–907 C.E.) and the Song Dynasty (960–1279 C.E.) were particularly noted for their splendor, while the Yuan Dynasty (1279–1368) was heavily influenced by the less colorfully arrayed Mongols. Costumes popular in earlier dynasties were relatively plain. The Sui Dynasty (589–618) began with relatively plain dress. At the start of the seventh century the Sui government specified the costume for each rank, from the emperor to petty officials.

The Tang initially retained the Sui dress code. In time, however, the Tang absorbed exotic styles of clothing and headgear, transforming regulation dress into distinctively and beautiful costumes. Men's costumes consisted mostly of silk turbans, or *fu tou*, and robes with round collars that were holdovers from the Sui era. Gauze hats, popular among Confucian scholars and hermits, were the usual headgear for formal occasions such as imperial court gatherings, legal hearings, and formal banquets. Typically, a robe was made of fabric woven with designs and colors indicating the rank of the wearer. Later in the period the robes were embroidered with various designs to identify the wearers as civil officials (birds) or military officers (animals). A Tang woman usually wore a bamboo hat with a veil and a short-sleeved cropped jacket with a long skirt, the waist of which was fastened under the armpit. The jacket sleeves gradually became longer as time passed. The collar was round, square, slanting, or V-necked. Many women wore boots, as did men of all classes.

At the beginning of the Song Dynasty the costuming of officials and members of the military remained almost the same as in the previous period. The rise of the idealist philosophy, however, led to a call for simplicity in dress. Consequently, Song clothing was quite reserved and conservative, with fewer variations and quieter colors. Most men continued to wear robes with round collars. The color of the robe—purple, crimson, red, blue, or green—indicated the wearer's rank. A woman's upper garments consisted mostly of a coat, silk or satin blouse, loose-sleeved dress, overdress, short-sleeved jacket, and vest. Beneath all those was a skirt. A lower-class woman wore a jacket but no overdress, and a short-sleeved upper garment and sleeveless vest identified the wearer as a commoner. Men wore boots, but women did not, because foot binding had come into fashion. Women wore silk or satin shoes embroidered with various designs.

The Yuan Dynasty, initially noted for its simplicity in clothing, also adopted an elaborate system of dress. The



Oval buckle with dragon; jade or soapstone, China, ca. 1279–ca. 1368
(Los Angeles County Museum of Art, gift of Patricia G. Cohan, Photograph
© 2006 Museum Associates/LACMA)

working costume for an official was a floor-length robe made of muslin with loose sleeves, a round collar, and buttons on the left side. Different colors denoted different ranks. The emperor and his courtiers wore clothes of one color only. Commoners wore tight-sleeved gowns and short-sleeved overjackets. Women also wore robes buttoned on the left side. Cuffs were tight, and trousers without a crotch or waist were worn under the robe. Dark shades showed the Mongolian influence, as did the buttoning on the left. Men and women of the north wore boots, while footwear styles in the south remained the same as the Tang system.

In Korea the basic styles of dress were established in the Three Kingdoms Period (300–668). Among the mountain nomads of northern Asia, both men and women wore pants (*baji*) and jackets (*jeogori*). For both men and women the typical jacket extended to the hip and was tied around the waist with a band. It had a straight neck band, narrow sleeves with trimmed hems and cuffs, and a rectangular cloth with variously colored stripes sewn to the center front of the bodice (*seop*). The pants had narrow legs tied at the ankles. In southern Korea, although women usually wore pants, they occasionally wore skirts (*chima*) instead. The skirt was long and gathered, with a wide band attached at the hemline. A coat (*po*) was worn over a jacket with pants or a skirt. The basic shape of the coat was the same as the jacket, except that the coat might have wide sleeves. Hats usually had brims. The hat of high official was decorated with feathers and held on by a string adorned with jade, coral, agate, or lapis lazuli, indicating the wearer's rank.

As in most of eastern Asia between the seventh and ninth centuries, the Silla Kingdom (668–918) of Korea adopted the official clothing styles of China's Tang Dynasty. In

1387 the ruler Wu ordered that officials' attire follow that of the newly established Ming Dynasty. Thereafter, Korean officials wore the *samo* silk hat and the *dannyeong* coat of their Chinese counterparts. Ranks were distinguished by the materials used in making the belts. Shoes were fabricated from leather, silk, wood, cattail, straw, and brass. Men's and boys' shoes had blunt toes, while footwear for women and girls were pointed. Clogs with high heels were used on muddy roads in the rain.

Travelers, particularly students, brought Chinese clothing and dyed fabrics to Japan. During the Sui Dynasty, Chinese women changed the closing of their kimono-like robes from the left to the right side. Japanese women promptly followed suit, relegating kimonos crossed from right to left to the dressing of corpses. Men's costumes were stiffer in both cut and material. Straight cuts of fabric were the norm.

Color particularly appealed to the Japanese. In 648 the emperor Kotoku reorganized the Japanese court according to the Chinese Tang style. Regulations mandated that men and women below the rank of prince wear, in order of rank, purple, lavender, crimson, Indian red, cherry, mulberry, dark blue, light blue, leaf green, and grass green. Paler shades indicated lower stations. Persons of no rank wore yellow. Successive ranks of the nobility were also indicated by the colors of their hat cords, with purple—signifying the perfect harmony of yang and yin in Chinese cosmology—given to the highest rank.

Hats were colored to indicate ranks. Many were decorated with lacquer. The emperor's tall hat carried a sort of roof, festooned with jewels in the Chinese style. Other men wore high, narrow caps. The nobility wore robes of brocades and thin gauzes in many colors and designs. Shinto priests wore white robes with blue skirts or green coats, stiff black hats, and lacquered shoes. Women typically did not wear hats. After the fall of the Tang Dynasty the cut of all Japanese clothing became extremely large. A nobleman of the Heian Period (737–1185 C.E.) wore sleeves so big that they hung to his knees when his arms were crossed. A woman might wear as many as 20 kimonos at once, with two cloaks on top.

Like other parts of Asia, Tibet fell under the influence of China. In their cold, mountainous homeland where snow remains on the ground even in the summer, the Tibetan people dress warmly year-round. Eighth- and ninth-century accounts indicate that boots—simply hide turned inside out with the inner fur keeping feet warm—were the most common footwear. In the 11th century the historian Ouyang Xiu noted that the Tibetans wore fur and felt. Another observer from the court of the Tang emperor Gaozong reported that the Tibetans wore several layers of sheepskin in the winter and still needed to wear wool in the summer.

When the Tibetan ruler Songtsän Gampo married the princess Wencheng of the Tang court, she brought much of the Tang culture into Tibet. As Gampo abandoned his furs, the upper classes followed suit by adopting Chinese styles. They wore silks and satin with leather boots that had upturned tips. Aristocratic men wore cloaks, while noble women typically dressed in capes. Males wore tweed or sheepskin vests. Commoners still could wear only felt in the summer and fur in the winter. Tibetan fighters were rewarded for their bravery on the field of battle with tiger skin robes to indicate that they were as brave as tigers. To punish a man who fled the battle, a foxtail would be attached to his head to indicate humiliation.

The Tang Dynasty collapsed in the ninth century along with the Tubo Kingdom in Tibet. Clothing styles changed as well. Despite its internal political divisions, Tibet continued to be strongly influenced by Chinese fashions. The Yuan Empire brought boots with colorful brocade patterns, vests made from brocade with patterns in gold and decorations of pearls, robes with colorful mantles for Buddhist priests, and a black headdress with gold trimming for the Living Buddha. Felt, wool, and skins remained popular in Tibet, in concession to the weather. When the Yuan Dynasty collapsed in the 14th century, Tibetan officials and nobles were forbidden by the Phag-ru regime to wear ordinary dress on festive and ceremonial occasions. They had to wear silks, satins, gold, jade, and jewelry. As prosperity increased in Tibet during the Phag-ru regime, the production of tweed also increased. It became the main material for Tibetan costumes and was used to pay tribute to the Chinese central government.

In India, the Philippines, and other parts of the Pacific with warm climates, it was common practice to walk barefoot. Shoes were worn to protect the feet against severe climatic or topographic conditions. The ascetics of the Hindu, Buddhist, and Jain sects in India were not generally permitted the worldly luxury of footwear. Instead, they used footwear made of wood to prevent contact with any ritually impure substances. Other Indians wore mules, slippers, shoes, boots, socks, and, most often, sandals. These items, often colored, were made from cow, buffalo, or goat hide; silk, wool, or cotton; or various grasses, with ornaments of animal skins, feathers, and scorpions' tails. The toe-knob sandals (*paduka*) of India were fancier attire made of wood, ivory, brass, silver, and semiprecious stones such as jade.

EUROPE

BY AMY HACKNEY BLACKWELL

Medieval clothing was simple and designed mainly to keep the wearer warm and covered. Most people in the medieval period dressed in tunics and cloaks that required minimal

sewing and tailoring. Families wore clothes they produced themselves, from making the cloth to finishing the garment. Because it took much time and effort to make a single garment, few people had extensive wardrobes. It was common for a person to have only one set of clothing and to wear it every day for months or even years. By contrast, a wealthy member of the nobility or royalty might own an extensive wardrobe fashioned from fine materials. Because the upper classes were the most common subjects of paintings of the time, the best information about medieval clothing comes from them.

Most medieval clothing was made of wool, linen, and leather. Cotton was unknown in Europe until the end of the medieval period and did not become a common fiber in clothing until the Industrial Revolution. People raised sheep throughout Europe, using the animals for meat and milk as well as wool. They spun the wool into threads and used looms to weave the thread into cloth that was warm and water resistant, albeit itchy. Flax grew throughout Europe, and people wove it into linen cloth. Although linen was most common in warm areas, some northern peoples imported it to make lightweight garments. Silk had to be imported from Asia, which made it uncommon and expensive.

In the early medieval period (between 450 and 900) the fashion center of Europe moved from Rome to Byzantium. Byzantine styles spread throughout Europe but were especially concentrated in eastern Europe and Russia. The basic Byzantine outfit for a wealthy person started with an undershirt made of silk or fine linen, worn by men and women. The shirt had long, fitted sleeves, unlike the sleeveless tunics common during the ancient period. It also might have a high neck. On top of their garments both sexes wore long cloaks. An ordinary cloak was made in the shape of a rectangle. For formal occasions people wore semicircular capes that fitted the shoulders and draped better than rectangular cloaks. Cloaks were fastened at the neck or shoulder with pins. In bad weather men and women wore hooded cloaks, which might be sewn shut in front to keep out the wind. The clothing of both sexes was as richly adorned with embroidery and jewels as the wearer's budget allowed.

On top of the cloak a man would wear a long tunic; lengths ranged from below the knee to the ankles. During the fifth and sixth centuries many men topped that tunic with another tunic called a *dalmatica*, which had been popular during the Roman imperial period. The *dalmatica* had long, loose sleeves and fell to the feet. During the later Byzantine period ordinary men stopped wearing the *dalmatica*, although kings and priests still wore it. Below his tunic a man would wear a pair of short breeches. On his legs he wore stockings, either knitted of wool or cut and sewn from silk and tailored to fit the leg closely. During the sixth century

men began wearing trousers, which until that time were considered suitable only for barbarians. Mens' shoes were made of soft leather or fabric and were custom-fitted to the wearer's feet. Early shoes were simply designed and had no heels, but they became more structured over time.

A woman wore a full-length gown on top of her under-shirt. Over that she might wear a gown, called a *stola*, belted around the waist. Over everything a lady would place a cloak called a *palla*. The *palla* could be woven in very elaborate patterns. Ladies sometimes covered their faces or heads with veils of fine silk. Women also wore leather or cloth shoes, often heavily adorned with pearls or gold embroidery.

In western Europe during the early medieval period people wore styles similar to those of Byzantium but much less elaborate. The Norman court of France became something of a fashion center in its own right during the Byzantine period and later. Both men and women in Europe wore long, tight-fitting tunics called *bliauts*. Men's *bliauts* fell to below the knee and women's to the floor. Both sexes wore heavy mantles over their garments. Some mantles were hooded. In cold climates people covered their shoulders with cloaks made of fur or sheepskin.

Under the *bliaut* a person would wear a chemise, or shirt. The chemise could be sleeveless if worn under a *bliaut* with long sleeves, or it could have tight, laced sleeves if the *bliaut* was sleeveless. Starting in the 12th century women laced their *bliauts* very tightly around their waists. They might wear corsets underneath to make their waists even smaller. On top of the *bliaut* a lady would wear a girdle, or belt, which could be as elaborate as the wearer's taste and means permitted. A woman's *bliaut* contained a great deal of material in the skirt.



Leather shoe and model for a foot; Britain, late 14th century (© Museum of London)

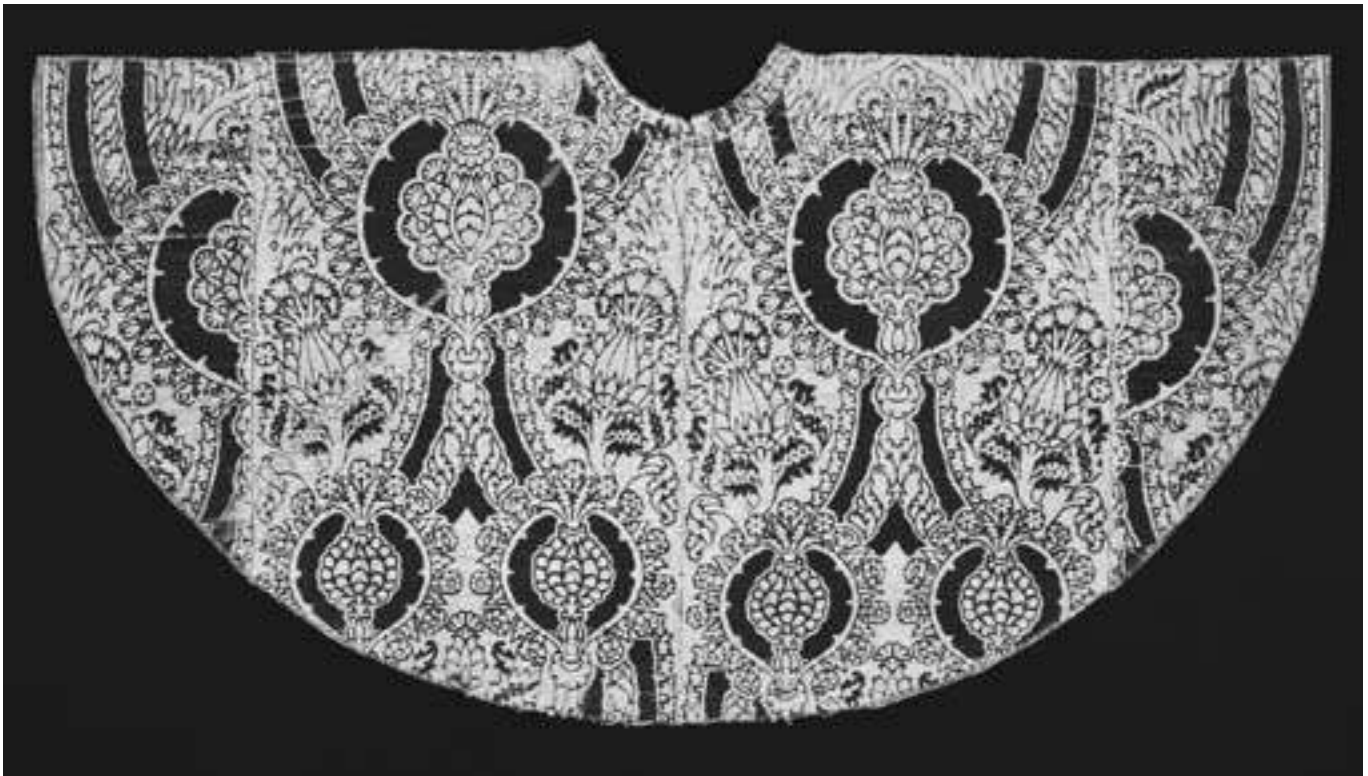
The skirt could be slit up the sides, with a long train in back. Sometimes the sleeves were very wide and loose as well.

Men began wearing linen undershirts called *shertes* in the 11th century. The *sherte* fell to the knee and had long sleeves. Wealthy men wore *shertes* decorated with embroidery. In the winter they covered their *shertes* with heavier woolen tunics. Men's *bliauts* were as tightly laced as women's, and historians believe that some men wore corsets under them. A man's *bliaut* often had a band of heavy embroidery around the hem to help it hang nicely. Under his clothing a man wore breeches that resembled cloth diapers; they were wound around the waist and through the legs, and the loose ends were tucked into the belt. Some men wore trousers. Peasant men made do with pieces of leather wrapped around their legs and secured with leather thongs. On their legs people wore loose stockings that could be sewn from heavy woolen cloth or knitted from fine silk or wool. People held up their stockings with garters that crisscrossed the legs and were fastened above or below the knee.

During the later medieval period people continued to wear the same basic styles with occasional new garments and a wider variety of fabrics as trade with the East introduced new textiles to Europe. Fabrics came in a greater profusion of colors as well. In the 12th and 13th centuries men continued to wear linen undershirts and drawers. They wore stockings that covered their legs entirely and held them up by tying the tops to their undershirts or belts. Over his undershirt a man would wear a calf-length tunic topped with a sleeveless shirt called a *cyclas*. During the 1300s men began wearing a short tunic called a *cotehardie*. It was made in four panels sewn together at the front and sides. The panels could be of different colors, a design called parti-colored. Men sometimes wore a padded tunic under the *cotehardie* to make themselves look more muscular. Atop the *cotehardie* a man might wear a calf-length tunic called a surcoat; it had loose sleeves that showed the tight sleeves of the *cotehardie* beneath. On his head a man would wear a cloth covering called a coif that tied under the chin. Over that he might wear a hood; in the late 13th century the hood grew longer until its point might hang down almost to the wearer's feet.

A woman of this period wore two gowns, one on top of the other. The undergown had long sleeves and a long skirt. The overgown had shorter sleeves and longer skirt so that it trailed in back and had to be held up in front, showing off the undergown. Typically, a woman wrapped her head and neck in lengths of linen in a style called a gorget or wimple. A woman also wore the *cotehardie* in a longer version than the man's style.

During the 14th and 15th centuries tailors became more skillful, and clothing began to fit better than in previous cen-



Man's cape; silk velvet on a gold brocade ground, Italy, ca. 1480 (Los Angeles County Museum of Art, Costume Council Fund, Photograph © 2006 Museum Associates/LACMA)

turies. Men's tunic hemlines rose until they were scarcely hip length. Stockings in this period evolved into actual tights, which covered the legs and the man's lower torso. A man would tie his stockings to a short sleeveless tunic and cover that with a long-sleeved jacket called a *jupon* or *pourpoint*. The *cotehardie* still existed, but only nobles wore it in this period.

Women continued to start their ensembles with a chemise made of fine linen or silk cloth. Over that a woman would wear a dress called a corset, which had a fitted bodice laced up the front, long tight sleeves, and a full skirt. Over that she would wear a surcoat with a low neckline and large armholes through which the corset could be seen.

During this period both sexes began wearing a gown called a *houppelande*. The garment and its enormous sleeves both fell to the floor. The hems of the sleeves were cut in elaborate patterns and ornately embroidered. The *houppelande* was usually worn with a high collar.

Both men and women continued to wear shoes made of leather or cloth. Men wore fitted leather boots when they went outside or rode horses. For inside wear some men wore shoes with long, pointed toes, occasionally stiffened into curls with whalebone or wire. When they went outside, both sexes tied wooden platforms called pattens to their shoes, which

kept the shoes and hems of their garments out of the mud and dust.

THE ISLAMIC WORLD

BY CARYN E. NEUMANN

Textiles held enormous importance as one of the major industries of the medieval Islamic world. Textile manufacture and trade probably occupied a majority of the working population. There has been little research into the clothing of the period, however, partly because few dated examples have survived the ravages of time. As a result, it is difficult to assign clothing styles to the major centers of the region. Clothing nonetheless constitutes a cultural statement that communicates a great deal of information about the medieval Islamic world.

The fashion of dress of the medieval Muslim community stayed close to the styles of the earlier period, with certain modifications for the new moral sensibilities engendered by Islam. Functionality became tempered by ideology. The basic articles of clothing for both sexes at the start of the medieval Islamic era consisted of an undergarment, a body shirt, a long gown or tunic, a head covering, and an overgarment such as a

mantle, coat, or wrap. Footgear consisted of shoes or sandals. A person might wear many garments or only one, depending on a variety of factors, including weather, occasion, and economic means. Many of the items worn by men and women were identical. Jewish and Christian groups sometimes used the same costume as their Muslim neighbors. More often, costume was the outward sign of religious beliefs, as exem-

SILK

Silk, the most luxurious textile of the medieval era, spread into the Islamic world from China in about 300 C.E. and moved into Europe with the Islamic invasions of the eighth century. Silk is lightweight, soft, and surprisingly strong. Its cost priced silk beyond the reach of most commoners.

From one era to another and from place to place, silk was produced in the same way. Silk is the filament of the cocoon spun by the larvae or caterpillars of moths belonging to the Bombycidae and Saturniidae families of the Lepidoptera order. One of the few cultivated insects, the silk moth lays 300 to 500 eggs. The eggs are collected and kept in cold storage until the beginning of the mulberry leaf-producing season. Silkworms will eat only mulberry leaves. After about 40 days of feeding, the larvae begin to secrete fibroin, a liquid protein, mixed with sericin, a resin. On contact with the air, the sericin solidifies, cementing two fibroin strands together. Each silkworm secretes about 1,600 to 4,000 feet of silk filament that is spun into a cocoon in about 60 hours. The silkworm pupates into the chrysalis. After 10 days, when the chrysalis is about to emerge from the cocoon as a moth, it is killed by steam. Cocoons are boiled to soften and dissolve some of the sericin. The mixture is stirred with rods, to which the filaments attach. After being unwound, this product is sold as raw silk.

To make silk cloth, the raw silk is soaked in an oil-based emulsion and wound onto a spindle. The silk filaments are pulled from the end of the revolving spindle and twisted together as they come off the rapidly moving machine. The result is a strong yarn that is wound on spools. Silk fabric is woven in the same manner as other fabrics, on a loom. The Sasanian Persians developed the eastern drawloom, permitting weavers to make intricate and ornate figurative designs that were typically animals.

plified by the colorful embroidered silk dresses worn by the Iranian followers of Zoroaster.

Undergarments in particular reflect Islamic ideology. There is a well-known story of Muhammad (ca. 570–632), the founder of Islam, in which he averts his glance from a woman who has fallen from her horse until he is assured that she is wearing underwear. Medieval Arabic dictionaries define clothing simply as that which conceals or covers the genitalia. Not everyone in early Islamic Arabia could afford a separate undergarment, however. There are numerous accounts of men without underwear being forbidden to sit or squat publicly, truss up their garments while working, or drape themselves in a fashion whereby one side of the mantle is pulled up on the shoulder, leaving the other side of the body exposed.

The body shirt, or *qamis*, could be worn by both sexes, like so many other Islamic clothes. The length of the body shirt ranged from mid-thigh to full length. It could have long or short sleeves. The opening for the neck was round, either slit down the front or not. Children often wore only a body shirt. Muhammad supposedly covered his uncle with a body shirt when the man was taken prisoner naked at the battle of Badr in 624. Robes or tunics might be worn over the *qamis*. These robes include the *thawb*, a long- or short-sleeved gown; the *jubb*, a woolen tunic with narrow sleeves; a *qaba*, or sleeved robe slit in front with buttons made of fabric such as brocade; and a *farraj*, a robe similar to the *qaba* but slit in the back. Many robes were nothing more than a piece of cloth, although this cloth could be quite elaborate, with threads of silk decorating linen. The habit of wearing several layers of tunics and robes continued through the Middle Ages.

Throughout the Muslim world loose wraps were a common feature of dress for both men and women. These were simply large pieces of fabric that the wearer wrapped around the body. Males and females set themselves off from members of the opposite sex by the manner of draping, the accessories (jewelry, headgear, footwear, and veils), and colors, fabrics, and decoration. The Bedouin maintained a fairly consistent style across the centuries, partly because of their nomadic existence outside the pale of sedentary civilization. They preferred wraps in dark colors, typically of a blue-black shade. Wraps for townspeople of the Arabian Peninsula and the more cosmopolitan centers of the eastern Mediterranean were common as well. However, city dwellers used textiles of finer quality that were more ornate than those of the nonurban dwellers. Many wraps and mantles were known by their fabrics. The *namira* was a man's wrap with stripes of varying colors that gave it the appearance of a tiger skin. Some wraps, particularly a striped one made of Chinese silk, were considered so luxurious that they were given as gifts. They were

apparently not meant to be worn. The wraps of urban people were worn over fitted clothing.

The habit of covering the head out of modesty and respect was the norm for people in the medieval Islamic world. Muslims and Jews customarily covered their heads while praying. A man or a woman might draw a long mantle or wrap over the head. In his last public appearance, in about 630, Muhammad supposedly wore a wrap over his head, held in place with a black headband. Women typically covered their faces with a variety of veils when appearing in public. The three most common veils were the *qina*, a rectangular piece of fabric that covered the head and fell down like a curtain over the face; the *litham*, a rectangular cloth that covered the nose and lower half of the face; and the *burqu*, a harness-like affair consisting of fabric suspended from the center front of the headband to cover the face. The lower corners of the *burqu* were attached to the sides of the headband by a string, creating a masklike effect. Women of good reputation covered their faces before strangers, and a woman who lacked a veil was described with the same word (*hasira*) used to describe a warrior without armor. Men did wear veils on occasion, normally by draping the outer mantle in a manner that covered both the head and face. Very handsome young men are reported to have occasionally veiled their faces, particularly at fairs and

festivals, to protect themselves from the evil eye. The free end of a turban cloth also frequently served as a veil to protect the wearer from getting dust in the eyes while riding.

The turban has been worn by Arabs since pre-Islamic times. By the medieval period it consisted of one or two caps and a cloth wound around the head. Jews wore a shawl-like head cloth. A high cap appears to date from the seventh century. On military expeditions men wore a *mighfar*, a cap or head cloth of mail over a helmet. The *mighfar* was called a *sabgha* when it had a mail-covered back flap to protect the neck. Medieval Arab women apparently did not wear hats, as no existing sources describe them in hats.

Footwear for both sexes consisted either of sandals or boots. Sandals were apparently the norm, while boots were viewed as luxury items. The sandal, or *na'l*, could be constructed from palm fiber, smooth leather, or leather with animal hair. Soft, fine sandals were the mark of a person of high rank, usually royalty. The *khuff* was a boot made of leather. A custom found in the Jewish Talmud and also attributed to Muhammad held that a believer should always put the right shoe on first and remove the left one first. He or she should not go outdoors barefoot or with only one shoe, for fear of creating an ill omen. Furthermore, shoes should never be left with the soles facing heavenward.

In the Umayyad Period that began in the eighth century most Muslims abandoned earliest Islam's aversion to luxury garments. Silk, satin, and brocade clothing became far more common. Only the ascetic priests, known as Sufis, still wore simple clothing. The styles remained the same as in previous eras. Conquered people were prohibited from dressing like their conquerors, and Arab warriors on duty in the Persian territories were banned from donning Iranian clothing. Nonetheless, the Umayyad caliphs had adopted certain elements of the previous regime, the Sassanian Dynasty (224–651), for themselves and their entourage. They wore special robes of office with wide embroidered or jeweled collars and embroidered borders. High-status men wore coats with pearl borders cinched with an ornamental belt. They wore a high conical hat, the *qalansuwa*, as a royal symbol. It consisted of a frame of reed or wood covered with silk or another fabric.

Clothes have always been viewed as objects of significant material value in the Middle East. Accordingly, clothing played an important political role. High officials were customarily thanked for their service with a gift of textiles. They received so-called robes of honor, turbans, and other garments woven in the households of rulers. These clothes were typically heavily decorated with embroidery and gold. Muhammad gave valuable clothing as gifts to his entourage. Garments could be used to pay taxes or tribute. Pious wishes,



Kumari vest (multicolor silk embroidery in brick and chain stitch on yellow silk damask); Nepal, 15th century (Los Angeles County Museum of Art, purchased with funds provided by Mrs. Harry Lenart, Photograph © 2006 Museum Associates/LACMA)

much more eloquent than the modern congratulations, were appropriate for someone with a new garment.

See also ADORNMENT; ART; CHILDREN; CLIMATE AND GEOGRAPHY; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; GENDER STRUCTURES AND ROLES; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SOCIAL ORGANIZATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WEAPONRY AND ARMOR.

FURTHER READING

- Patricia Anawalt, *Indian Clothing before Cortés: Mesoamerican Costumes from the Codices* (Norman: University of Oklahoma Press, 1981).
- Apei Awangjinmei, *The Clothing and Ornaments of China's Tibetan Nationality* (Beijing: Beijing Publishing House, 2002).
- Fatima Bercht, ed., *Taino: Pre-Columbian Art and Culture from the Caribbean* (New York: Monacelli Press, 1997).
- Vandana Bhandari, *Costume, Textiles, and Jewellery of India: Traditions in Rajasthan* (London: Mercury Books, 2005).
- Katherine Bullock, *Rethinking Muslim Women and the Veil: Challenging Historical and Modern Stereotypes* (London: International Institute of Islamic Thought, 2002).
- Stewart Gordon, ed., *Robes and Honor: The Medieval World of Investiture* (New York: Palgrave, 2001).
- Lee Kyung Ja, Hong Na Young, and Chang Sook Hwan, *Traditional Korean Costume* (Kent, U.K.: Global Oriental, 2005).
- Jutta Jain-Neubauer, *Feet and Footwear in Indian Culture* (Toronto, Canada: Bata Shoe Museum, 2000).
- Frances Kennett, *Ethnic Dress* (New York: Facts on File, 1995).
- Helen Benton Minnich and Shojiro Nomura, *Japanese Costume and the Makers of Its Elegant Tradition* (Rutland, Vt.: Tuttle, 1963).
- Philippa Scott, *The Book of Silk* (London: Thames and Hudson, 1993).
- Robert Selbie, *The Anatomy of Costume* (New York: Crescent Books, 1977).
- Yedida Kalfon Stillman, *Arab Dress: A Short History from the Dawn of Islam to Modern Times* (Boston: Brill, 2003).
- Rebecca Stone-Miller, *To Weave for the Sun: Ancient Andean Textiles* (New York: Thames and Hudson, 1994).
- Zhou Xun and Gao Chunming, *5000 Years of Chinese Costumes* (San Francisco: China Books, 1987).

► crafts

INTRODUCTION

One of the great pleasures in studying history is discovering the many ways in which people can create societies and adjust to their environments. One way to understand the many variations in human society is to study people's crafts. For instance, crafts can show what people found to be most important in their lives: Hunter-gatherer societies, especially when enduring shortages of food or water, tended to focus on crafts that

would ensure their survival. In medieval Australia the making of bags out of animal skins for carrying water was a common craft, as was making loose netting for carrying goods or for trapping birds. That hunter-gatherer societies were not immune from the human conflicts found in other types of society is revealed in the fact that Australians devoted about as much time to making spears and practicing for warfare as they did to weaving baskets for transporting goods with them during their travels.

That people almost universally adopt technologies that can help them is evidenced in the medieval nomadic societies of southern Africa, where hunter-gatherers such as the San exploited the resources they found within their territories: People who had access to clay in their ranges made pottery, those with grasses made baskets, and those surrounded by furred game animals made coats or pouches. All such groups then traded with one another to gain the goods that the others produced. One lesson from the history of crafts is that seemingly primitive societies can engage in complicated trade and economic practices.

Through the study of crafts, archaeologists and historians can trace the development and even the decline of societies. One of the reasons the Tang Dynasty is often called China's golden age is that China during the Tang engaged in making numerous crafts, and archaeologists can find the remains of fine pottery, excellent metalwork, and evidence of other crafts scattered in Tang villages as well as Tang cities. The crafts of the Tang speak of an era during which most of China's people could partake in at least some of the benefits of the manufacturing economy.

On the other hand, an economic decline can be traced in Korean pottery of the 1300s. Korean potters had long imitated Chinese manufacturing techniques, but in the 1100s there was a revolution in Korean pottery manufacturing when Korean potters learned how to make celadon ware—pottery with a beautifully serene blue-green glaze. For about two centuries Koreans produced some of the best pottery ever made, but warfare against the Mongols and then the Chinese brought Korea's economy down, and celadon ware became crude and sloppy. Archaeologists infer from this that despite outside pressures, Korea managed to maintain an economy stable enough for craftspeople to perfect their crafts and pass on their knowledge. But by about 1300 the society was destabilizing, resulting in a decline not only in the quality of pottery but also in the quality of life for Koreans.

As economies become more complex, the number of crafts seems to increase, partly because people want better lives and will buy products that serve to make their lives superior to what they otherwise would have been. Thus, carpenters flourish when people can afford expert workmanship

for building houses and making furniture and even toys. A remarkable aspect of the society of the medieval Indians was that they could provide their children with expertly crafted toys throughout the medieval era. This indicates that people could afford to buy toys for their children, and the presence of toys even among the lower castes suggests that people thought that well-made toys were important.

The creativity of people can be seen in the crafts they use to solve problems. For instance, transporting water from its source to a home or public cistern would be difficult to do with only cupped hands for holding the water. One way to carry water is in baskets, but being woven with grasses or strips of bamboo, baskets tend to leak. Some societies responded to this problem by improving their basket-weaving techniques: tighter weaves meant less leakage. Other cultures chose to use another type of vessel, for example, ceramic containers, but crudely made pottery can soften and fall apart when wet. This meant either having to shift to yet another technology or doing what the peoples of eastern Asia did: improve their kilns to allow for higher temperatures when firing pottery, thereby making the pottery harder, and invent glazes that could seal the sides of the vessels from water. When looking at such solutions, it is very much worthwhile to note that medieval craftspeople seldom wasted the opportunity to beautify their work, whether with painted designs or, in the case of pottery, with beautiful glazes like celadon. Medieval craftsmanship was not just about satisfying basic needs; it was also about bringing beauty into everyday life.

AFRICA

BY KIRK H. BEETZ

The crafts of medieval Africa were as varied and accomplished as those of anywhere in the world. It is part of human nature to want beauty in life, and medieval African craftspeople seem to have tried to imbue even the simplest objects with grace, elegance, and beauty. Even a simple spoon would be made long, with a smoothly rounded drop at one end to counterbalance the scalloped scoop at the other end.

To many medieval Africans metalworking was the most important of all crafts. In western and central Africa blacksmiths were considered to have special spiritual powers that gave them a status higher than that of most other people. In western Africa metalworkers were almost always men. Their work depended on the availability of metal with which to work, and during the medieval era iron and copper were available in abundance. Ironworking was common from at least 500 on, and crucibles with traces of copper in them have been found dating from the 700s. The iron was mined in western Africa and was often available as either raw



African elephant ivory waste from a British workshop making items such as combs and knife handles; 15th century (© Museum of London)

ore or smelted ingots. Copper was accessible in some parts of western Africa and could be obtained through trade in the form of ingots throughout not only western and central Africa but also eastern Africa far into the modern nation of South Africa. In the region of the Congo metalwork from the 1000s included a vast variety of objects. Copper was used for fishhooks, knives, spearheads, and belts as well as for jewelry such as necklaces and bracelets. Archaeologists have found iron objects dating to the 1000s, including fishhooks, spearheads, harpoon heads, knives, axes, spears, and hoes. The introduction of iron hoes was especially significant in western and central Africa because draft animals were unavailable to help till farms and breaking the ground for planting required direct human labor.

Smiths had kilns outside their homes for melting or softening metal. They did most of their hammering and shaping inside their homes. They shaped metal by hammering it and by using iron tongs to draw hot, soft metal through holes in drawplates, making wire of various thicknesses, which was wound into coils. The wire was used to make jewelry as well as for decorating stone or wood or for tying iron to shafts to make weapons or tools. In medieval nations such as Mali and Benin gold, copper, and bronze in sheets were often hammered into shape for decorative purposes, such as covering for an art object.

Carved wood was decorated with metal. A common ritual object was a carved wooden animal in which nails were driven, with each nail representing a wish the person doing the nailing wanted fulfilled. Knives and adzes were the tools of woodworkers. Wood carving was very important throughout most of Africa, but wood is perishable, which means that the further back in time one looks, the fewer wooden artifacts survive to the present. An additional problem was that if a

wooden object became defective in some way, it was usually disposed of and replaced. Even so, enough wooden artifacts survive to tell archaeologists something about how they were made and why they were made.

Although wood carvers made kitchen utensils, bowls, cups, and other useful household items, in western and central Africa their most important work involved the carving of spirit figures and masks. It seems that throughout the medieval era and after, most western and central African cultures honored the spirits of their ancestors. For a deceased person to prosper in the spirit world, he or she needed to be remembered in the present world. The carving of somewhat abstract representations of the deceased ancestors helped keep their memories alive among the living. Moreover, an ancestral spirit could be drawn to the carving to listen to and help the living. The spirit figures usually had arms, legs, and head, with faces that were not intended to depict accurately the face of any of the departed. When a spirit figure was damaged, for instance, by splitting because of drying out, it was disposed of because it could no longer hold a spirit in it, and it was replaced by a new carving. The carver had to find a living tree that had a part that could be used. That part was carved out of the tree in the form of a cylinder, hence the tendency of the spirit figure to have its limbs tightly held against its body. When finished, it had to look as though it were spiritually powerful. It has been difficult for archaeologists to tell how spirit figures changed during the medieval era, because the carvers worked from what they knew, and since carved wood rarely lasted more than a couple of generations, the carvers did not have an ancient legacy to imitate, as stone carvers might have. Thus the sizes, shapes, and styles of the spirit figures probably changed greatly during any 100-year period.

Masks were very important in many African societies. Masks served various functions, depending on the culture that made them. In societies in western and central Africa and much of Africa to the south, masks were used in initiation rites. A young person wore a mask during rituals that would connect him or her to the spirit world. Sometimes the masks were huge and covered all of the head and rested on the shoulders. A person who could carve good masks was considered very important, because he or she had an especially powerful connection to the spirit world, but in some societies the children were expected to carve their own masks. Masks were used in religious ceremonies, and wearers often were overcome by the spirit in the mask and would dance as if in a trance for many hours. Some masks were for use only in secret societies that had special connections to spirits. A mask could be handed down for several generations before being considered beyond repair and replaced.

Such masks were thought to bear the imprint of each of its previous owners, the spirits of whom subsume the body and mind of the wearer.

For many, probably most, western and central African cultures the wilderness was associated with the male principle, and wood was considered part of the wilderness, which may be one reason why most wood carvers were men. On the other hand, the earth was associated with the female principle. This meant that in most medieval cultures of the region women quarried the clay used in building houses and making pottery and transported the clay, and they were usually in charge of building houses and making pottery. Most medieval pottery from the area survives in fragments, but enough complete pieces exist to make it clear that the medieval potters were very skilled. Making pottery combined three important elements: earth, water, and fire. This meant that the act of making pottery was spiritual. The potters did not use wheels. They molded their wares by hand by coursing the clay sides in circular bands from bottom to top, or they made coils of clay and then wound them in circles to form their products. These products varied from ones for cooking to ones for storage. In Benin and Mali pottery was used to pave city streets. Among the peoples of the Sahel steppes, huge pots were sometimes set in the ground, and children would climb into them to fetch stored grains, usually rice, wheat, or millet.

Among those who made huge storage pots, shaped like bells, were peoples in Chad. It is among the descendants of those people that one of the most extraordinary uses of basketry survives. Although basketry had to have been very important in medieval Africa, very little from medieval Africa survives, and usually it is in the form of patches of woven grasses rather than intact artifacts. Basketry was used to make nets for catching animals in the forest and fish in streams and the sea. In eastern Africa fishermen sometimes used baskets to store fish live in the water of tide pools or streams. Waterproof baskets for carrying water seem to have been common, although some of the evidence for this comes from ceramic pots made to look like baskets. In Chad millet farmers built their houses out of woven mats that formed circular walls. Each house was in a compound surrounded by a wall of woven grasses, probably intended to keep wild animals out.

Along the east coast of Africa, from Ethiopia to near the southern edge of present-day South Africa, a great exchange in crafting techniques was in constant motion during the medieval era. Some of the metalworking techniques of Ethiopia influenced western and central Africans, while the migrations of the Bantu-speaking peoples from western Africa to the east and to the south brought their traditions for weaving baskets and carving wood. Ethiopia and a string of mighty

city-states along the eastern coast borrowed ideas from India, China, Indonesia, the Near East, and Europe. In Ethiopia this blending of outside influences with African traditions resulted in doors and window frames of shapes recognizably influenced by foreign styles. Some historians speculate that these works were made by outside artisans, but it is much more likely that Ethiopian artisans incorporated new ideas into their work, probably for reasons similar to those of people of the present incorporating exotic decorative elements in their homes. Ethiopia had its own tradition of carpentry, as evidenced by doors from the medieval era that still bear the images of people and animals in an unmistakably African style, often inlaid with metal.

Metalwork was a major occupation throughout eastern Africa. Some places in southern Africa, such as the city of Kilwa, could import metals from nearby sources, while others imported ingots from Ethiopia and West Africa. Their products reveal a mastery of form and function from spoons and knives to hoes and ritual axes. Their potters were very skilled, but perhaps their tasks lacked the sacred element found in western and central Africa, because the quality of their pottery seems to have varied from somewhat crude objects probably intended for everyday household use to glazed pots that rivaled the works found overseas. Indeed, in Ethiopia and some of the city-states pottery sometimes had walls so thin that they were almost translucent, yet they were durable enough to survive use as cups and plates.

One craft that especially excites archaeologists is that of glassmaking. Most Africans imported glass from abroad, mostly from the Byzantine Empire and India, but there is evidence of glassmaking in Africa. In a few of the city-states, glass fragments have been found that were likely made from the remelting and reshaping of glass from abroad, but in the region of today's South Africa, there seems to have been a site where glass beads were made from scratch. Little about how the beads were made has been figured out by archaeologists, but glass beads were held in great value in much of the medieval world, and glassmaking in Africa could open new ways for understanding the medieval African economy.

Across most of today's South Africa were nomadic cattle herders, and farther to the west were hunter-gatherer peoples. These peoples tended to import many of their craft objects. Among those in the Kalahari groups of hunter-gatherers tended to specialize according to what natural resources they had within their territories. Those with lakes and marshes mined clay from the shores and made pottery. Those with access to grasses made baskets. Wood carvers may have been universal among the peoples of the Kalahari, with the manufacture of digging sticks, bows and arrows, and spears being of special importance to their survival.

THE AMERICAS

BY NANDI COHEN

The crafts of the Americas during the medieval period differed greatly from their ancient counterparts. The development of cities with major ceremonial centers necessitated specialized production centers to create luxury items for elites. In addition to cities, small agricultural hamlets, towns, and villages dotted the landscape, often providing tribute to the governing polity to which they belonged in the form of both raw materials and finely worked crafts. Moreover, inhabitants of these smaller regions continued to produce utilitarian crafts for household consumption. Crafts are generally defined as handmade objects created from natural materials for utilitarian, social, and symbolic purposes. Throughout the Americas individuals produced crafts in many cultural, social, and economic contexts, all of which directly influenced the appearance and function of every item created.

In Mesoamerica the city of Teotihuacán in central Mexico (fl. ca. 1–ca. 650 C.E.) possessed a series of highly specialized craft workshops, identified by several archaeological features such as tools and large amounts of leftover waste materials. Archaeologists discovered evidence of ceramic and lapidary workshops, which led them to infer that leather, wood, feather, and papermaking shops must have existed as well. Well-preserved evidence of obsidian workshops reveals that artisans crafted ceremonial weapons, tools, and decorative objects, including sacrificial knives and spear points as well as amulets in the shapes of humans and animals in black and green obsidian. Green obsidian, extracted from quarries in the central Mexican city of Pachuca, was highly revered for its scarcity and ritual significance.

Toward the first millennium the first evidence of metallurgy in Mesoamerica appears, with many examples found in western Mexican burials. The presence of metal objects along the western coast of Mesoamerica provides strong evidence of the existence of maritime trade with the north coast of Peru, where metallurgy had been going on since nearly 1000 B.C.E. Throughout the Americas metal objects tended to possess a ceremonial and ritual significance over a utilitarian one. Although some examples of metal tools such as copper axes and knives have been uncovered, for the most part these were used as symbolic status markers rather than weapons. The same archaeological sites also yielded a wealth of copper bells, human and animal figurines, and amulets.

The Aztec provide some of the most comprehensive information about craft production for the high level of artifact preservation and the existence of extensive ethnohistorical documentation on Aztec culture and ways of life. (Historical period documents, often written by 16th-century Euro-

pean travelers in consultation with indigenous informants, reconstruct preconquest history in the Americas.) Mobilized into three major imperial capitals, known as the triple alliance—Tenochtitlán, Texcoco, and Tlatelolco—the Aztec Empire came to dominate nearly the entire expanse of what is present-day Mexico from about 1200 to 1521 C.E. Clusters of households in various barrios (neighborhoods) tended to specialize in one particular product for both personal consumption and tribute payment to the empire. As in Teotihuacán, artisans specialized in lapidary work (the cutting and polishing of precious stones), woodworking, feather working, weaving, and metallurgy. What distinguished Aztec crafts from their predecessors, however, was their incorporation

of exotic materials imported from lands as distant as eastern North America and northern South America, facilitated by traveling merchants known as *pochteca*. Turquoise from the American Southwest and feathers from tropical Central America, for example, are common materials found in Aztec crafts obtained through long-distance trade.

Feathered objects were of special significance to the Aztec, crafted by specialists into elaborate multicolored headdresses and shields for elites and warriors. Detailed illustrations of feather workers in Fray Bernadino de Sahagun's famous encyclopedic work about Aztec culture, the Florentine Codex (1577), provides invaluable information for reconstructing how craft workshops were organized and the types of objects produced, particularly those of perishable materials that have survived to the present day in small numbers. In addition to feather work, wooden objects were ubiquitous in the Aztec Empire, and bowls, weapons, sculptures of deities, and furniture were created for all sectors of society. Wooden objects for commoners were generally simple and unadorned, while those for elites were often more elaborate and inlaid with precious stones, imported shells, gold, and silver.

In the Andes artisans used diverse materials to produce crafts like baskets and finely woven textiles; metalwork of copper, gold, and silver; and ceramic and wooden vessels. A distinctively Andean craft object is the wooden *kero*, or ceremonial drinking cup. Artisans carved decorative motifs on the exterior of the *keros*, often depicting animals and humans interspersed with geometric designs. This craft tradition began in the Tiwanaku Empire located in present-day western Bolivia (ca. 100–ca. 1000) and continued through the colonial period. Portable crafts were important in the Andes throughout the medieval period, serving as utilitarian items, ceremonial objects, and grave goods. As in Mesoamerica, feathered goods like tunics and headdresses were highly valued and reserved only for elites. On the southern coast of Peru archaeologists discovered large rectangular mosaics fashioned from macaw feathers and decorated with depictions of birds, suggesting an intimate link between medium and subject.

Gold and silver miniature sculptures, a craft tradition that flourished from pre-Inca cultures and survives to the present day, probably served as amulets or divinatory objects and represented revered animals, such as llamas, as well as humans. These objects were often wrapped in textiles and left in burials and as offerings at *huacas*, or sacred sites. Some examples survive in which the human figurines are adorned with doll-sized clothing and feather work is executed in painstaking detail.

The seafaring Taíno culture was the last indigenous group to inhabit the Caribbean (including present-day Cuba, Jamaica, Puerto Rico, Haiti, and the Dominican Republic)



Female standing figure; slip-painted ceramic, Huastec culture, Mexico, ca 100–ca. 600 (Los Angeles County Museum of Art, gift of the Art Museum Council in honor of the museum's 25th anniversary, Photograph © 2006 Museum Associates/LACMA)

before the arrival of Columbus in 1492. They produced various distinctive crafts of stone, plant fibers, and wood. Taíno artisans crafted objects from stone into mortars and pestles, ceremonial and utilitarian weapons, and various vessels and sculptures. Special baskets known as *cibucanes* were used for processing manioc, a root crop that was integral to Taíno subsistence, have been found in domestic contexts at archaeological sites. Other baskets, called *jabas*, were crafted from cotton, hemp, and banana leaves, and used for storage purposes.

Duhos, or wooden ritual chairs, are among the most important craft objects of the Taínos, directly associated with divine rulership and used primarily by high-ranking individuals during ceremonies. They were a device used to distinguish the elites from the commoners, somewhat analogous to thrones in European aristocracies or *petates* (woven floor mats) in Mesoamerica. A *duho* also symbolized the human being's transportation into the spiritual realm, serving as a seat during *cohoba* rituals, at which participants partook of hallucinogenic substances. Artisans crafted *duhos* from high-quality woods such as mahogany, onto which they would carve geometric designs in low relief and finish with several layers of resin.

In North America elaborate wooden boats and sculptures of all sizes from miniatures to larger-than-life totem poles were created by people inhabiting the northwestern coastal region of present-day Oregon, Washington, western Canada, and Alaska. Ecological factors made the region unsuitable for ceramic production; thus stone and wooden vessels as well as tightly woven baskets took the place of clay pots. Potlatch ceremonies in which elites redistributed their material wealth to the rest of the population involved the exchange of various crafts, including feathered headdresses, wooden masks, finely painted vessels, baskets, and textiles.

Artisans of the Mississippian cultures (ca. 750–ca. 1500) of the present-day eastern United States were expert stone carvers, producing finely detailed sculptures of humans and animals found in both domestic and funerary contexts. Among the Hopi of the American Southwest the continuing tradition of producing kachina dolls (representing ancestral spirits) possesses deep roots. Used in ceremonies to ensure bountiful harvests, successful hunts, and fertility, the dolls were fashioned out of wood with painted decorations, although archaeological evidence suggests that they remained relatively simple, with few accoutrements, in the prehistoric era. It was not until modern times that kachinas were adorned with feathers and elaborate painted designs.

Basketry remained an important craft for all North American cultures, acquiring ever more elaborate designs and weaving techniques through time. Using various wild plants, basket makers had to undergo extensive technical

processes to prepare the fibers for weaving. Depending on the type of plant, the process could involve soaking, pounding, partially cooking, or steaming the fibers. Both coiling and plaiting techniques for weaving baskets were employed by basket makers throughout North America. Coiling called for the tight twisting of strands of plant fibers, beginning at the base and gradually spiraling around to create the body of the basket. Plaiting required the braiding and subsequent stitching of strands into a body. Both of these basic techniques, among countless others, allowed for the creation of baskets to fulfill many needs, including storage, cooking, personal adornment, and ceremonial functions.

Crafts throughout the Americas took on a diversity of forms during the medieval period, attaining culture-specific functions and significances that occurred in tandem with large-scale political, social, and economic transformations. Crafts fashioned out of local and imported materials served innumerable purposes, from assisting in basic subsistence activities to articulating the ideologies of an empire. With the arrival of Europeans in the 16th century, many of these traditions died out as indigenous populations were devastated by disease, exploitation, and warfare. More commonly, however, artisans incorporated new design schemes and iconography into their practices to keep up with the rapidly changing needs and demands of colonial society while retaining many of their ancient forms and techniques.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

Crafts varied enormously across Asia and the Pacific during the medieval period, based on the availability of materials and cultural preferences. Even in the simplest culture, crafts could be complicated, requiring careful design and patient work.

Basketry came the closest to being the universal craft of medieval Asian and Pacific regions, with nearly every culture using baskets. In Oceania, Indonesia, and the Philippines baskets were essential to the everyday lives of people, but in China they were less important because of the many alternatives for storing and carrying the goods produced in China's advanced manufacturing society. Baskets were made of perishable materials such as reeds and bamboo; thus most of the baskets created during the medieval era have decayed. Unable to determine the full range of basketry from that time, anthropologists study the basketry of modern people in traditional societies and infer what it was like hundreds of years earlier.

Baskets made in the arid areas of Australia had a better chance of surviving over long periods. Most of these extant baskets are made of tightly woven reeds. In general, baskets

CARRYING ONE'S LIFE IN AUSTRALIA

Most medieval Australians were nomadic, moving in small groups through territories shared with other small groups. In some places such as forests, the nomads had a fair amount of certainty that if they moved with the changing seasons, they would find seasonal foods each place they journeyed. In other cases their lives consisted of constant movement across the land, always searching for food and water. They needed to carry with them food, water, and small personal belongings, such as magical objects and symbols of status. Their solutions for satisfying their needs are examples of the ingenuity of people and how human beings creatively exploit even small opportunities in their environment. For instance, in eastern Australia, bags were made out of bark. A section of bark was folded in half, holes were made along the edges where they met, and cane was used to stitch the edges together. Resin was used to seal the bark so that the bag could carry water.

In Arnhem Land in northern Australia, people made bags out of bark, but they seem to have preferred bags made of green palm leaves for most of their carrying needs. They harvested fresh palm leaves and folded the leaves so that their edges aligned. The bottom end of the stalk was folded inward, and the loose ends were sewn together. These bags were often decorated, with ochre being favored for making the designs.

More common in Australia were baskets of a variety of shapes made of woven grasses, often with human hair woven into them. These served for general tasks of carrying but also were used by both men and women to carry magical and other personal objects. Men's baskets were decorated with bird down and feathers—brightly colored feathers were preferred. Both men and women's baskets were decorated with images of sacred places or of trees and streams. Frequent use of the baskets would have rubbed off the images, which suggests the baskets were not opened and closed often, although it is possible that rubbed-off images were just replaced with new ones.

were used for carrying food or small items. To carry water, Australians used sacks made from possum or kangaroo skins. These were sewn with sinew, using small kangaroo bones as needles. The insides of the skins were lined with bark, and

then skin and bark were soaked, releasing tannins from the bark into the skin. The tannins acted as preservatives and helped prevent the skin from fouling the water. After the soaking, the skin was rubbed vigorously to soften it.

Elsewhere in Asia and the Pacific baskets were used for food storage. In the streams of Southeast Asia people used baskets to dip into the water to catch fish. In most areas almost everyone was expected to know how to make baskets, but in India basketry was a recognized trade of special craftspeople. Usually women, Indian basket makers worked with many kinds of grasses, most commonly those found growing in or near water. The basket makers gathered the materials themselves. Their products could be very sophisticated, especially the boxes householders used to store valuables, laundry, spices, and other everyday articles. With loose weaves the craftspeople created sacks, and with tight weaves they fashioned sandals. They made mats used to line roofs, to cover



Ivory throne leg; Eastern Ganga Dynasty, Orissa, India, 13th century (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer)

floors, and even as fences. Their work could be seen almost anytime in public in the form of umbrellas, usually made of woven reeds and used for protection from rain and sunlight. Indian basket makers also made rope from woven grasses.

Woven rope was important almost anywhere for use in making nets. In Australia and other parts of Oceania nets were loose crossings of rope designed to be flexible enough to collapse around what they held. In Australia nets were made by women and used in hunting. Draped between trees or wooden posts in a spot where birds were known to fly near the ground, the nets would catch birds and hold them until people came to collect the catch, which usually became a meal. This use of nets was common in forests on Pacific islands and in most of eastern and southern Asia. The Australians also used netting to make bags for carrying goods during their frequent migrations.

Woodworking was another craft found in most areas of Asia and the Pacific. In Japan woodworking was an essential part of the culture. Because of the country's abundant supply of trees, the Japanese used wood for most of their housing and storage needs. The medieval Japanese, both poor and rich, preferred sparsely furnished, nearly empty rooms. A home was supposed to impress by the elegance of its design rather than the opulence of its interior. Thus Japanese woodworkers were skilled at fulfilling household needs with unobtrusive furniture. For instance, a staircase might have tucked under it a *kaidan-dansu*, a storage chest that fit under the stairs, making use of space in such a way that the room still seemed uncluttered and open.

Japanese woodworkers were primarily travelers, and during most of the medieval era they were highly valued by rural communities. Food and lodging were usually part of their pay, and the rest of their fee could be paid in goods they could take with them or in money. They were well cared for because their work made life much better for their clients. The woodworkers carried with them small lathes with which they fashioned cooking and eating utensils and wooden vessels. Much of these were custom made, but because wooden cooking utensils were always in demand, woodworkers often made them ahead and sold them to clients with other orders. Among Japanese tales of the era are ones about woodworkers who became rich by turning discarded wood into chopsticks and selling them.

Despite their importance to Japanese society, woodworkers and other craftspeople were considered part of the lower levels of society, beneath samurai (the warrior class) and farmers, and were usually forbidden even to add surnames to their names. In the latter half of the medieval era some craftspeople, most notably carpenters who worked for the shogun (a military governor) or for daimyo (a feudal baron),

were given permission to adopt a surname. Chinese craftspeople also were considered to be part of the lowest levels of society, beneath nobility, government officials, and farmers. During the Tang (618–907) and Song (960–1279) dynasties, craftspeople were even forbidden to take the government-sponsored examinations that allowed people who passed to enter government service, an important privilege for people who wanted to better their lives.

The Tang Dynasty was a particularly dynamic period for woodworking. During that era a courtier invented the first Chinese chair. As a gift to the emperor, the courtier created a small couch with a back carved in the shape of a dragon, apparently launching the popularity of chairs. Household furniture had consisted primarily of stools and benches, but stools were often replaced by chairs. Unlike the Japanese, who slept on woven mats on the floor, the Chinese slept in beds. These were customarily more than 3.5 feet above the floor to prevent demons in the ground from reaching sleepers. A bed had four posts and cloth draped between the posts to provide privacy.

Indian woodworkers were part of the Shudra caste, the laboring caste. In everyday life they ranked much higher than most other craftspeople because building houses involved important religious rituals. Although some woodworkers felled trees themselves, they often employed foresters, who were a class of craftspeople. In either case the woodworker would be present and would ask the spirit living in the tree to forgive those who were about to cut it down. A rope was tied around the tree and pulled to direct the tree's fall. Usually the woodworker cut and sawed the lumber where the tree fell, using a cart to transport the planks and other pieces to the woodworker's workshop or the site where a house was to be constructed. Woodworkers not only built houses but also made beds, chairs, tables, and storage chests as well as carts and sandals. Accounts from the medieval era even credit woodworkers with building flying machines. Some of their work survives in the form of spinning tops and other toys.

Medieval China, Korea, and Japan are famous for their pottery. During the 600s Chinese potters invented porcelain by mixing the mineral feldspar into stoneware. The Chinese became so famous for their porcelain that much of the modern world calls it china. Many art historians believe Chinese porcelain reached its highest quality in the Song Dynasty, but it was during the Yuan Dynasty (1279–1368) that the process of making porcelain was at its most advanced, with potters mixing the white clay kaolin and china stone, which contained feldspar, and firing their creations at about 2,640 degrees Fahrenheit.

The zenith of Korean pottery making is considered by most art historians to be from 1100 to 1300, when craftspeople manufactured celadon ware. For centuries Koreans had



Funerary sculpture of a double-courtyard residential compound; molded earthenware with green glaze, middle Ming Dynasty, China, ca. 1450–ca. 1550 (Los Angeles County Museum of Art, gift of Mrs. Blanche Wilbur Hill, Photograph © 2006 Museum Associates/LACMA)

imitated Chinese techniques to create gray stoneware, but during the 1100s Korean potters mastered a blue-green glaze that resembled a serenely beautiful sky. Only the Japanese, who began producing celadon ware in the 1600s, have come close to the quality the Koreans achieved for about 200 years. The best pieces may have been the incised celadon ware. After shaping a pot, the potter painted it with iron oxide, coated it with celadon glaze, and then fired it. The potter would then incise images into the sides of the pot and fill the cuts with white, black, or reddish brown slip. The pot would be fired again, recoated with celadon glaze, and fired a third time at temperatures hot enough to make stoneware. Korean masters taught the technique to Japanese potters in Kyoto.

The production methods of Indian potters were different from those of eastern Asian cultures because of a fundamental difference between their cultures' views of pottery. Unlike eastern Asians, Indians did not intend their pottery to last a long time. In many Indian households ceramic wares were broken at the start of a new year and then replaced. As a result Indian potters always had plenty of work. They tended to work quickly. They gathered clay from shores of ponds or lakes, mixed it with cow dung and ashes, and then shaped it on a potter's wheel. The products were fired at low temperatures.

Indian potters and metalsmiths were Shudras and held in about equal esteem. Smiths worked at anvils, near furnaces. The smith served other crafts by making tools for carpenters, weapons for hunters, needles for tailors, and razors for barbers as well as weapons and armor for soldiers. In Japan metal usually had to be imported from other countries, and Japanese smiths tended to specialize in making weapons. Japanese sword makers may have brought medi-

eval steelmaking to its apex in Asia and the Pacific. They were held in somewhat higher esteem than most Japanese craftspeople, partly because they worked in a religious atmosphere. Their work was ritualized and worshipful, and those who purchased their swords had a spiritual attitude toward the product that could save their lives. Swords were made by folding white-hot iron with carbon and pounding it and folding it over and over again, dozens of times. The result was a sword that when burnished would have a lasting shine and a very fine edge. Prices for swords were often set by the government according to their length, without regard to quality. Another group of craftspeople were the sword sharpeners, who devoted their days to keeping the weapons shining and keen.

EUROPE

BY KIRK H. BEETZ

During the thousand or so years of the medieval era innovations and changing economic conditions altered the practices of craftspeople and their living conditions. The status of crafts and the particular crafts that flourished in a given region differed according to the supply of natural resources in each area. As trade routes improved during the medieval era, raw materials became much more widely available outside the areas where they were found, allowing for towns and cities to have ever-greater varieties of craftspeople.

By the time the Western Roman Empire officially ended with the abdication of the last Roman emperor in 476, craftspeople in Roman Europe were almost universally suffering. Their taxes were high, and customers had become rare. For many European craftspeople the supplanting of Roman authority with the authority of Germanic invaders may have come as a relief. The invaders were interested in employing craftsmen to build houses, churches, and palaces as well as make domestic goods. Even so, as late as the age of Charlemagne in the 800s blacksmiths remained rare. Blacksmiths had been so important in the Roman Empire that nearly every village had at least one. During the 800s foundries were uncommon and mines even more so. For centuries iron had been dug in surface pits, but those pits were depleted, and the digging of passages to follow deposits of iron ore deep underground was yet to become common enough to supply many foundries. Iron was so valuable in warfare that European governments tried to regulate where iron ore went and who was allowed to possess smelted iron. Much iron was made into armor and weapons and also agricultural tools. The shortage of blacksmiths affected the productivity of other craftspeople. For instance, nails were hard to come by, which limited the kind of work carpenters could do.

An exception to this situation was the Byzantine Empire, also called the Eastern Roman Empire, which retained knowledge of ancient Roman craftsmanship. The Byzantine government built and controlled workshops and set the prices of all manufactured goods, along with the wages for employees of craftspeople. Even for privately owned workshops, the government set standards for quality, with government inspectors keeping close watch. In contrast to the situation in much of the rest of Europe during the 800s, craft work of the old Roman Empire thrived in the Byzantine Empire, even with government price controls. At this time Constantinople had 23 crafts guilds for such work as shoemaking, glassmaking, ceramics manufacturing, smithing, and perfume distilling.

A craftsman was not required to join a guild in order to work at his or her craft, and even people expelled from guilds could still find work at monasteries, churches, and the estates of the wealthy. To join a guild, a craftsman had to pay an entrance fee and probably had to prove proficiency in his or her craft. Future craftspeople were usually assigned to a workshop as apprentices at about the age of twelve and had to work for free or for a tiny stipend while learning from the master of workshop. After several years, the apprentice could join a guild and open his or her own workshop, often with the help of his or her former master, or could continue as a journeyman—an employee whose wages were set by the government. Guilds provided benefits for their members: They found work for members, bought and distributed raw materials to members, and saw to it that during hard economic times even small workshops had enough paying work to survive. A small number of guilds were imperial guilds, because they produced wealth that the imperial government especially wanted. Silk workers, metal workers, and dyers were required to join imperial guilds.

Byzantine potters made a variety of items. Many were crude vessels, intended for dirty work and not meant to last long. Other items were very well finished, often for display. Potters provided various household items, such as bowls,

cups, plates, and jars for wine or oil. Glassmakers also manufactured household items such as candlesticks, cups, and jars. Syria had long been a leader in glassmaking, and Syrian glassmakers were among the empire's finest craftspeople, but some Syrian glassmakers were unhappy with the government control of their work and left for northern and central Europe. Although glassmaking would not be widespread enough to provide commoners with glass windows until the 1300s, the glassmakers brought with them a set of skills that future European glassmakers followed, such as glassblowing.

A glassmaker would blow through a long tube to make a glass bubble expand, break the bubble off the end of the tube, split the bubble in two, and flatten the two halves while they were still molten. The resulting slabs of glass could be shipped to markets, and by the 1100s a set of crafts had developed to make use of the glass by cutting it into small pieces to be painted and used in mosaics, to fit between edges of lead for use in windows, and for remelting to be reshaped as cups, jars, and lamps. The use of metals to give glass color was borrowed from Byzantine glassmakers. Adding a little iron, for example, made glass appear translucent green. By the 1000s European glassmakers had a preference for mixing beech wood ash with well-washed, finely grained sand and firing the mixture in a charcoal furnace to produce glass.

Cologne had a colony of Syrian glassmakers, and they may have been among the first to form a crafts guild. Trade guilds for merchants already existed when craftspeople began forming their own guilds in the 1100s, in an effort to escape the feudal requirement that they pay part of their production to local nobles. This occasionally resulted in violence. For instance, craftspeople in Laon, France, bribed King Louis VI (r. 1108–1137) to allow them to organize into a commune, a protective organization that freed them from their feudal overlords. Their bishop organized nobles to give Louis VI a bigger bribe, and permission to organize was withdrawn. The result was a riot in which craftspeople used their tools such as knives and hammers to kill the bishop and those nobles who tried to protect the bishop.

The benefits of guilds had a mixed history in medieval Europe. Like those in the Byzantine Empire, many guilds bought raw materials and distributed them to guild members, and they saw to it that all members shared in the available work. When members were sick or injured, their guilds cared for them, and when a member was too old to work, his or her guild provided money, food, and household necessities. These practices proved very important in the mid 1300s, when most of Europe had an economic recession. By seeing to it that even the poorest of their members had enough work to survive, guilds enabled their crafts to survive the recession



Cattle jaw used by craftsmen to practice designs; Britain, late 10th century (© Museum of London)

and be prepared to help fuel a vigorous consumer economy in the 1400s. On the other hand, some guilds became imperious in their behavior, forbidding members to work at crafts outside the guild and sometimes even requiring members to give up ownership of their tools and equipment, making them totally dependent on their guilds not only for employment but for the tools with which to work.

Medieval European craftspeople usually worked in their own homes, although big public works projects such as castles and cathedrals would attract carpenters and blacksmiths to workshops set up on the work sites. Their products often were made to order, with wealthy nobles providing much work to those craftspeople who made housewares and luxury goods. The patronage of nobles was joined by that of wealthy merchants as international trade improved. Craftspeople often made goods to sell in markets. During the first few centuries of the medieval era, they hauled their goods to a weekly market if there was one close enough to their homes. At the markets the craftspeople had portable stalls. The towns where the markets were held often charged the craftspeople for the privilege of entering the town, a practice that continued into the late medieval era. A town might charge for the privilege of selling, additionally for bringing a cart, additionally for using a horse, and even more for bringing a horse shod with horseshoes. This meant that men and women hauled as much as they could on their backs; if they were forced to use a cart and horse, then they used an unshod horse.

By the 1000s, the light portable stalls were giving way to permanent stores in marketplaces. The best locations would often be given to the most socially prominent craftspeople. These stores were gradually replaced by houses with shops on the bottom floor and the craft person's family living quarters upstairs. Streets would be named for the crafts found on them, such as Potters Street.

Craftspeople often made their own tools, which became prized possessions passed from parent to child or from master to apprentice. Sometimes they were inherited by close friends when their owners died. Even so, crafts in general became ever more dependent on the work of blacksmiths when the availability of iron increased enough for blacksmiths to become common. They made tools such as hammers, hatchets, axes, adzes, saws, drills, awls, and knives. Much of a blacksmith's work was producing nails. A blacksmith's shop typically had a furnace and bellows, usually tended by a family member or an apprentice. The blacksmith would have an anvil, often set on a wooden trunk, and a stone trough filled with water, both near the furnace. The blacksmith's tools included light and heavy hammers, tongs, and files. Many of the tools made by blacksmiths were for carpenters, who made chairs, benches, tables, and beds for their clients. Metal awls and hole punch-

ers were used by tanners, who produced belts, boots, and other leather goods. The leather goods could be used as tool belts by other craftsmen, and so on, with late medieval craftsmanship becoming ever more interdependent.

THE ISLAMIC WORLD

BY BASHIR A. KAZIMEE

Crafts and art reflect the values and emotions of a society. In the world of Islam, which covered a vast territory in medieval times, artisans and professionals enriched their work with new values and traditions. The technical skills and artistic achievements of other cultures, such as Byzantine, Coptic, and Sassanian, played an important role in the maturity of Islamic craft work and remained sources of inspiration. However, the development of crafts in later periods of Islam reflects a distinctive style and aesthetic flavor that suited the Islamic belief system. Muslim craftsmen produced unique ceramic works, colored glass, metalwork, and wood carvings with lasting expressions of beauty and creative spirit.

During the Middle Ages ceramics and pottery developed significantly throughout the Islamic world, and the demand for pottery increased. Professionals and artists combined functional design with highly artistic adornments, and they were able to apply wide ranges of decorative techniques, such as thumb marks, channels, embossing, engraving, and calligraphy, to the surfaces of the clay vessels. During the early Islamic period pottery work was influenced by the Chinese pottery industry, and Islamic potters imitated Chinese techniques, especially the Chinese porcelain in the style of Tang, which was admired in the region. However, within a half century there was considerable development in this craft, unparalleled elsewhere in the world.

The rediscovery of tin-enamel glaze, which resulted in a clear, white surface, was perfected in Persia and soon spread throughout the Islamic world as far as Spain. There it formed the basis for Hispano-Moresque pottery and provided Europe with luxury pottery for centuries to come. Another important innovation in this craft was the use of luster painting, which originated in Mesopotamia and reached its peak during Seljuk and Mongol times of the early 11th to mid-14th centuries. Luster painting involves a mixture of certain sulfuric pigments and dissolved gold, silver, or copper oxide applied to the surface of an already fired smooth glaze that appears as a shining metallic film. Chinese potters created objects using this technique much later. In Moorish Spain luster paint was used in the famous potteries of Valencia.

During the rule of the Ayyubids (1169–1260) and later the Mamluks (1250–1517), ceramic pottery flourished in Syria and Egypt. The city of Raqqa, located on the fringes of

Syria and Mesopotamia, and later the cities of Damascus and Cairo evolved into the most important centers of manufacturing pottery and glass. Medieval 13th-century Syrian ceramic wares included fine examples of luster with underglaze techniques, which typically appeared in turquoise and black colors. In this period Syria also produced three-dimensional glazed ceramic sculptures, such as animals, horses, and human figures.

The use of blue cobalt and lapis lazuli mineral pigments that appear as beautiful shades of blue was another hallmark of Islamic pottery. From 1260 to 1368 cobalt mineral pigments, known as Mohammedan blue, were a commodity in China and were imported from the Middle East. The use of new pigments and minerals resulted in completely new coloring techniques and the development of color-enameled ceramic wares. These techniques offered many advantages to pottery artists and encouraged them to use a wide variety of mediums and decorations.

The craft of glassmaking also developed dramatically in the Islamic world during the Middle Ages. Damascus and Aleppo were major centers for the production of enameled glassware. Phoenician and Roman techniques of glassmaking were still influential in the Syrian glass industry before it reached new heights during the Islamic period. Syria produced famous articles for the demanding Muslim and Western markets. Blown pipe glass was produced through many different techniques to create valuable wares. The spiral fluted effect, the honeycomb, carving, and other decorative elements were commonly applied to glass vessels. One of the popular objects produced by the Syrian glass industry was the inscribed glass lamp. It was produced in large quantities for mosques.

Metals and mining played an important role in the working economy of medieval Islamic countries. Metals were mined and produced in large quantities for domestic consumption as well as for export. Craftsmen and professionals in the Islamic world converted metal into valuable goods for demanding markets. Metal objects produced from steel, copper, tin, and brass included such items as kitchenware, vessels of various sizes, incense burners, and lamp stands for household and commercial uses with a range of working techniques. These objects were cast, wrought, pierced, or drawn from metal. Decorating techniques included engraving, chiseling, damascening by inlay, embossing, laceworking, gilding, and incrustation.

The popularity of cast bronze and brass forms was significant in the Middle Ages. Large numbers of cast-bronze items of different styles were mass-produced in eastern Iran. The most popular items in the marketplaces of the Middle East were bronze lamp stands, decorative items, caskets,



Stone-paste jar painted in black under turquoise glaze; Syria, late 12th to early 13th centuries (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer)

and inkwell bases. Most scientific instruments were made of brass. The best-known scientific objects made of brass are astrolabes, used by astronomers, navigators, and surveyors. These articles are exceptional examples of the arts and crafts of the period, with their rich inlay and embossing techniques. Many surviving objects of this period include the names of the artists and makers.

Metalwork reached its height of technical sophistication in 13th century, when some of the artisans migrated westward from Afghanistan and Iran owing to the invasion of the Mongols. These artisans settled in Iraq, where the major center of metal production was Mosul (in modern-day northern Iraq). The industry also flourished in eastern Anatolia, Damascus, and Cairo at the same time. In this period Mosul was very famous for its red copper, silver, and even gold inlay craft artistry, which employed an earlier Iranian technique.

In the later part of 13th century, under the patronage of the Mamluk Dynasty, Cairo advanced as a major center of commerce and artisanship. Mamluk metalwork is notable for its mass production. It became possible to produce metal objects in large quantities and to fabricate elaborate objects in a

very short time. Some fine examples from the Mamluk Period include bronze plaque doors that were used to cover religious buildings and palaces, often displaying intricate geometric patterns and magnificent sculptural motifs for decoration.

Wood is a relatively rare commodity in most of the arid regions of the Middle East, but woodworkers always applied their unique skills wherever elegance and craftsmanship were necessary. Medieval carpenters handled a wide range of tasks, using wood materials to build structures, furniture, cabinetry, and other functional items. Wood was an integral part of building, too, even when the structure was crafted of other materials. The intricate geometric designs and assembly of various interlocking patterns on buildings are still admired. In relief carving, in marquetry, and in latticework made of intricately jointed turned wood, Islamic craftsmen produced work that had few parallels elsewhere.

In the porch of the Ali Qapu palace in Isfahan (1598), timber columns support a patterned ceiling ornamented in precious wood of several colors, inlaid with mirrors, exemplifying a brilliant work of wood mastery. The transparent screened windows called *mashrabiya*, characteristic of Islamic houses, were constructed in part to shade the interior from the harsh sunlight and in part to segregate women's quarters from public view. Such screens often project out in the upper stories, displaying a wide variety of ingenious patterns, and consist of small pieces of turned wood grafted together.

Syria is believed to have been an important center for wood carving and inlaying. Earlier examples of wood carving dating to the 10th century show a simple floral carving style, in which the technique of inlaying wood with ivory, bone, or mother-of-pearl was perfected with sophisticated geometric designs. In the Middle Ages the craft of wood carving was an important industrial art in many regions of the Islamic world, and this art maintained its high standard of craft in the traditional techniques. The wood species commonly used were suitably grained timber, such as walnut, rosewood, red pomegranate, or maple. Most of the carving was done with hand tools, such as chisels, files, and saws. Articles produced in this period include richly carved chest frames, chessboards, combs and banister rails, bowls, sherbet spoons, and caskets.

Furniture for homes was simple but elaborate in its quality. Plain tables, chairs, storage shelves, and chests were made out of plain wood. The surfaces were scraped and sanded with pumice stone and then polished with linseed oil. For more elaborate works the carpenter applied metal plaques or inlays to the surface of the wood for ornamentation. Until the 13th century the city of Rhagae in Persia had a thriving industry of wood products for export and was renowned for its wooden furniture industry.

Basketry and mat weaving from reed and grass existed for many centuries before the birth of Islam in this region. Grain baskets found in Iraq and Egypt date to about 4500 B.C.E. The techniques and craft of basket making and mat weaving did not change much during the Islamic period. The basket weaver prepared the raw material—bamboo or rushes—in bundles. Bamboo was softened by soaking it in water. The plaiting of the basket was done by hand. The only tools used for basket plaiting were a wooden block and a curved knife, serving to split and cut the reeds and rushes. The process of mat making was similar to that of basket weaving. Basket makers also made brooms.

Other material sources of craft and artistic expression, such as textiles, colorful carpets, leatherwork, and embroidery, remained consistent with local tastes across the Islamic world. These and other decorative items filled not only the marketplaces and homes of Muslims but also the palaces and homes of many across the world for many centuries.

See also ADORNMENT; AGRICULTURE; ARCHITECTURE; ART; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FOOD AND DIET; FORESTS AND FORESTRY; GENDER STRUCTURES AND ROLES; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; ILLUMINATION; INVENTIONS; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MINING, QUARRYING, AND SALT MAKING; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WEAPONRY AND ARMOR; WRITING.

FURTHER READING

- Fatima Bercht, Estrellita Brodsky, John Alan Farmer, et al., eds. *Taino: Pre-Columbian Art and Culture from the Caribbean* (New York: Monacelli Press, 1998).
- Janet Catherine Berlo and Ruth B. Phillips, *Native North American Art* (New York: Oxford University Press, 1998).
- Martyn Bramwell, ed., *The International Book of Wood* (New York: Crescent Books, 1984).
- Dominique Clévenot and Gérard Degeorge, *Splendors of Islam: Architecture, Decoration and Design* (New York: Vendome Press, 2000).
- Charles J. Dunn, "The Craftsmen." In *Everyday Life in Traditional Japan* (North Clarendon, Vt.: Tuttle, 1972).
- Susan Toby Evans, *Ancient Mexico and Central America: Archaeology and Culture History* (London: Thames and Hudson, 2004).
- Gabriele Fahr-Becker and Chris Murray, eds., *The Art of East Asia* (Cologne, Germany: Konemann, 1999).
- Frances Gies and Joseph Gies, "The Asian Connections." In *Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages* (New York: HarperCollins, 1994).

- George Wharton James, *Indian Basketry*, 2nd ed. (New York: Dover, 1972).
- Janet Mathews, *Wurley and Wommera: Aboriginal Life and Craft* (New York: Collins, 1979).
- Esther Pasztory, *Aztec Art* (New York: Abrams, 1983).
- David Talbot Rice, *Islamic Art*, 2nd ed. (London: Thames and Hudson, 1975).
- Pierre Riché, "Technology and Domestic Occupations," in his *Daily Life in the World of Charlemagne*, ed. and trans. Jo Ann McNamara (Philadelphia: University of Pennsylvania Press, 1988).
- Rebecca Stone-Miller, *Art of the Andes from Chavín to Inca*, 2nd ed. (London: Thames and Hudson, 2002).
- Hans E. Wulff, *The Traditional Crafts of Persia; Their Development, Technology, and Influence on Eastern and Western Civilizations* (Cambridge, Mass.: MIT Press, 1966).

► crime and punishment

INTRODUCTION

The main role of punishment in medieval society, as it is today, was to serve as a deterrent to would-be criminals and also to satisfy the victims of crimes with the terms of punishment. In the ancient world few places had written laws, most parts of the world relying on oral tradition and the enforcement of laws by rulers or tribal chiefs. This usually meant that punishments were imposed on the basis of legal precedents, with the penalties meted out generally reflecting the existing practice of the group or area. Because the laws were not written, it meant that they often were open to wide interpretation and ad hoc amendment. It also meant that they might be openly flouted by powerful people.

Throughout the medieval period and around most of the world there were attempts to codify these laws, in terms of recording in legal works or by carvings on stone, the punishments for specific named crimes. In Europe this coincided with the emergence of parliaments, such as those operated by the Vikings or the Witan in England, the Cortes in the Spanish kingdoms, and the Sejm in Poland. These parliaments frequently served not only to enact laws but also to clarify points of dispute and be the final place of appeal for wealthy people seeking redress.

In much of the world conviction for serious crimes resulted in capital punishment. Executions generally were conducted in public, not only to show the power of the state but also to show that the person actually had been executed. In some places these executions were done with solemnity, but in other cases, especially in instances where large numbers of people were being killed, such as after a rebellion, executions might be conducted with dispatch. The location of the places of execution varied. In China and in many parts of Africa people would be executed outside the city walls. In Europe executions were often in centers of towns or cities, usually at

a spot reserved for such a purpose, such as Tyburn in London. When Joan of Arc was burned to death as a witch in 1431, the execution took place in the center of the city of Rouen, and the burning of Jacques de Molay, the last Grand Master of the Knights Templar took place just outside Notre Dame Cathedral, in the center of Paris in 1314.

The method of execution generally depended on the offense, with most offenders in Europe, Asia, and the Islamic world being executed by hanging or beheading. Beheading seems also to have been used in Central America. However, many kingdoms and empires came up with more painful and degrading methods of executing people guilty of more heinous offenses. Slow strangulation was used in China for people found guilty of particularly terrible crimes, and those in western Europe were hanged, drawn, and quartered, with their heads, arms, and legs later put on public display. In Romania, Vlad III had criminals impaled on stakes. A Viking who was involved in ransacking a church in London in 991 was flayed alive, and in Europe during the late medieval period people found guilty of poisoning or making false coins (counterfeiting) could be boiled alive, a punishment also used in Japan.

In some countries people were fined, but this was a punishment rarely imposed except in cities, where there was an organization (court, church authority or town council) to receive the fines, and among wealthier people, who were in fact able to pay the fines. The shortage of coins in much of the medieval world meant that fines were often impractical in country areas. Prisons were used largely to hold people awaiting trial or political prisoners; few medieval countries employed imprisonment on a large scale. As a result, many legal systems around the world inflicted various forms of corporal punishment, such as flogging, whipping, or caning. For the most part such punishment took place in public, with many towns in Europe having whipping posts in the town squares.

The system of stocks also was used to hold people for short periods of time. The Chinese developed the use of a cangue, a large wooden collar, as a mobile stock in which people could be locked for periods of time at no cost to the authorities. In some parts of the world branding criminals or cutting off hands, ears, or noses was also used as punishment. Burning was largely reserved for people with heretical beliefs. Some tribal societies in Africa, Australia, and the Americas tended to exile criminals as a severe form of punishment. People were not executed but might have little chance of survival in harsh climatic conditions.

AFRICA

BY KIRK H. BEETZ

The study of law involves a study of words, because people use language to define and explain laws. This makes studying

crimes and punishments in medieval Africa difficult, because most medieval African cultures did not leave written records of their laws. Another challenge when trying to understand medieval African crime and punishment is that Africans often did not think of crime the way many other cultures did. For many African societies laws as outsiders might understand them were not needed, because social relationships defined how people were supposed to conduct themselves and traditions served to identify people who transgressed against society. Each African culture established the punishments it needed to suit the crimes it confronted.

One way to identify crime and punishment in medieval Africa is to study the behavior of traditional societies in modern times, inferring from observations how Africans behaved hundreds of years earlier. The weakness in this approach is that even the most traditional of societies is likely to change over periods of hundreds of year, so that what a culture does now may not be what it did in the medieval era. African cultures seem to have been flexible, often eagerly incorporating new ideas or discoveries from other cultures with which they came into contact. For example, the hero of a folktale may have used a spear in an early version of the tale but changed to using a musket in a later version, an alteration that resulted from Africans' exposure to musket-carrying Portuguese explorers.

Folktales from the medieval era offer insights into what various African cultures considered crimes as well as what they considered to be fitting punishments for those crimes. It is important, however, to keep in mind that Africa had many cultures, and what was a crime in one culture might not have been a crime in another. For instance, in the Herero culture of southwestern Africa, stealing cattle was a crime, yet in their stories about the hero Kemangurura, the Kikuyus of Kenya tell of his defeating an army of the Masai and then becoming a great leader by taking bringing Masai cattle home with him. In parts of eastern Africa, in the Sahel steppes and farther south, boys were taught how to steal cattle, and men were encouraged to do so as a way to gain prestige.

Crimes that often appear in African tales are murder, attempted murder, stealing, breaking and entering, and illicit sexual behavior. Crimes of identity theft also appear in the form of people being denied their rights by having their identities appropriated through subterfuge by others. A good example of this is the story of Kwege told by the Zaramo of Tanzania. If Kwege were to step over a log, he would die, so on a long journey he has his slave, Bahati, carry him over logs. Bahati extorts an item of clothing from his master every time Kwege needs to be carried over a log. When they reach the home of Kwege's uncle, Bahati looks like the master and Kwege looks like the slave, and Bahati claims to be Kwege. After some suffering on Kwege's part, Bahati's subterfuge is revealed, and he is executed. This suggests that a person's

identity was a highly valued possession and closely tied to that person's status in the community.

The death penalty seems to have been practiced by most African cultures. It was often invoked for murder. The Boloki of the Central African Republic told a story of how murder was introduced into the world by a selfish man, Mbungi, who cut off his wife's head. When he started a journey into town, her head followed him, asking him to wait for her. He tried cutting the head to pieces and burying the pieces, but even then the head followed him as he continued his journey. When they saw the head, members of the wife's family bound Mbungi and killed him.

An important aspect of many African folktales is the persistence of justice. For instance, the Xhosas of southern Africa told a story about Nyengebule, who beat the younger of his two wives to death for not bringing him any of the honey she had found in the forest. Feathers fell from her hair while she was beaten, and they transformed into a bird that followed Nyengebule, announcing his crime to anyone nearby. He tried to kill the bird several times without success, so he hid the bird in one of his bags when he went to the murdered wife's family to demand the return of the dowry he had paid. When he opened his bag to retrieve something, the bird flew out and declared the crime. Nyengebule was executed for his evil deed. Again, justice is persistent, following the criminal relentlessly until the criminal is found out and punished.

The attitudes revealed by these folktales are somewhat mystical, and most African cultures treated crime as part of the supernatural aspect of their world, as something that deceased ancestors would know about and could reveal. When a community suspected that a crime had been committed, especially a socially destructive one such as a theft from communal food stores, members of the community might ask a magician to persuade ancestors to identify the culprit. Magicians were usually very well acquainted with the activities of local people, which increased the likelihood of their successfully identifying the culprit. This put much pressure on criminals to confess their crimes.

Many African peoples, particularly in western and central Africa, had no clear legal code and no government authorities to enforce the law, which confused early Arab and European visitors who were accustomed to judges and trials. Yet these African societies were orderly, with elaborate customs for how people were responsible for each other. Crimes were viewed as actions that disrupted the traditional relationships of immediate families, clans, and villages. For instance, husbands who did not take care of their wives were punished, as were wives who did not fulfill their matrimonial duties.

Gender roles in Africa were defined in ways that would not be familiar to most people outside Africa. African cultures were not strictly patriarchal, with men dominant over

women, or matriarchal, with women dominant over men. Instead, division of labor between the genders in Africa involved cooperation between men and women to keep their families, clans, and villages prosperous. In many cultures men were the manufacturers of goods such as iron tools and ceramic vessels, and women were the traders, the experts in the mathematics of trade and in the marketing of village goods. A criminal could be a man who made shoddy goods or a woman who did not take good care of her family's finances.

Likewise, punishments for crimes in Africa might be considered unusual by non-Africans. For example, thieves were not hanged and did not have their hands cut off, nor were they even imprisoned. Instead, thieves were punished by loss of status within their immediate families, clans, or villages. The change could be subtle, such as a woman not being allowed to wear as many iron rings around her ankles. A man could have his status as head of his household transferred to one of his sons. A public proclamation of the transfer was unnecessary because people would simply begin treating the criminal as subordinate to other men in his family, and they would speak to his son in terms befitting a head of household. So vital were a person's social ties that a change in status would be humiliating and even frightening, because to many Africans social ties were essential to their well-being.

In western, central, and eastern Africa most deaths were considered suspicious, even deaths from old age or disease. To the African cultures, every event had a cause deeper than that apparent on the surface. Typically, a corpse was carried high in the air by several men as it was taken to its burial site to enable the corpse to point out its killer among the villagers, even when the person had died from natural causes. Punishment for a killer identified in this way was execution or exile. Among western African peoples, a criminal could be identified with the use of a scorpion. For instance, if a family suspected one of its members of stealing food from the family's stores, the head of the family would gather together all members of the family and place a scorpion on the arms of each family member until it stung someone. The scorpion was supposed to be controlled by the family's ancestors, who would inspire it to sting only the guilty person. This was a fairly effective bit of psychological pressure, because the guilty person would often confess before the scorpion ritual began, preferring not to risk death from the scorpion's poison.

Some African cultures developed criminal systems more familiar to outsiders. Most of the information about those systems comes from Muslim and European traders and explorers. For instance, the city of Benin and the kingdom of Ghana had police forces. Generally, the police enforced laws governing protocol, such as the law requiring traders to speak to certain representatives of the king before speaking to anyone else and then to spend several days not talking about

trading before being allowed to begin their business. Punishment for disobeying the law could entail the confiscation of the traders' goods and expulsion from Benin or Ghana as well as loss of trading rights.

THE AMERICAS

BY ARDEN DECKER

As there are no substantial documents concerning law, crime, or punishment in the Americas during the medieval period, much of what is known has been gleaned from information provided by Spanish chroniclers of the colonial era. We may attempt to reconstruct the workings of legal systems in the times before European contact through such documents.

Very little is understood about how North Americans of the medieval dealt with crime and punishment. There have been suggestions on the basis of physical evidence that some North American Indians used human sacrifice and cannibalism as forms of social control. Certainly the severity of this type of punishment (if it indeed served as such) would have been a powerful deterrent against crime. Given the many scenarios, however, that could generate the physical findings, it is difficult to draw any definitive conclusions regarding the functioning of a legal system at this time. Indeed, the existence of any system of jurisprudence among North American Indians in this period remains a debated topic among scholars.

Much of what we know about crime and punishment in Mesoamerica comes from early Spanish colonial sources on jurisprudence in the two largest cities in the Aztec Empire at the time of the Spanish entry: Texcoco and Tenochtitlán. By 1428 both of these cities had joined with a small city-state called Tlacopán to form the Triple Alliance. It must be noted, however, that the specific manner in which crime and punishment were dealt with in the heart of the empire may not be the case for Mesoamerica at large. Examination of the two larger cities nonetheless contributes immensely to current understanding of law in medieval Mesoamerica.

Jurisprudence among the Aztec was primarily concerned with taxation, land rights, and social control. The earliest recorded legal code comes from the Texcocan ancestors and is clearly related to the needs of a hunter-gatherer society. Some of the early laws known to the Texcocans stipulated that no fires could be lit outdoors without the ruler's license on penalty of death. Similarly, hunting required a license from the ruler. Moreover, no one could steal another hunter's game under penalty of having their bows and arrows confiscated. Adultery was considered a particularly serious offense; the breaking of this law was punishable by beheading with arrows.

The laws were something to be feared in 15th-century Texcoco and Tenochtitlán, as they served the primary role of

controlling the population. The laws were not considered fair, because the equal treatment of all citizens was not assumed, as it is today. The 15th-century Texcocan ruler Nezahualcoyotl was the first to establish a supreme legal council, under which the ruler himself could alter only specific legal policies. Nezahualcoyotl was arguably the most significant law-giver of the Aztec world. Among his accomplishments was the institution of 80 sets of laws divided into four parts, each part overseen by a supreme council. Most of these laws were designed to protect and benefit the state as a whole.

Texcocan noblemen were elected to official positions to facilitate the legal process. The many provinces of Texcoco were organized into six regions for purposes of collecting taxes and other legal issues. Each of these regions was assigned two judges who served at the main palace in Texcoco. The judges oversaw all cases pertaining to their respective jurisdictions and sentenced criminals with the approval of the supreme leader. These local judges were allowed to pass sentence on those who broke minor laws. If the crime was particularly serious, a judge could hand down a sentence without any official defense for the accused, but this circumstance appears to have been rare. Colonial Spanish chroniclers suggested that general councils were held every 10 to 12 days to decide minor or clear-cut cases. Another council known as the *nappapoolatolli* was held every 80 days to decide difficult or unresolved cases. These were most often resolved by public punishment or execution. While the specific circumstances are unknown, it seems that accused persons could appeal their sentences.

By all accounts, most accused persons received some type of trial to decide their punishment. While the exact court procedures are not entirely understood, we do know that witnesses could be called during trials and evidence could be submitted. Some colonial accounts have suggested that witnesses were sworn to tell the truth by an oath to the earth goddess. Similarly, judges were required to be truthful and honorable in their post. They were forbidden to receive gifts or bribes under penalty of being removed from their position. Within the courtroom there were bailiffs and scribes who recorded the proceedings of the trial. There has been some evidence to suggest that there were persons acting as trial lawyers, but this information is not conclusive.

Adultery, drunkenness, and treason are the crimes most often discussed in colonial chronicles. It should be noted that men of military rank or nobility would receive less severe punishments than the common man. Punishment was often physical rather than financial; it might include dismemberment, beating, stoning, or mutilation. These penalties were sometimes used in combination with such nonphysical punishments as verbal reprimands or public humiliation. The punishment for adultery varied according to the status of the perpetrator and the severity of the crime. Adulterers could

face stoning, strangulation, or even burning alive as punishment. Alcohol consumption was acceptable as long it was associated with some type of celebration or medicinal purpose. Some areas of the empire were more tolerant of drunkenness than others. When punishment was strictly enforced, it could be as severe as strangulation.

Theft was considered the worst possible offense and punished most severely. Again, the punishment would vary according to the magnitude of the theft and the value of the stolen property. Stealing goods from the public market was regarded as particularly offensive. Convicted thieves were often punished by strangulation. Often the bodies of these offenders would be dragged through the streets as a warning to others. A less harsh sentence for theft made the perpetrator a slave to the victim until the stolen goods were paid for. Similarly, in business and land laws a person who failed to pay a debt would be jailed until the debt was paid or made the slave of the person to whom they were in debt.

Most of our information about crime and punishment in South America during this period concerns the Inca Empire of Peru. The empire was strongly centralized and implemented Incan law over any new territories it acquired. The Inca (chief ruler) was an absolute monarch, and his rule was to be upheld by all persons under the empire's control. Even so, some local laws were kept in place, as deemed necessary by officials. Like Aztec law, much of Incan law centered on social control, collecting taxes, and forcing new territories to accept Incan authority. The justice system served primarily to compel obedience from commoners. Laws were enforced by several different methods, including spying, investigation, and sentencing by the central government.

While some colonial chroniclers suggested that there was an official court in the capital city of Cuzco, its existence has not been definitively established. We know that there was a hierarchical trial system in place that began at the level of the local governors and went up to the high court of the Inca state. There is no evidence, however, that the Incan legal system had lawyers. Unlike the Aztec judicial system, there is no evidence that the Incan system required people to swear oaths.

Incan laws were enforced at the local level by persons called *mitimaes*, who judged crimes related to taxation. They were also in charge of sentencing rebellious people in their communities and enforcing such cultural codes as the law that required all people to wear the characteristic clothing of the province in which they lived. This requirement helped determine who owed taxes. If someone altered his or her dress, they could be punished for attempted tax evasion. Other low-level officials, called *curacas*, handled such community problems as property theft. Often these crimes were punished by reprimand, public beatings, or even death, depending on the seriousness of the offense.

The legal offices of the Incan government were not specialized; officials often served simultaneously as governors, tax collectors, and judges. The more significant the crime in the eyes of the state, the higher the rank of the official appointed to judge the case. In crimes committed against the central government, inspectors were sent to investigate the crime and report any other violations. A governor then served as judge on behalf of the central government to punish the perpetrators. These judges even had the power to impose the death penalty if they saw fit. Crimes against the Inca himself often included refusal to pay taxes or performing witchcraft against the ruler. During the trials, all persons associated with the crime would be called into court to explain their accusations. The accused would be given the chance to defend himself or herself. If the guilt of the accused remained uncertain after a trial, the governor would investigate the person's reputation among the community. If the overall assessment was negative, the accused would be tortured until a confession was extracted.

ASIA AND THE PACIFIC

BY JUSTIN CORFIELD

Some countries such as China had detailed codified legal systems that other countries sought to emulate during the Middle Ages. In other places customary laws and common law provided the only system of justice, with village elders giving permission for customary punishments. In imperial China most punishments were decided by magistrates appointed by the central government. Injustices did occur, and numerous folk stories tell of those who escaped bad judgments, with the most famous being the classic novel *Water Margin*, also known in English as *All Men Are Brothers* and presumed to have been written by Luo Guanzhong (ca. 1330–ca. 1400).

Although prisons existed, they usually served as places to hold people until they were tried. Common punishments were monetary fines, flogging, being sentenced to a certain number of years of hard labor or exile, or execution. The Chinese codes established levels of sentencing, with lesser punishments imposed on people who surrendered themselves and pleaded guilty. Offenders could mitigate their punishments by paying money to the imperial treasury. For some offenses the required sentence was banishment.

The offenses considered most heinous were poisoning, murder, seriously wounding another person, and “killing by magic.” Punishment for any of these offenses was execution either by beheading or by strangulation with a cord. The latter was used on wealthier people to avoid the shedding of blood. If a member of the imperial family was found guilty of a crime, the effort to avoid spilling royal blood went as far as sentencing the offender to commit suicide by taking poison. Marco Polo described an instance when the Mongol ruler Kub-

lai Khan faced this dilemma after capturing a rebel warlord, Nayan, who was Khan's cousin. The punishment designed by Khan required Nayan to be wrapped in a carpet and dragged around until he died, the carpet ensuring that no blood would be spilt and that “the sun and the air” would not witness Nayan's death. Most beheadings took place outside the city walls, often with the body of the deceased left on display to serve as a warning to others.

Generally the Chinese, like many other cultures during this period, avoided using prisons as much as possible. Malefactors like thieves or even people found guilty of breaking the curfew were held overnight, tried the following morning, and if found guilty immediately punished. The cangue was a Chinese invention used largely to prevent the need for a prison population. It was a large square wooden collar divided into two pieces with a hole in the middle, allowing it to be locked around the neck of the offender. Some cangues were built for two or more prisoners in a row. Sleeping and eating were difficult with the cangue, making the prisoner's life a misery for several days or weeks. Corporal punishment in China involved hitting the criminal on the buttocks with a polished bamboo cane. A sentence of as much as 100 strokes could be imposed, causing serious injury and occasionally death.

The most heinous of crimes was treason, for which the perpetrator was executed, often in a gruesome manner. One form of execution was the Death of a Thousand Cuts, in which the traitor was tied up and cut with a sharp knife 1,000 times before being killed. Punishing a traitor often meant executing the culprit's parents, grandparents, children, and grandchildren. If any of those relatives had already died, their bodies were dug up and burned and the ashes scattered to the wind.

Punishments meted out by the Tartars and Mongols were severe. Marco Polo wrote that capital crimes included murder and theft of a horse. For the former there was no mitigation, but a convicted horse thief could escape being “chopped in two” by making a payment to the owner of the horse. A person found guilty of theft had to pay a sum equal to nine times the value of the item stolen to escape a flogging, which consisted of between seven and 107 strokes. The crime of assault was punishable by amputation of the hands or by the victims wounding their attackers in the same manner they had been injured.

The medieval legal system in Vietnam was based on the Chinese model; in fact, Vietnam was occupied by China until 939. Capital punishment could involve decapitation, strangulation, being crushed by elephants, or “slow death.” Following decapitation, the head was displayed in public and later thrown in a river. Less severe punishments included branding the face, cutting off the nose or foot, and castration. Caning and time in stocks or the cangue were other possible penalties.

The Vietnamese system of punishment was overhauled by the Emperor Le Thanh Ton (r. 1460–1497). He enacted the

Hong Duc Penal Code, which introduced strong Confucian ethics into the civil and criminal laws. Completely codifying all the laws in Vietnam along the Chinese model, it consisted of 721 articles and remained in force until the 19th century.

Japanese magistrates operated much like those in China, holding people in prison until they confessed their crimes or were brought to trial. Authorities could use water torture, “pressing with stones,” or flogging to gain a confession. A prisoner ready to confess was led to the dais on which the magistrates sat and forced to kneel on white sand, symbolic of truth. The punishments prescribed depended not only on the crime but also on the class of the offender. If a samurai was convicted of raping a woman who did not live on his lands, he was banned from participating in military service for 100 days and could have one side of his head shaved. The penalty for rape by a commoner could be execution.

The Japanese legal system regularly resorted to capital punishment for murder, robbery, and some instances of adultery. Arsonists were burned alive. Samurai found guilty of capital crimes were permitted to commit seppuku, or harakiri (ritual suicide by disembowelment), to avoid the court’s designating a method of execution. Some people might be sentenced to work in the mines. Banishment involved sending the offender to a remote island, not permitting other people to come within roughly 25 miles of the offender’s home, or not allowing the offender to return to his or her home district. Smaller crimes could warrant house arrest; restrictions on liberty; or, in the case of women, having her head shaved. Some other offenses warranted floggings, and people found guilty of gross insult or slander or flagrant adultery were branded.

Various legal codes operated throughout the Indian Subcontinent, with punishments resembling those imposed by the Chinese. In some other parts of Asia most of the information on legal codes and systems of punishment is fragmentary and derived from the records of travelers from China or other parts of Asia. One Chinese official, Zhou Daguan, recorded his travels to Angkor, Cambodia, around 1296 to 1297. He suggests that crime was relatively rare. Although people could have hands, feet, or noses amputated, most penalties called for the use of the cane or fines. The death penalty, rarely imposed, was effected by burying the offender alive outside the western gate of the city. Zhou also recorded some peculiar punishments. Although there was no prescribed punishment for adultery, if a woman’s lover was caught by her husband, the lover’s feet could be squeezed between two wooden splints until he surrendered his property to stop the pain.

A Cambodian method of identifying guilt was similar to the “trial by water” used in feudal Europe. If someone was accused of being a thief but the case was in doubt, the suspect’s hands were plunged into boiling oil; unharmed hands indicated innocence, whereas burns were a sign of guilt. It

is probable that similar systems of punishment existed in Champa in central Vietnam and in Ayuthia in Thailand.

Tribal codes of justice were used in the Pacific. To handle disputes arising between individuals or neighboring groups, some Pacific peoples used a complex system of “payback.” Senior men and women would meet to decide whether an offense had been committed, who was at fault, and what the punishment should be given. In a hostile environment isolation from one’s community was certainly a harsh punishment. Other punishments might involve banishment for a period or even spearing for major offenses.

EUROPE

BY TOM STREISSGUTH

The collapse of the Western Roman Empire brought social and political chaos to much of the European continent. The system of Roman law was in large part replaced by the new customs of the migrating peoples who were overrunning Roman cities and provinces. Law codes of Germanic societies took some procedures from Roman law and mixed them with pagan law customs. In Ireland, where Roman armies never set foot, Brehon law remained in force for civil disputes throughout the medieval period.

Criminal law followed local customs in the new feudal estates and principalities. One of the most important legal traditions was *wergild*, which placed a value in gold on each individual. Varying with the age and status of the victim, the *wergild* had to be paid in a case of violence or murder against that person. *Wergild* was set in each village and was meant to put a stop to the constant feuds that plagued early medieval communities with generations of murder and violence. Rather than taking personal vengeance against the perpetrator or his family, the victim or his family could simply demand a *wergild* payment and thus put an end to the dispute.

The traditional law of the Franks, known as the Salic law, set out an elaborate schedule of *wergild* payments to be made in the case of specific acts and injuries. The Salic law distinguished between Franks, Romans, slaves, nobles, and freemen. The more powerful the victim of a crime, the more severe the fine or punishment. With the creation of a vast Frankish Empire under the rule of Charlemagne in the late eighth century, the Salic law was imposed in much of northern and central Europe and replaced the local customary laws that had been enforced in those regions.

Christianity had an important impact on the treatment of crime. Where religious authority was established, ordinary crimes were separated from religious crimes, such as immoral acts and heresy, and systems of canon (church) law were created to try to punish infractions. The church reserved the right to try priests and other ecclesiastics and set



Carved wooden panel depicting Chaucer's "Pardoner's Tale" of greed and crime; Britian, ca. 1410 (© Museum of London)

its courts apart from and in some places above the secular law. (This issue would remain a point of contention between kings and popes throughout the Middle Ages.) The church also provided a place of sanctuary for fugitives, a right that could not be transgressed by secular rulers.

A distinction was always made between crimes against persons and crimes against property. Property crimes included theft, trespassing, and fraud. The use of land belonging to kings or nobility was always considered a serious crime, often punishable by death. Crimes against persons included slander and insult and the more serious crimes of violence, including assault, rape, and murder.

Medieval trials often consisted of physical ordeals intended to determine criminals' guilt or innocence or to persuade witnesses to tell the truth. The idea was that an ordeal opened the proceedings to God's direct intervention in deciding an accused criminal's fate, ensuring that the innocent would go free and the guilty would be punished. A trial by ordeal could proceed in various ways. The accused might be thrown into a river, because it was believed that a guilty party would be rejected and float to the surface. Hot brands might be applied to the skin and the burns examined over several days for signs of infection (and thus guilt). In 1215 the Catholic Church banned trial by ordeal.

In medieval Europe criminal trials also were carried out by oath. The parties in a dispute swore their innocence, and the final decision in the case rested in the hands of chieftains or feudal lords who had the right to dispense justice on their own lands. The value of an oath varied with the status of the person making it, with the word of a noble considered more trustwor-

thy than that of a commoner. Trial by combat, another important way of bringing criminals to justice, was a contest between the accused and the accuser, with the winner declared to be the prevailing party in the case and the loser to be at fault.

Numerous punishments were available to the courts, most of them involving some form of mutilation or execution rather than imprisonment (prisons for long-term confinement or "correction" did not exist in the Middle Ages). Thieves might have a hand cut off or be hung from a public gibbet, which was placed prominently outside the walls as a warning to the law-abiding populace. Medieval courts also had different punishments for different social classes, as in the Salic law of the Franks. Punishments were less severe for a landowner or noble, and monarchs placed themselves above the reach of the courts altogether.

To avoid punishment, those accused of crimes often fled. Their property was confiscated, any bail they posted was forfeit, and their families often were banned. Those who fled were subject to capture and, in some places, summary execution. Criminals could also occasionally bargain down their punishment as a condition of returning.

The adoption of Roman law in the late medieval period instituted national criminal codes, which replaced the customs of towns and feudal estates. The custom of *wergild* disappeared, and in England a common law developed out of the findings of juries and judges in past cases. Capital punishments declined toward the end of the Middle Ages and were reserved for more serious crimes such as conspiracy, assassination, highway robbery, and murder. The worst form of execution was reserved for traitors and conspirators: Their

bodies were broken with sledgehammers on a wheel, or they were drawn and quartered—stretched and torn apart by horses. In the Inquisition courts of the church, heretics were bound over to the civic authorities for a public burning.

In England the Star Chamber was instituted by the Tudor kings to hear cases on appeal; its decisions superceded the findings of common-law courts. The Star Chamber held public trials and, as a branch of the royal government, was supposed to provide a fair hearing and avoid the petty rivalries and corruptions of local courts. It dealt with fraud, bribery, property crimes, public disorders and, after the Church of England was established, obedience to the doctrines of the church. The Star Chamber could order fines, time spent in the stocks, whippings, brandings, and mutilations but never execution.

THE ISLAMIC WORLD

BY CHRISTIAN LANGE

The Islamic polity was born when the prophet Muhammad emigrated from his hometown Mecca (in modern-day Saudi Arabia) to Medina in 622 C.E. Until his death in 632 Muhammad laid the foundations of the Islamic political and legal order, including rules governing the prosecution of crime and the administration of punishment. The greatest danger to the urban settlements of seventh-century Arabia resulted from bands of nomads attacking caravans on the ancient trade routes connecting southern Arabia with Greater Syria. This is reflected in the “brigandage verse” in the Koran, which stipulates that “the reward of those who make war upon God and His Messenger and strive after corruption in the land is that they be killed or crucified, or have their hands and feet cut off on alternate sides, or that they be banished from the land.” Until the end of the Umayyad Dynasty in 750, marauding Arab nomads, among them the infamous brigand-poets (*saaliq*), continued to challenge the central authority of the caliphate.

With the rise of the Abbasids (749–1258) and the development of Islamic urban society from Spain to India, urban criminality appears on the horizon of Islamic criminal history. In the towns of Syria, Iraq, and Persia local militia, created originally around the 10th century to protect the city’s neighborhoods against abuses by the agents of the repressive state apparatus, developed into gangs of common thieves and ruffians. A different class of urban criminals was that of the so-called Clan of Sasan (*Banu Sasan*), the blanket designation in medieval Islamic literature for the practitioners of begging, swindling, confidence tricks, displaying disfiguring diseases and mutilated limbs, and other offenses. Crime and criminals were never absent in Islamic history, even though periods of peace, prosperity, and security may have helped to curb criminal activity.

No criminal codes existed in Islam before the 15th century. In theory criminal law was developed by the jurists of

Islam, who devoted special attention to offenses mentioned in the corpus of Islam’s sacred texts (the Koran and the Sunna, the collected reports from the prophet Muhammad). In accordance with the law of Islam (sharia) jurists classified punishments for offenses that touched on public interests as the “rights of God.” This concept implied that once a procedure was initiated, neither the victim nor the judicial authorities could pardon the defendant. In addition to brigandage the Koran stipulates that four offenses are punishable as rights of God: theft, fornication, unfounded accusation of fornication, and consumption of alcoholic drinks. The punishments prescribed for these offenses, known as divinely ordained punishments, are amputation of the right hand for theft, 100 lashes or stoning for fornication, 80 lashes for unfounded accusation of fornication, and 80 or 40 lashes for alcohol consumption. The typical punishment for apostates—those who renounce Islam publicly by words or by conduct—is execution.

This rather grim picture needs to be qualified in important respects. The divinely ordained punishments tend to be defined narrowly (with the exception of brigandage) and underlie strict rules of evidence. For example, four eyewitnesses are required in cases of alleged fornication. In addition, the accused has ample opportunity to use legal doubt as a defense, because according to a widely circulated saying of the prophet Muhammad, the divinely ordained punishments are to be averted on the strength of doubt. Thus, as jurists conceive it, the purpose of a divinely ordained punishment is to serve as a threat and deterrence rather than an actual prosecution of a crime. The Koran regulates murder and corporal injury only insofar as the victim’s immediate relatives are given a right to seek retaliation in the court of the Islamic judge, in the form of either “an eye for an eye” (talionic, or retaliatory, punishment) or monetary recompense. Complaints must be brought forth by the victim’s party because talionic punishments are considered the rights of men.

The majority of offenses, however, are not specified in either the Koran or the Sunna. They fall under a third, residual category of punishment—that of discretionary punishment. Legal discussions of discretionary punishment contain little systematic reflection. However, a lot of attention is given to the issue of slander and calumny, which reflects Islamic law’s prohibition of exhibitionism and effort to protect personal honor. The Syrian al-Kasani (d. 1189) proposed an influential fourfold classification of discretionary punishment, the more “honorable” the offender, the less harsh the punishment (in descending order: jurists and descendants of the Prophet, landowners and military leaders, merchants, and commoners).

According to legal theory, discretionary punishment was the domain of the Islamic judge, but the repressive state organs appear to have adjudicated and implemented

discretionary punishments with little regard to sharia, often under the pretext of following the dictates of political expediency. Beginning in the 12th century jurists tried to assimilate the concept of political expediency into the framework of sharia. Late medieval jurists such as the Syrian Ibn Taymiyya (d. 1328), developed the influential doctrine of “governance in accordance with sharia.” In the long run, however, this doctrine tended to further subordinate Islamic judges to the executive power of the temporal authorities.

Documents of investiture for the office of the Islamic judge from the ninth to the 15th centuries tend to be silent with regard to the divinely ordained punishments, let alone the discretionary punishments. Only with the full development of the doctrine of political expediency under the Ottoman Empire (13th–20th centuries) were Islamic judges reintegrated into the administration of penal justice. From early on there was a dual regime of religious and temporal criminal justice. The institution known as the Court of Grievances was originally instituted under the caliph al-Mahdi (r. 775–785). According to al-Mawardi, the major medieval theorist of Islamic public law, this court possessed the authority to investigate crimes *ex officio*, in addition to relying on rules of evidence somewhat more lax than those of the Islamic judge’s court. However, the Court of Grievances seems to have functioned as a criminal court only in cases that aroused great public interest, such as when the popular mystical preacher al-Hallaj was sentenced to death by crucifixion in 922 in Baghdad.

In the day-to-day prosecution of crime, the urban police and the market inspector played a more important role. Between the 11th and 13th centuries in Baghdad the chief of police was a powerful political player, second in importance only to the vizier. The police punished crime according to both the principles of political expediency and sharia. The brigandage verse in the Koran was conveniently exploited for the persecution of all sorts of offenders. The police were aided by the market inspector, who was set to watch over public morals and commercial fraud. Market inspectors are mentioned in the chronicles as having publicly rebuked, flogged, or ignominiously paraded trespassers against norms of public behavior.

Types of punishment in medieval Islam included executions, corporal punishments, shame punishments, banishment, imprisonment, and fining. The form of execution most frequently mentioned in the chronicles is crucifixion, a practice that comes closer to hanging than to the Roman-style nailing on a cross. However, execution by the sword may have been just as common or even more widespread. Other forms of execution, rarely mentioned in the sources, included stoning, throwing from towers (a punishment applied to sodomites), strangling (of high-ranking members of the military

or administrators), burning (mostly of heretics), drowning (of ill-reputed women), and trampling by elephants (especially in the East). Corporal punishments included flogging with whips, switches, or crops; beating of the soles of the feet was common under the Ottomans.

Except in cases of retaliation, a strong reticence to mutilate bodies appears to have prevailed through much of Islamic history. Ignominious parades on donkeys, camels, or oxen were common sights throughout the Islamic Middle Ages. Offenders were led through the city, their faces blackened with smut or embers, sitting backward, while their crimes were called out to the public. Other forms of shame punishment included the privation of the right to act as witness, a coveted position of honor. The stipulation in the Koran that certain criminals “shall be banished from the land” was taken to refer to both banishment and imprisonment, since prisons were thought to be a kind of netherworld of almost eschatological proportions. Little is known about what popular prisons looked like, but conditions in the great prison in the Cairo citadel (Mamluk Period, 1250–1517) seem to have been miserable, with prisoners starving to death if unaided by their families. Pecuniary punishments, though disputed by the jurists, were a common form of discretionary punishment.

The outstanding feature of the administration of penal justice in medieval Islam would seem to be the divorce of legal theory from penal practice. Soon after the decline of charismatic religious leadership in early Islam (ca. 622–720) the prosecution of crimes was usurped by the temporal authorities (ninth–11th centuries). However, concurrent with the development of Islamic legal doctrine, the jurists managed to reclaim a measure of influence in criminal law by defending the inviolability of the human body as well as that of the private sphere of Muslim households and by bringing the concept of political expediency back into the fold of sharia (especially from the 14th century on). Thus, debates about the extent to which the prosecution of crime in medieval Islam lay outside the realm of religious law must take into account specific historical and doctrinal contexts. The study of the history of Islamic criminal law is still in its infancy, despite some progress in recent years, especially with regard to the Ottoman Period, for which court registers are available.

See also ALCHEMY AND MAGIC; BORDERS AND FRONTIERS; CITIES; DEATH AND BURIAL PRACTICES; EMPIRES AND DYNASTIES; FAMILY; FOOD AND DIET; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; LANGUAGE; LAWS AND LEGAL CODES; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SCANDALS AND CORRUPTION; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; WRITING.

Africa

~ The Xosa Tale of Nyengebule (undated) ~

So it was with Nyengebule. He had two wives, who, one day, went out together to collect firewood in the forest. The younger found a bees' nest in a hollow tree, and called her companion to help her take out the honeycomb. When they had done so they sat down and ate it, the younger thoughtlessly finishing her share, while the elder kept putting some aside, which she wrapped up in leaves to take home for her husband. Arriving at the kraal, each went to her own hut. The elder, on entering, found her husband seated there, and gave him the honeycomb. Nyengebule thanked her for the attention, and ate the honey, thinking all the time that Nqandamate, the younger wife, who was his favourite, would also have brought him some, especially as he was just then staying in her hut. When he had finished eating he hastened thither and sat down, expecting that she would presently produce the tidbit. But he waited in vain, and at last, becoming impatient, he asked, "Where is the honey?" She said, "I have not brought any." Thereupon he lost his temper and struck her with his stick, again and again. The little bunch of feathers which she was wearing on her head (as a sign that she was training for initiation as a doctor) fell to the ground; he struck once more in his rage; she fell, and he found that she was dead. He made haste to bury her, and then he gathered up his sticks and set out for her parents' kraal, to report the death and demand his lobolo-cattle back. But the little plume which had fallen from her head when he struck her turned into a bird and flew after him.

When he had gone some distance he noticed a bird sitting on a bush by the wayside, and heard it singing these words

"I am the little plume of the diligent wood-gatherer,

The wife of Nyengebule.

I am the one who was killed by the house-owner, wantonly!

He asking me for morsels of honeycomb."

It kept up with him, flying alongside the path, till at last he threw a stick at it. It paid no attention, but kept on as before, so he hit it with his knobkerrie, killed it, threw it away, and walked on.

But after a while it came back again and repeated its song. Blind with rage, he again threw a stick at it, killed it, stopped to bury it, and went on his way.

As he was still going on it came up again and sang:

"I am the little plume of the diligent wood-gatherer . . ."

At that he became quite desperate, and said, "What shall I do with this bird, which keeps on tormenting me about a matter I don't want to hear about? I will kill it now, once for all, and put it into my bag to take with me." Once more he threw his stick at the little bird and killed it, picked it up, and put it into his inxowa. . . He tied the bag up tightly with a thong of hide, and thought he had now completely disposed of his enemy.

So he went on till he came to the kraal of his wife's relations, where he found a dance going on. He became so excited that he forgot the business about which he had come, and hurried in to join in the fun. He had just greeted his sisters-in-law when one of them asked him for snuff. He told her—being in a hurry to begin dancing and entirely forgetful of what the bag contained—to untie the inxowa, which he had laid aside. She did so, and out flew the bird dri-i-i! It flew up to the gate-post, and, perching there, began to sing . . .

He heard it, and, seeing that every one else had also heard it, started to run away. Some of the men jumped up and seized hold of him, saying, "What are you running away for?" He answered—his guilty conscience giving him away against his will—"Me! I was only coming to the dance. I don't know what that bird is talking about."

It began again, and its song rang out clearly over the heads of the men who were holding him. . .

They listened, the meaning of the song began to dawn on them, and they grew suspicious. They asked him, "What is this bird saying?" He said, "I don't know."

They killed him.

From: Alice Werner, *Myths And Legends of the Bantu* (London: G. G. Harrup, 1933).

Asia and the Pacific

~ Jean-Baptiste du Halde: Excerpt from
Description de la Chine (1735) ~

No crimes pass unpunished in China. . . . The bastinado is the common punishment for slight faults, and the number of blows is proportionate to the nature of the fault. . . .

Another punishment, less painful, but more infamous, is the wooden collar which the Portuguese have called cangue. This cangue is composed of two pieces of wood, hollowed in the middle to place the neck of the criminal in. When he has been condemned by the mandarin, they take these two pieces of wood, lay them on his shoulders, and join them together in such a manner that there is room only for the neck. By this means, the person can neither see his feet nor put his hand to his mouth, but is obliged to be fed by some other person. He carries night and day this disagreeable load, which is heavier or lighter according to the nature of the fault. Some cangues weigh two hundred pounds and are so troublesome to criminals that out of shame, confusion, pain, want of nourishment and sleep, they die under them. Some are three feet square and five or six inches thick; the common sort weigh fifty or sixty pounds.

The criminals find different ways to mitigate the punishment. Some walk in company with their relations and friends, who support the four corners of the cangue that it may not gall their shoulders. Others rest it on a table or on a bench; others have a chair made proper to support the four corners, and so sit tolerably easy. When, in the presence of the mandarin, they have joined the two pieces of wood about the neck of the criminal, they paste on each side two long slips of paper about four fingers broad, on which they fix a seal, that the two pieces which compose the cangue may not be separated without its being perceived. Then

they write in large characters the crime for which this punishment is inflicted and the time that it ought to last; for instance, if it be a thief or seditious person or a disturber of the peace of families, a gamester, etc., he must wear the cangue for three months in a particular place. The place where they are exposed is generally at the gate of a temple which is much frequented, or where two streets cross, or at the gate of the city, or in a public square, or even at the principal gate of the mandarin's tribunal.

Then the time of punishment is expired, the officers of the tribunal bring back the criminal to the mandarin, who, after having exhorted him to amend his conduct, frees him from the cangue, and to take his leave of him orders him twenty strokes of the battoon, for it is the common custom of the Chinese justices not to inflict any punishment unless it be a pecuniary one, which is not preceded and succeeded by the bastinado, inasmuch that it may be said that the Chinese Government subsists by the exercise of the battoon. . . .

There are some crimes for which the criminals are marked on the cheek, and the mark which is impressed is a Chinese character signifying their crime. There are others for which they are condemned to banishment or to draw the royal barques. This servitude lasts no longer than three years. As for banishment, it is often perpetual, especially if Tartary is the place of exile; but before they depart, they are sure to be bastinadoed; and the number of blows is proportionate to their crime.

From: Eva March Tappan, ed., *The World's Story: A History of the World in Story, Song, and Art*, Vol. 1, *China, Japan, and the Islands of the Pacific* (Boston: Houghton Mifflin, 1914).

Europe

~ Leo III: The Ecloga on Sexual Crimes (726) ~

1. A married man who commits adultery shall by way of correction be flogged with twelve lashes; and whether rich or poor he shall pay a fine.
2. An unmarried man who commits fornication shall be flogged with six lashes.

3. A person who has carnal knowledge of a nun shall, upon the footing that he is debauching the Church of God, have his nose slit, because he committed wicked adultery with her who belonged to the Church; and she on her side must take heed lest similar punishment be reserved to her.

4. Anyone who, intending to take in marriage a woman who is his goddaughter in Salvation, bringing baptism, has carnal knowledge of her without marrying her, and being found guilty of the offence shall, after being exiled, be condemned to the same punishment meted out for other adultery, that is to say, both the man and the woman shall have their noses slit.

5. The husband who is cognizant of, and condones, his wife's adultery shall be flogged and exiled, and the adulterer and the adulteress shall have their noses slit.

6. Persons committing incest, parents and children, children and parents, brothers and sisters, shall be punished capitally with the sword. Those in other relationships who corrupt one another carnally, that is, father and daughter-in-law, son and stepmother, father-in-law and daughter-in-law, brother and his brother's wife, uncle and niece, nephew and aunt,

shall have their noses slit. And likewise he who has carnal knowledge with two sisters and even cousins.

7. If a woman is carnally known and, becoming pregnant, tries to produce a miscarriage [abortion], she shall be whipped and exiled.

8. Those who are guilty whether actively or passively of committing unnatural offences shall be capitally punished with the sword. If he who commits the offence passively is found to be under twelve years old, he shall be pardoned on the ground of youthful ignorance of the offence committed.

9. Those guilty of "abominable crime" [homosexuality?] shall be emasculated.

From Edwin Hanson Freshfield, trans.,
A Manual of Roman Law: The Ecloga
(Cambridge, U.K.: Cambridge University
Press, 1926).

The Islamic World

~ *The Koran, excerpt (seventh century)* ~

Of old our Apostles came to them with the proofs of their mission; then verily after this most of them committed excesses in the land.

Only, the recompense of those who war against God and his Apostle, and go about to commit disorders on the earth, shall be that they shall be slain or crucified, or have their alternate hands and feet cut off, or be banished the land: This their disgrace in this world, and in the next a great torment shall be theirs—

Except those who, ere you have them in your power, shall repent; for know that God is Forgiving, Merciful.

O ye who believe! fear God. Desire union with Him. Contend earnestly on his path, that you may attain to happiness.

As to the infidels—if that they had twice the riches of the earth to be their ransom from torment on the day of resurrection, it should not be accepted from them! And a dolorous torment shall be their's.

Fain would they come forth from the Fire; but forth from it they shall not come: and a lasting torment shall be their's.

As to the thief, whether man or woman, cut ye off their hands in recompense for their doings. This is a penalty by way of warning from God himself. And God is Mighty, Wise.

But whoever shall turn him to God after this his wickedness, and amend, God truly will be turned to him: for God is Forgiving, Merciful.

Knowest thou not that the sovereignty of the Heavens and of the Earth is God's? He chastiseth whom He will, and whom He will He forgiveth. And God hath power over all things.

O Apostle! let not those who vie with one another in speeding to infidelity vex thee;—of those who say with their mouths, "We believe," but whose hearts believe not;—or of the Jews listeners to a lie—listeners to others—but who come not to thee. They shift the words

(continued)

(continues)

of the law from their places, and say, "If this be brought to you, receive it; but if this be not brought to you, then beware of it." For him whom God would mislead, thou canst in no wise prevail with God! They whose hearts God shall not please to cleanse, shall suffer disgrace in this world, and in the next a grievous punishment;

Listeners to a falsehood and greedy devourers of the forbidden! If, therefore, they have recourse to thee, then judge between them, or withdraw from them. If thou withdraw from them, then can they have no power to injure thee. But if thou judge, then judge between them with equity. Verily, God loveth those who deal equitably.

But how shall they make thee their judge, since they possess already the Law, in which are the behests of God, and have not obeyed it? After this, they will turn their backs; but such are not believers.

Verily, we have sent down the law (Towrat) wherein are guidance and light. By it did the prophets who professed Islam judge the Jews; and the doctors and the teachers judged by that portion of the Book of God, of which they were the keepers and the witnesses. Therefore, O Jews! fear not men but fear Me; and barter not away my signs for a mean price! And whoso will

not judge by what God hath sent down—such are the Infidels.

And therein have we enacted for them, "Life for life, and eye for eye, and nose for nose, and ear for ear, and tooth for tooth, and for wounds retaliation:"—Whoso shall compromise it as alms shall have therein the expiation of his sin; and whoso will not judge by what God hath sent down—such are the transgressors.

And in the footsteps of the prophets caused we Jesus, the son of Mary, to follow, confirming the law which was before him: and we gave him the Evangel with its guidance and light, confirmatory of the preceding Law; a guidance and warning to those who fear God;—

And that the people of the Evangel may judge according to what God hath sent down therein. And whoso will not judge by what God hath sent down—such are the perverse.

And to thee we have sent down the Book of the Koran with truth, confirmatory of previous Scriptures, and their safeguard. Judge therefore between them by what God hath sent down, and follow not their desires by deserting the truth which hath come unto thee. To every one of you have we given a rule and a beaten track.

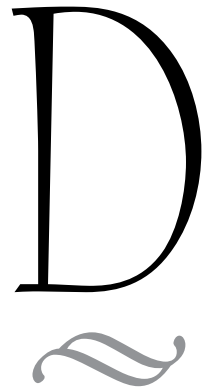
From: J. M. Rodwell, trans., *El-Kor'ân; or, The Koran* (London, B. Quaritch, 1876).

FURTHER READING

- Clifford Edmund Bosworth, *The Medieval Islamic Underworld: The Banu Sasan in Arabic Society and Literature*, 2 vols. (Leiden, Netherlands: Brill, 1976).
- G. R. Evans, *Law and Theology in the Middle Ages* (London: Routledge, 2002).
- Maureen Mulholland, Anne Pullen, and Brian Pullen, *The Trial in History* (Manchester, U.K.: Manchester University Press, 2003).

- Anthony Musson, ed., *Expectations of the Law in the Middle Ages* (Rochester, N.Y.: Boydell Press, 2001).
- Jerome A. Offner, *Law and Politics in Aztec Texcoco* (London: Cambridge University Press, 1983).
- Rudolph Peters, *Crime and Punishment in Islamic Law: Theory and Practice from the Sixteenth to the Twenty-First Century* (Cambridge, U.K.: Cambridge University Press, 2005).
- Zvi Razi and Richard Smith, *Medieval Society and the Manor Court* (Oxford, U.K.: Clarendon Press, 1996).

Entries D to I



► death and burial practices

INTRODUCTION

With death often seen, in religious terms, as a rite of passage, there were a wide variety of burial systems throughout the medieval world, influenced by the differing nature of these views. These customs helped influence varying attitudes toward dead bodies. Many cultures of the medieval world had beliefs that centered on the afterlife, with distinct views on resurrection and heaven. In the context of such beliefs, death sometimes was seen as less sad because the person who had died was thought to be transcending to a “better” place. As a result, great care was always exercised in preparing the bodies of dead family members for this transition.

Enormous efforts were made to show respect for the bodies of the dead. In most parts of the world, for example, the bodies were washed. In some parts of the world, such as northern Europe, this was often done for practical and aesthetic reasons, but in the Islamic world it took the form of a “spiritual cleansing,” an important ritual meant to prepare the body for life in the next world. By contrast, for convicted criminals many forms of capital punishment involved the disfigurement or dismemberment of bodies or even in some cases their burning.

The task of preparing bodies for burial was often undertaken by family members in village societies in Africa and the Islamic world. The routine often was seen as a part of the grieving process. By contrast, in most of Christian Europe,

especially in cities, bodies were often washed and put in coffins by professional undertakers. By medieval times most societies had come to realize that bodies should be buried away from areas where people live, for reasons of public health. This understanding led people to locate burial grounds on the outskirts of cities, towns, and villages. In western Africa rituals dictated exactly where the dead would be buried. In China, Vietnam, and Korea geomancers would try to find the best place to bury people, which for farmers might be near the graves of other ancestors or in a distant field. In Christian Europe burials were in churchyards, positioned in the center of a settlement but away from the areas where people lived and crops were grown.

For those societies that used cremation—mainly in Buddhist parts of Asia—this method of disposing of bodies solved the problem of hygiene, and it became more common in areas where there was great pressure of population growth. The Parsi communities in India used the “Towers of Silence,” allowing vultures to eat the flesh from bodies placed in these circular structures. Maritime societies continued to perform burial at sea, and some such societies, like those in Scandinavia, even buried people in boats.

In the medieval world the grand burials of the ancient world, with large numbers of personal effects and sometimes even slaves, gave way to a more practical and simpler burial style. People would proceed to the afterlife clothed as they had been in life but largely without their household goods. They might still be buried with some of their favorite objects, but

these items often were placed with the dead for sentimental reasons and not necessarily because the person would need such things in the afterlife.

Although societies had various customs, around the world there were two instances when burial practices changed—in time of war and during epidemics such as the plague. War and pestilence often led to the death of large numbers of people, and there was a need to bury bodies quickly. Large pits would be speedily dug and bodies placed in mass graves. Archaeologists have found numerous examples of this in cities which were badly affected by the Black Death in the 1340s, such as in Siena (Italy) and London.

Death was a period of great sadness in all medieval societies, with sanctioned periods of mourning after the death of a political or religious leader or family member. This happened in China, Korea and Japan for emperors throughout the medieval period. In Christian Europe, the Islamic World, and Asia it is known that people embarked on pilgrimages to places where holy or religiously influential people were buried. Paying respect to the honored dead was also prevalent among the Aborigine of Australia, and it seems likely that it also was practiced in sub-Saharan Africa and the Americas, as such customs were certainly being followed when the first European explorers arrived in these regions. Although gravestones with names mark the burials of the deceased in many societies, it was forbidden among the Aborigine to mention the name of the dead person for a prescribed period.

Beyond helping explain components of varying belief systems in the medieval world, studies of burials provide other sorts of information about cultures and people. Archaeologists studying Anglo-Saxon burial sites in Britain, for example, have been able to trace in considerable detail the spread of the Anglo-Saxons through England. Similarly, African burial customs have shown the regions where various ethnic groups managed to extend their power. Where intact remains of bodies are available at medieval sites, archaeologists have been able to study them to deduce much about the medieval diet, methods of dealing with medical problems, and life expectancies.

AFRICA

BY JUSTIN CORFIELD

The medieval traditions related to death and burial practices varied greatly throughout Africa depending on the local customs, which in turn were heavily influenced by the terrain and the availability of material for the burials. Burials were common in the vast majority of places; cremation was unusual because of a belief in human spirits.

In pre-Islamic North Africa the Roman traditions of burying people in small mausoleums along the sides of roads was popular outside some of the cities along the Mediterranean coast. This continued for a long period after the end of the Western Roman Empire. Some of these graves around Carthage have been excavated by modern-day archaeologists and date from the fifth and sixth centuries. A Jewish community in North Africa during the Roman occupation used Jewish burial customs throughout the medieval period. Many of the old Jewish cemeteries do not survive, but there are some Jewish graves at Volubilis in modern-day Morocco. They are located around the ruins of a late-Roman-era synagogue.

With the coming of Christianity to North Africa came the Christian custom of burying people with their bodies lying east–west. After the advent of Christianity in Nubia in about 540 several Christian cemeteries were built, though some Egyptian traditions can still be seen at places like Ballana. Later Nubian burial sites show gravestones decorated with Christian emblems. The graves of some of the Christian bishops from the 10th century can still be found along the west wall of the Faras Cathedral in modern-day southern Egypt. In Ethiopia some people were buried in crypts, perhaps the most famous being the subterranean crypts at Lalibela, the capital of the kingdom established by King Lalibela during the 13th century. Many other medieval graves have been found throughout Ethiopia, including those of the Falashas (sometimes called the black Jews of Ethiopia), who used traditional Jewish burial practices.

In the Sahara care usually was taken to bury people some distance from oases, partly for reasons of hygiene. Cairns, or heaps of stones, typically were placed on top of the graves to prevent the bodies from being exposed in a sandstorm or attracting wild animals. Except for some of the more important rulers, people were always buried outside the perimeter of towns in the Sahara. The So people of the Sahara retained a number of legends, one of which centers on a chief whose people had to keep his death secret for a year by burying him in a jar and then holding a small, private formal funeral at which a sheep and possibly two slaves were sacrificed. (Slave sacrifice was occasionally used as a way of curing people who were ill.)

There was a traditional belief in sub-Saharan Africa that life did not end with death but continued within another world as the human spirit went into a different dimension. The result was that most religions did not have a clear divide between life and death; although the latter was feared, it also was viewed as the start of somebody's deeper relationship with the earth. The cherishing of ancestors—the spirits of family members who had died but could still intervene in earthly affairs—meant that the goal of life was to become an ancestor.

A proper funeral was therefore necessary to prevent the spirit of the dead person from becoming a “wandering ghost.”

In tropical western Africa and in west-central Africa the customs involved in dealing with a dead person were remarkably similar. The first process involved washing the body of the deceased, which was often undertaken by the women of the household. Then a bandage was wrapped around the head to keep the jaw of the person closed. This was to prevent the soul of that person from leaving the body and wandering or, according to other tribal beliefs, from returning. If somebody had died within a house, the body was removed through a hole in the wall, which was often made especially for the purpose. The hole was then immediately filled to prevent the spirit of the person from returning. If possible, the corpse was removed feet first, pointing away from the person’s house. In some cultures the body was then taken to a burial ground near the village, often along a crooked or zigzag path to confuse the spirits. Thorns were sometimes placed on the path to slow down any attempt by the spirit to return. Groups holding the opposite belief, by contrast, buried the person close to the home to allow the spirit to return. Customs differed regarding the use of specific burial places outside towns and the burial of children within townships, and many groups buried the bodies of infants close to a house.

For the Bakongo people of the modern-day Democratic Republic of the Congo, a body buried in the ground often was interred in a relatively shallow grave marked by a cairn. Dishes and jars were usually broken and placed over the grave. Symbolically this signified the release of the spirits associated with the deceased, and it also removed any incentive for the soul of the dead person to search for the broken pottery. Small, unbroken pots often were attached to nearby trees to lure evil spirits into them, keeping their malign influence away from the grave of the deceased. In addition, a white chicken was sacrificed over the grave to release the powers of the spirit world; it also was believed that the chicken would serve as food for a long journey. Particularly wealthy families sometimes sacrificed larger animals, including oxen.

Other symbolic customs included lighting lamps and bonfires to help the soul find a path to the world of the dead. Occasionally, shiny objects such as quartz were placed on the grave to help the living see the ancestral spirits as a reflection. This custom was particularly strong among the people living in present-day Ghana, who replaced the quartz with glass pieces during the late medieval period. For coastal communities it was also customary to decorate the sides of the grave with seashells, especially white shells. This signified the transition to the world of the dead, which was connected to the world of the living by water or by the ocean. Many of these Bantu customs were later continued by the slave com-

munities in the Americas, who kept some of these traditions for several centuries.

In central Africa, where many settlements were located on hilltops that had been cleared by farming, the graves of kings frequently were located on the sides of the hills with a sacred fire tended by the people. In modern-day Burundi burials were at the edges of forests. A Nyamwezi chief in the central part of modern Tanzania was buried with an accompaniment of human sacrifice, which was rare in the rest of Africa. A Bantu group of west-central Africa had a different custom, by which fire represented the life of a king; a perpetual fire was maintained by his supporters and put out when he died. This practice was also used for periods by the Shona, the southern neighbors of the Bantu, who dominate modern-day Zimbabwe. Burial goods have been found in south-central Africa, including deposits of cruciform copper ingots found in some of the graves in the Sangha region to the west of Lake Tanganyika. Three separate pottery traditions have been identified by archaeologists working through pots associated with Sangha graves. Pottery styles also have been identified among the material found in graves of the Mutapa Empire (also called the Empire of Great Zimbabwe, dating to the late 15th century), which was in the northern half of modern-day Zimbabwe, perhaps reflecting some of the customs associated with the civilization of Great Zimbabwe.

In the Limpopo valley lived people who were identified as following a “cattle cult,” which involved the burial of cattle along with the interment of humans. Different burial customs were followed by people in Madagascar and the islands of Comoros, where people were more influenced by Asian and Islamic traditions. At Vohémar in Madagascar excavations have revealed large numbers of grave goods buried with bodies. These items included Chinese objects, glass beads, and bronze mirrors, showing pagan traditions that transcended communities adopting Islam.

THE AMERICAS

BY KEITH JORDAN

The indigenous peoples of the Americas practiced a variety of death and burial customs during the medieval period. Native Americans of the Mississippian culture (ca. 750–ca. 1500) of the midwestern and southeastern North America deposited the bodies of deceased chiefs in charnel houses placed atop platform mounds. The bodies were cared for by priests, along with the chiefs’ stone or wood ancestral portrait sculptures, ritual objects, luxury goods, and weapons. These mortuary shrines were ritually destroyed from time to time and their occupants reburied in the mound. A new charnel house was then built atop the old one. Some of these interments were

extremely elaborate. At Spiro, Oklahoma, and Cahokia, Illinois, some bones of rulers were placed on the wooden litters on which they had been carried in life. Persons of lower rank were accorded secondary burials in basketry coffins. The grave goods at Spiro included shell drinking cups and ornaments, stone pipes carved into human effigies, and ornaments of copper imported from the area around Lake Superior. Many of the objects were centuries old at the time they were buried.

One mound at Cahokia yielded two central figures, one placed above and the other below a bird-shaped cape made of thousands of shell beads. Human sacrifices were later incorporated into this mound, including the bodies of young women from outside the Cahokia region—perhaps sent as tribute from vassals of the chief—and four young men whose hands and heads had been removed.

The Hohokam (ca. 500–ca. 1450) of present-day southern Arizona practiced complex burial ceremonies that changed over the course of the culture's development. From about 700 to 1150 cremation was the favored form of mortuary practice. Along with the ashes of the dead, burials from this period contain stone tools, ceramic vessels, and shell ornaments. Some of these items had been burned as well, perhaps to “kill” the objects to accompany their deceased owners. After 1150 burial in the flesh became more common in the Hohokam region, although cremation was still practiced.

The people of the Mimbres culture, which flourished in present-day New Mexico between 750 and 1200, buried their dead under the floors of their stone and adobe houses. A distinctive feature of Mimbres graves is the frequent placement of a painted pottery bowl over the head of the corpse. Each bowl had a hole punched through it before inclusion in the grave. Archaeologists speculate that this act was intended to “kill” the object and release its spirit into the afterlife to accompany the soul of the dead person. Another possibility is that the pot with its hole over the head symbolized the emergence of the deceased into the next world.

The Anasazi, or Ancient Pueblo, peoples of the Southwest (ca. 900–ca. 1300) buried their dead in abandoned residential structures and separate cemeteries. Burials were accompanied by offerings of ceramics, jewelry, or textiles. Ritual specialists occasionally were buried with their ceremonial regalia. In general, however, Anasazi burials do not reflect vast differences in status between individuals. The major exception to this pattern occurs at Chaco Canyon in New Mexico, where a distinct ruling group presided over this religious and economic center from about 950 to 1100. In one stone building complex, a residential and ritual center known as Pueblo Bonito, several rooms contained very rich and complex burial sites. In the most elaborate of them, two adult males had been



Ceramic funerary urn, Zapotec style, Mexico, ca. 250–750 (Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 163631])

laid to rest under a floor of wooden planks. Above this floor the bones of 14 other people lay scattered about the room. It is not clear whether the condition of the bones resulted from disturbance by robbers, secondary burial, or the dismemberment of human sacrifices to accompany the two men. The site contained thousands of turquoise beads, ceramic vessels, wooden staffs and flutes, and baskets decorated with turquoise mosaic. One of the two men had sustained severe head injuries at the time of death, which may indicate that he died defending the site. Pueblo Bonito burials differ from those at smaller Chaco sites not only in the amount of grave goods but also in the extended position of the bodies. Whatever their precise roles in Anasazi society, these inhabitants of Pueblo Bonito received exceptional treatment in death.

While commoners of the Classic Period (ca. 200–ca. 900) of Maya civilization usually were buried under the floors of their pole and adobe dwellings, the divine kings of the Maya were interred in elaborate stone tombs under pyramid-temples. The dead of all social classes were venerated as ancestors by their descendants. In the case of royalty the temples were the sites of elaborate rituals in which living kings sought vi-

sionary communion with the spirits of their predecessors to legitimate their earthly rule. The platforms of such temple-tombs sometimes rose as high as nine levels, probably to symbolize the nine levels of the Mayan underworld. Here the king descended after death as had the Maize God in the saga of the mythological Hero Twins. As the maize plant sprouted again from kernels of corn, the king hoped to be reborn as a god. This equation of the human life cycle with that of vegetation and the hope of resurrection like the sprouting of new plant life probably explains the custom of burying wealthy people with a green jade bead in the mouth.

Probably the best known Mayan royal tomb is that of King Pakal the Great (r. 615–83) in the Temple of the Inscriptions at Palenque in Mexico. A hidden stairway, not rediscovered until the 1940s, led from the temple atop the pyramid down to a crypt at its base. The king had been laid to rest in a stone sarcophagus with a carved lid showing his resurrection from the underworld as the Maize God. Images of ancestors adorned the sides of the sarcophagus and walls of the tomb. The corpse was covered in red cinnabar, symbol of blood and life, and adorned with jade ornaments, including a jade mosaic mask over the face. The mask further identified Pakal with the greenery of the risen Maize God. A long tube connected the burial chamber to the temple far above and functioned as a conduit for Pakal's spirit to manifest to his descendants.

Ancestor veneration also characterizes the elite funerary practices of the Mixtec kingdoms of Oaxaca, Mexico, during the Late Postclassical Period (ca. 1200–1521). At some sites deceased kings were entombed in caves as mummy bundles. These locales became ancestral shrines where oracle priests spoke on behalf of the dead and were consulted by their descendants on matters of royal succession. The looted remains of these cave burials include fragments of luxury items like turquoise mosaics and decorated textiles. At the site of Monte Albán, the Mixtec reused a tomb, now referred to as Tomb 7, built by the earlier Zapotec. This burial site remained undisturbed until discovered in the 1930s. It contained the skeleton of a man about 55 years old, surrounded by the secondary burials of family members. More than 500 exquisite treasures accompanied the occupants of Tomb 7, including ornaments of gold, silver, rock crystal, and turquoise.

In contrast to Maya and Mixtec practice, the Aztec of central Mexico (ca. 1300–1521) cremated their dead, both royal and commoner, after wrapping them in textiles to form bundles. The Aztec also frequently sacrificed dogs to help guide the deceased on the difficult four-year journey to Mictlan, the underworld, a cold and gloomy place situated in the far north. At the ruins of the Aztec Great Temple in modern-day Mexico City, modeled pottery urns contained the ashes of

elite persons with offerings of jewelry and obsidian weapons. The same site also yielded the bones of sacrificial victims deposited with other offerings in caches dedicated to the gods.

Nobles of the Moche culture (ca. 100–ca. 700 C.E.) of Peru's northern coast were buried in the mud brick pyramids or platforms that supported their palaces and temples. While few of the contents of these sumptuous tombs have survived centuries of looting, the intact examples discovered at Sipán in the 1980s reveal the splendor that surrounded these rulers in death. They were accompanied by magnificent jewelry in gold, turquoise, and imported shell, ranging from delicate ear ornaments to massive breastplates. Sacrificed warriors and retainers stood guard over their masters. Recent interpretations of scenes in Moche art as well as archaeological remains indicate that the funeral of a ruler was viewed as a dangerous time of political and spiritual transition for the community. Human sacrifices and the torture of captives marked this transitional phase, ending with the rebirth of the ruler as an ancestor in the afterlife. All Moche dead were interred in an extended position lying on their backs, and most were provided with cloth shrouds, with members of the elite encased in reed or cane coffins. Lower-ranking folk spent their eternities in rectangular graves or small mud brick tombs.

The successors of the Moche on the northern coast, the Chimú (ca. 1000–ca. 1470), buried their dead kings in the palace compounds they inhabited during life. All of their accumulated wealth remained part of their estates, maintained like modern museums. Royal descendants had to embark on new conquests or find other means to enlarge their own treasuries, since they did not inherit the riches of the dead. Chimú burial platforms, like the rest of the palace compounds, were built of adobe. Ceramic images show funeral processions carrying the bodies of dead nobles in pod-shaped reed coffins. Although the royal tombs at the Chimú capital of Chan Chan have been heavily looted over the centuries, they show that these rulers also took numerous sacrificial victims with them in death to serve them in the hereafter.

At the time of the Spanish invasion in 1527, the Inca of all classes regarded their dead as ongoing members of the community whose advice was sought for daily matters by the living. Many tombs therefore remained open for continued access. Many subjects of the Inca Empire (ca. 1450–1532) used artificial mummification (evisceration, or removal of the internal organs; drying; and perhaps the application of herbal substances) to preserve the bodies of the dead, which were then flexed and wrapped into bundles of textiles. Artificial heads of textiles or wood added a more lifelike quality to the mummy. On the level of royalty the mummies of Inca emperors were treated like living rulers, carried in processions to state events, and allowed to retain their palaces and

treasure. The specialists who maintained the mummies (and who consumed all the offerings made to the dead rulers) became a very powerful caste, rivaling living emperors in influence. The last Inca emperor, Atahualpa (r. 1532), attempted to destroy the power of the mummy retainers, who had opposed his accession in the civil war that followed his father's death. The Spanish conquistadors completed the task, eventually burning the royal mummies as idols as part of their campaign of forcing the population to convert to Roman Catholicism.

ASIA AND THE PACIFIC

BY LISA NIZIOLEK

Cultures around the world and throughout time have considered death to be a rite of passage. People have surrounded death with ritual activities believed to help the deceased make the transition from this world to the next and the living to cope with the loss of an individual. Written historical records from indigenous people, explorers' chronicles, and missionary accounts as well as archaeological material provide information regarding death and burial practices in medieval Asia and the Pacific.

In China elite members of society often were interred in elaborate tombs resembling palace structures. Stone statues lined the walkways leading up to the tombs—this was called the *shendao*, or spirit road. Each tomb had a long tunnel and sealed openings or shafts in the ceiling. The chambers held painted walls, ceramic figurines, delicately carved tombstones, and decorated sarcophagi, frequently made in the likenesses of palaces. The size and design of each tomb represented the importance of the individual buried within it. For example, royalty close to the emperor had tombs with elaborate sarcophagi, several columns, intricate engravings, and several human and animal figurines. The tombs of ministers had only simple carvings, a coffin, and a few figurines.

The burial practices of nonelites were simpler than those of elites, but they still allowed the living an opportunity to honor the dead. In an Astana cemetery in western China, for instance, the deceased was dressed with a hat and shoes that the local people constructed from wastepaper. Throughout China a deceased person was transformed into a venerated ancestor through mortuary rituals that enhanced the social status of the dead person's living family. Customs included washing and dressing the corpse while performing traditional lamentations for the dead. A significant amount of money was spent on the coffin, a determination of the proper burial place with a geomancy specialist (one who prophesies through the study of features of the landscape), funeral supplies and personnel, and paper images of animals and servants to burn at the funeral that would accompany the dead

into the next world. After the 10th century the practice of cremation—until then an uncommon custom—was used more frequently, especially in areas where land was scarce. Cremation was less expensive than interment, and it was increasingly practiced by members of the lower and middle classes.

Most mortuary practices in India included the practice of cremation, which in Buddhism signals the breaking of the final tie to the physical world. Ancestors were venerated through festivals and memorials. Masses and memorials for the dead, such as the Avalambana festival, were held to save generations of ancestors from suffering.

Although it was known from earlier historical records, the Hindu practice of suttee became more widespread in India during the sixth century, particularly among the Rajput court. The act of suttee was the voluntary self-immolation of a widow or concubine left with no sons upon her husband's death. Suttee was practiced by royalty and commoners, and in Rajputana several memorials were erected to commemorate the deaths of women who died on their dead husbands' funeral pyres.

In the eighth century the Parsis from Iran introduced new mortuary practices to India. Instead of cremation or interment, which were believed to pollute the fire and the earth, they placed their dead in *dakmas* ("towers of silence"). Ideally situated on hills where vultures had easy access to the corpses, these towers were several levels tall and had exposed chambers in which the dead were placed by ritual bearers. After the bones were cleaned and dried by animals and the sun, they were placed in a central chamber with a stone floor where they were naturally pulverized by the sun and rain. At the end of this process, any remaining bones were buried, but no tomb or monument was constructed in commemoration.

Keyhole-shaped tumuli were a common grave type in medieval Japan. These large, mounded stone structures were burial places for the deceased. They often contained numerous grave goods, including armor, iron swords and spear points, arrowheads, and farming tools. The size of the tumulus and number and quality of grave goods probably indicated the dead person's status in life. Although earlier tumuli contained simple, single burials in wooden coffins that were inaccessible after the tombs were closed off, later ones incorporated design changes that enabled the main chambers to be reentered at later times through side doors. This allowed mourners to gain access safely to the burial chambers inside a tumulus to add more coffins when needed.

In the sixth century improved stonecutting technologies allowed for the construction of larger and more finely built stone tombs. These later tombs incorporated stone slabs

weighing up to several tons and beautifully painted frescoes. The frescoes, which feature figures in Korean costume and grave goods imported from Korea, indicate medieval ties between Japan and Korea.

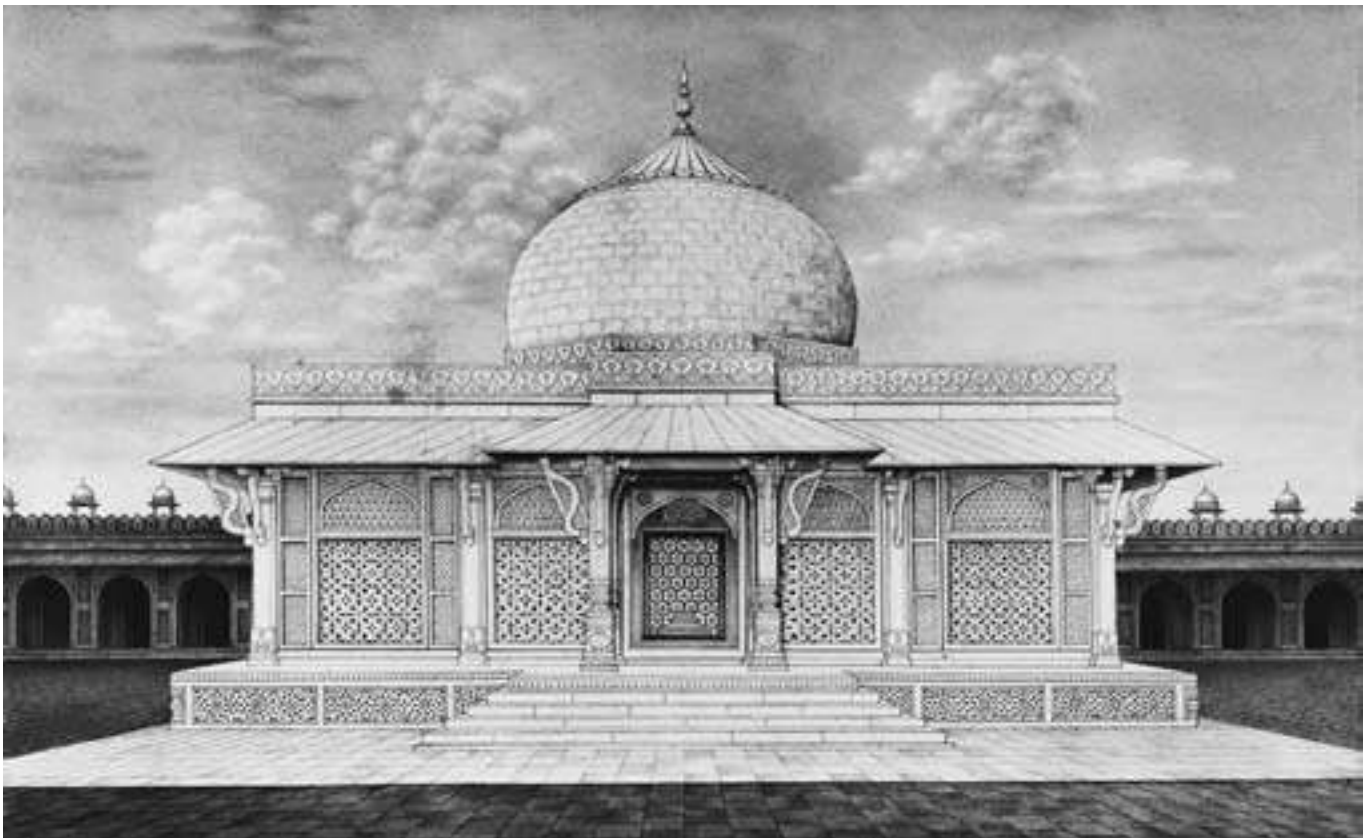
Graves in Korea take the form of mounded earth and stone tombs, often with a square shape. Near Pyongyang in northern Korea, mounded tombs of various sizes are found clustered together. For example, one tomb cluster near the northern Han River contains mounds ranging in size from 20 to 200 feet in diameter. Some of the tombs are decorated with paintings, one of a warrior riding an armored horse and a group of noblewomen wearing pleated skirts. Some also contained pottery.

Another tomb form from the period is the pyramidal stone tomb. These tombs have the appearance of multitiered pyramids and sometimes contain several burials. Grave goods in one of the tombs near the Han River included a pottery steamer, farming implements, spearheads, and pottery. Jar burials also have been discovered in Korea, usually composed of a large and a small jar placed mouth to mouth to contain the full body of the deceased. The jar burials are found clustered atop keyhole-shaped or square earthen mounds. Jar

burials had few grave goods, suggesting that they probably were not linked to social status.

Jar burials also have been found in Vietnam and throughout Southeast Asia. These large, lidded burial jars contained fragmentary skeletal remains of one or several individuals, some of whom may have been cremated, along with incised smaller vessels, metal jewelry, beads, and tools. Near the Sulu and Celebes seas in Southeast Asia jar burials were secondary burials, where the bones of the deceased had been cleaned and prepared elsewhere and then placed communally in the vessels. Small decorated vessels, metal objects, beads, and jewelry accompanied these burials.

In the Philippines burials frequently involved the interment of the deceased in a wooden coffin under or near the person's house site. Commoners and slaves were interred in simple wooden coffins with grave goods related to their life activities, such as weaving or fighting. Elite mortuary rites were more complex and their graves more elaborate than those of commoners. Leaders were wrapped in shrouds and placed in wood-railed pits under their houses along with grave offerings, such as Chinese porcelain, gold ornaments, decorated weapons, and aromatics. The number and quality of grave of-



Tomb of the Sufi saint Shaikh Salim Chisti (15th to early 16th centuries) at Fatehpur Sikri, India, watercolor on paper (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1907-192)



Mortuary figure of a female dancer, earthenware with three-color lead-silicate glaze, Tang Dynasty, China, first half of the eighth century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1949-27)

ferings and mortuary customs, as elsewhere in Asia, reflected the social position of the deceased and the ability of the family to provide these goods and rituals.

One of the most famous burial sites in the Pacific islands is that of Chief Roy Mata in Melanesia. According to legend, after his death the chief's body was displayed in the villages over which he ruled. He was then buried along with members of his kin group. Archaeological research has revealed a central male burial, accompanied by several pairs of males and females. Although the males were found lying on their backs, the females were found in positions suggesting that they had been buried alive, with some clutching their partners. Between Chief Roy Mata's legs was a bundle burial, possibly the remains of one of his ancestors. Found in the graves were shell beads, pig tusks, and shell bands. In other parts of

the Pacific islands are unmounded burials, burial mounds, and megalithic tombs, which incorporate large stones and stone slabs.

Although they are dated to the centuries immediately following the medieval period, accounts from European explorers provide insight into medieval mourning and burial practices in the Pacific islands. For example, in Tonga mourners burned or beat their cheekbones with their fists until they bled, and they carved or burned concentric circles into their arms. Males were reported to hit their heads with clubs, knock their teeth out with rocks, and stick spears into their bodies as signs of mourning. Another common feature of Tongan burials was covering the grave with sand and black and white pebbles collected as part of the funerary ritual.

Early burials found in New Zealand bear similarities to those found in parts of Oceania. Some burials in New Zealand and the Pacific islands included adzes, personal ornaments, fishhooks, and other grave offerings that were strikingly similar to each another in style and were located in or close to settlements. At several early Maori sites in New Zealand individuals, probably members of the same kin group, were found buried in clusters close to habitation areas. Each individual was interred in a shallow grave in either a flexed or an extended position, with one or more large stones placed at the deceased's head or feet or right above the body. Secondary burials in these graves are known from the period as well. When present, grave goods included food offerings, perforated moa eggs, adzes, and personal effects of the deceased.

Mortuary customs among early Aborigines in Australia were diverse and included partial dismemberment and drying, ritual consumption of the body, cremation, interment in a shallow grave, or placement in a hollow tree or rock crevice. On the coast of eastern Australia a cemetery was uncovered at Broadbeach that contained the remains of at least 140 people. Burials were mostly secondary burials in bundles of bark or animal skin. Some primary burials also were found, and it has been suggested that these may represent the defleshing stage before the final burial. One of the best-excavated cemeteries is on the Murray River at Roonka Flat in south-central Australia.

EUROPE

BY JUSTIN CORFIELD

The medieval period saw significant changes in the system of burial in Europe. This was largely because of the spread of Christianity: The common pagan practice of burying people north-south was replaced by the Christian tradition of burying people east-west. This practice is mentioned by Bishop Hildebert of Tours, writing in the 12th century: "A man ought

so to be buried that while his head lies to the West his feet are turned to the East, for thus he prays as it were by his very position and suggests that he is ready to hasten from the West to the East.” In addition, people were no longer buried along the side of roads, as was common in Roman Europe, but rather in official burial grounds organized by the Anglo-Saxons and the Jutes. Burial grounds soon were placed in churchyards.

Many people in Roman times were buried alongside roads outside the city walls. Because it had been common for hundreds of years, this practice continued in Italy after the collapse of the Western Roman Empire, especially in Romano-Celtic Britain and Gaul during the late fifth and early sixth centuries. The Anglo-Saxons tended to use particular sites at which to bury their dead, usually with valuable objects. Initially, during the invasion of Britain in the fifth century, the Anglo-Saxons used boat burials. It was thought that this sort of burial allowed the honored dead to sail to Valhalla, or heaven. The most elaborate excavated to date is at Sutton Hoo, near Woodbridge, Suffolk. There, in 1939, archaeologists found mounds and the remains of boats, along with the most famous of all finds—a helmet similar to those found in eastern Sweden.

As the Anglo-Saxons moved inland from the coastal regions of Britain, they stopped burying people in boats. There is clear evidence that many of their burial sites were used for many generations, sometimes several centuries, showing that the local community had earmarked a particular spot for burial. Unlike the Anglo-Saxons, the Vikings continued the use of ship burials for many more centuries and occasionally buried people within stone circles set up like a boat, as in Højstrup and Bække in Jutland, Denmark. At the Viking cemetery at Lindholm Høje archaeologists have studied as many as 700 graves, many containing cremated remains. Vikings also used stone markers, often inscribed with the name of the person buried.

With the growth of Christianity throughout Europe, burials started to be organized by church authorities. Christians believed in the resurrection of the dead—meaning the actual physical body—and early on they were opposed to cremation, which would not preserve the physical body. Before death people were given the “last rites” by a priest, who would be summoned and would arrive preceded by a person ringing a handbell. After the rites were uttered, a crucifix would be held before the dying person. As death approached, the doors and windows of the room were opened to allow the soul to go to heaven unhindered. For some monks and pious laypeople, the body might be laid on the ground to show humility. Family and friends were usually present at the time of death.

In Christian Europe when a person died, the preparation of the body for burial was the task of women, who washed the

naked body and wrapped it in a shroud made from linen. In England the face was covered, though this often did not take place elsewhere in Europe. The body of Edward I of Britain (r. 1272–1307) was intricately wrapped, with care taken over each finger. Such care would not have been taken with most people buried in shrouds. Wealthy people had their bodies placed in a wooden coffin prior to burial. (Edward’s body was placed in a lead casket.) Sometimes the coffin would be used for burial, but on many occasions it was only for transport. Remains of the wooden coffin of Saint Cuthbert (635?–87) survive and show that it was decorated with stylized images of Jesus Christ, the Virgin Mary, the Apostles, the Archangels and Evangelists. Only occasionally were bodies embalmed, which involved opening up the person’s body, removing the organs, immersing the body in alcohol, inserting herbal preservatives through cuts into the body, and finally wrapping the body in sheets.

During a funeral procession pallbearers would carry the coffin, and in the case of famous people, such as rulers, crowds of people would come to pay their respects. Such a scene is represented on the famous Bayeux tapestry, which portrays the events surrounding the Norman invasion of Britain in 1066. The scene shows a group of men watching the coffin of the English king Edward the Confessor (r. 1042–66) being carried to Westminster Abbey—the only surviving image of a Saxon funeral. By the Middle Ages, if a member of a city guild was to be buried, it was expected that all members of the guild would come to the funeral. Sometimes people al-



Funerary badge, probably a memento from the funeral of Edward of Woodstock (known as the Black Prince) at Canterbury Cathedral in 1376, Britain (© Museum of London)

lotted money in their wills for a requiem—a special mass for the dead; others had the church fees paid by their families. The English cardinal Henry Beaufort (d. 1447) left enough money for 10,000 masses in his honor, and King Henry V (r. 1413–22) of England provided for 20,000 masses to be said for his soul.

The catacombs—subterranean tunnels and rooms—where skeletons were stored in early Christian times were replaced by burials in church crypts and in-ground burials in churchyards. Throughout the medieval period wealthy people could be buried inside churches—often in return for benefactions, or charitable donations, or for faithful service in the case of clergy. The ordinary parishioners typically were buried in the grounds of the church, which were considered consecrated, or declared sacred. Generally the sites of graves were marked with either a wooden or a stone marker, and the bodies were buried clockwise around the church, with land reused when needed—usually after several centuries, by which time the previous body had decomposed. Traditionally, people who had been executed were buried face down, and those who had committed suicide were buried nearby on unconsecrated ground. In cities the use of churchyards for burials presented space problems, so burials began to take place in churches outside the walls of the city.

There were exceptions to the choice between burial inside a church or in a churchyard. When many bodies had to be buried quickly—such as after a battle or during an epidemic—mass pits were used. This could occur after a battle or during an epidemic, as was the case during the Black Death (bubonic plague) in Europe in the mid-14th century. Some societies, mainly on the Continent and especially in the Mediterranean, adopted the custom of burying people in a mass grave until the bodies decomposed and then exhuming the bones and storing them in ossuaries—which might be as large as a building or as small as a chest. The Sedlec ossuary, a Roman Catholic chapel beneath the Church of All Saints at Sedlec, a suburb of the town of Kutná Hora in the modern-day Czech Republic, contains some 40,000 skeletons believed to date to the 13th century.

Most kings, queens, and nobles were buried within cathedrals or churches, with their places of burial marked by significant monuments in marble and stone, often giving detailed descriptions to highlight their contributions. Nobles frequently were buried in the churches attached to their castles or, for lesser nobility, in the nearby parish church. In the 14th and the 15th centuries, mainly in Britain but also at some other places in Europe, their tombs were decorated with embossed brass reliefs. In most cases the base of the tombs were carved from a single block of stone.

People visited the graves of famous people, and some tombs even became places of pilgrimage. In 813 a grave found near Santiago de Compostela in northeastern Spain was said to have been revealed supernaturally as being that of Saint James, one of the 12 apostles, who was martyred in Jerusalem in 44. Despite early skepticism, the new shrine in the cathedral started attracting pilgrims from around Christian Europe. At Glastonbury Abbey in Somerset, England, a grave said to be that of the legendary King Arthur also had many pilgrim visitors. After Edward the Martyr, king of England (d. 978), had been murdered, his body was briefly hidden in the hut of a poor blind woman before being interred at a nearby church at Wareham in Dorset and then moved to nearby Shaftesbury Abbey. The blind woman was said to have recovered her sight, and a series of similar miracles followed the body from Wareham to Shaftesbury. As a result, the king's grave became a place visited pilgrims, in particular those who were blind.

THE ISLAMIC WORLD

BY BABAK RAHIMI

Like Judaism, Christianity, and Zoroastrianism, Islam recognizes the doctrine of resurrection, in which people's souls and bodies reunite on the world's last day so that they may face judgment by God for their deeds on earth. Death plays a pivotal role in the Islamic narrative of resurrection, described as a threshold through which humans are brought to face the final Day of Judgment; the Koran states, "Man shall on that day be told of all his deeds, from first to last. Indeed, man shall bear witness against himself, plead as he may with his excuses." Death is universal, according to the Koran, but not all humans are aware of their mortal reality. In a sense, the human understanding of death can be said to take one of two forms: either rejection or acceptance of a hereafter, a notion often associated with belief in an omnipotent God.

By the tenets of Islam, death should be considered at all times and viewed as merely a crucial stage in the preparation of the soul for the day of resurrection, when good souls shall be granted eternal life in heaven; unbelievers, by contrast, will suffer eternal torment in the fires of hell after their death on the earth. Free will plays a central role in this eschatological concept of death, since individuals are understood to choose their fates—and, at times, their deaths—through their behavior in the earthly world. However, predestination, too, figures in the Islamic notion of death, since both believers and unbelievers can experience their mortality in relation to the power of divine will. Thus, the destiny that ultimately determines the death and life of a human being can be understood to rest in God.

With the rise of Hadith literature, or literature relating to traditions established by Muhammad, in the two centuries after the Prophet's death (in 632 C.E.) new sacred canonical texts emerged introducing a legal system of practices and doctrines to the Muslim community. Hadith literature played a central role in determining how Islamic jurists ought to conduct various forms of funerary rites in order to treat the dead in a religiously appropriate manner. Based on this literature, precise religious rulings, called *fiqh*, were carried out by diverse medieval Muslim communities, highlighting shared patterns of funeral practices.

Central to the Koranic concept of resurrection is the belief that the decomposed, scattered corpses of the deceased will be recomposed for the Day of Judgment. The ritual treatment of the corpse, accordingly, has played a significant role in Islamic history, especially in the medieval period. As with birth and marriage, medieval Muslims held diverse attitudes toward death, such that various practices were employed in the treatment of the corpse. Nevertheless, in accord with overarching Islamic theology and practices, Shia and Sunni communities alike have shared certain funerary customs. Also, Islamic death ceremonies share many features with Christian and Jewish ceremonies, as the ritual of earth burial plays a predominant role in the funerary proceedings of the three religions.

Medieval Muslim funerary rites usually involved the three stages of preburial, burial, and postburial proceedings. For deceased males, in the preburial stage, bereaved women of the family and community would wail, and senior male family members of the deceased—or hired hands—would wash the corpse three times, in order to protect it from earthly contamination. In the case of a deceased female, usually the senior female members of the household or professional corpse washers would perform the washing. The washing ritual would resemble the ritual ablution performed by Muslims before prayer in being a physical and symbolic display of entering a temporary stage of bliss and meditation.

Fragrance would be applied to the body, which would then be covered with clean cloth or a shroud, called a *kafan*, which was usually white but at times green—especially if the deceased was believed to be a descendant of the Prophet. The only two exceptions to this particular ritual performance occurred when the person had died while performing the ritual purity (*ihram*) ceremony during the pilgrimage to Mecca or when the person had died a martyr's death while fighting for God. In such cases, the body would be quickly buried with the clothes on without the performance of the washing ritual. Otherwise, the washed body would be taken to the cemetery on a bier before the end of the first day of death. The place of burial typically would be somewhere outside a city; however,



Tombstone, marble, Iran, 12th century (Los Angeles County Museum of Art, Gift of Nasli M. Heeramaneck, Photograph © 2006 Museum Associates/LACMA [M.73.7.1])

at times a Muslim cleric or major saint would be buried in a mosque. At the burial stage a cleric or pious man would lead the prayer for the deceased, and the assembly of faithful, both men and women, would recite the prayer and patiently attend the burial. The body would be placed in the grave with the head facing in the direction of Mecca. Immediately after the burial, food would be offered to the family of the deceased, completing the burial stage.

The postburial stage would include the performance of three major commemorative ceremonies: mourning ceremonies on the seventh and 40th days after the death and on the first anniversary of the death. In these ceremonies animal slaughter, communal feasting, and public recitation of the Koran and sayings of the Prophet would be central features. After the first anniversary ceremony the family of the deceased would occasionally visit the grave, washing the tombstone with water and performing prayers.

According to certain Sunni theological schools of thought, attending to the deceased after the proper stages of

burial is a sign of *jahl*, or “ignorance,” recalling the pre-Islamic period of pagan cults of ancestor worship. Since belief in the absolute greatness of God is the central principle of the Islamic faith, such schools contend, no Muslim should associate any divine power with any earthly phenomena, including the deceased—regardless of how saintly their lives on earth were. For most medieval Sunni theologians, crying at or attending to the grave of the deceased was a sign of *shirk*, or associating partners with God, who alone was to be praised and worshipped.

Given this perspective, prohibitions from and restrictions on visiting graves or performing ceremonies at the tombs of the deceased, especially the shrines of Muslim saints, became major legal and theological issues for Sunni scholars. Theologians like Malik Shafii, Ahmad ibn Hanbal, and Abu Hanifa, whose teachings based on their interpretations of the Hadith literature became the basis for Islamic jurisprudence in medieval times, proposed new religious rulings with the purpose of regulating funerary practices such as tomb and shrine building. For Hanbal, for instance, constructing buildings over graves or tombs was not to be forbidden, but it was to be discouraged for potentially being an evil act. According to Abu Hanifa, funeral buildings were not to be discouraged, because the intentions of the Muslims who visit the grave of the deceased were of primary importance.

The Sunni theologians’ disapproval of certain funerary ceremonies, including wailing and the performing of prayers over graves, was in fact a direct assault against the spread of Shia Islam in the 10th and 11th centuries. Since Shiism promoted the culture of martyrdom, including the ceremonies of wailing and tomb building for the deceased—in particular, for the holy imams whom Shiites believed were martyred by the Sunni caliphs—Sunni theologians found political motives for imposing greater restrictions on funerary proceedings. Such regulations thus served the purpose of distinguishing Shia and Sunni communities, with the latter considering themselves alone to be the true Muslims. The politics of tomb and shrine building played a predominant role in the shaping of medieval Muslim communities, as Shia and Sunni theologians debated the sanctity of funerary architecture, making reference to various collections of Hadith literature. In the medieval Islamic world funerary ceremonies became not only major theological concerns, regarding the proper Islamic manner for the burial of the deceased, but also political statements for various Muslim communities seeking to legitimize their Islamic identities.

See also ADORNMENT; ARCHITECTURE; ART; BUILDING TECHNIQUES AND MATERIALS; CLIMATE AND GEOGRAPHY;

CLOTHING AND FOOTWEAR; CRAFTS; EMPIRES AND DYNASTIES; FESTIVALS; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; HOUSEHOLD GOODS; LAWS AND LEGAL CODES; LITERATURE; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SACRED SITES; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; WAR AND CONQUEST.

FURTHER READING

- Nancy J. Akins, “The Burials of Pueblo Bonito.” In *Pueblo Bonito: Center of the Chacoan World*, ed. Jill Neitzel (Washington, D.C.: Smithsonian Institution, 2003).
- Walter Alva and Christopher Donnan, *Royal Tombs of Sipan* (Los Angeles: Fowler Museum of Cultural History, 1994).
- Robert D. Baird and Alfred Bloom, *Indian and Far Eastern Religious Traditions* (New York: Harper and Row, 1972).
- Anthony Barrett, *Dying and Death among the Turkana* (Eldoret, Kenya: Gaba Publications, 1987).
- Paul Binski, *Medieval Death: Ritual and Representation* (Ithaca, N.Y.: Cornell University Press, 1996).
- James A. Brown, “Spiro Art and Its Mortuary Contexts.” In *Death and the Afterlife in Pre-Columbian America*, ed. Elizabeth Benson (Washington, D.C.: Dumbarton Oaks, 1975).
- Rupert Bruce-Mitford, *The Sutton Hoo Ship-Burial* (London: British Museum Press, 1975).
- Christopher Daniell, *Death and Burial in Medieval England 1066-1550* (New York: Routledge, 1997).
- William Wayne Farris, *Sacred Texts and Buried Treasures: Issues in the Historical Archaeology of Ancient Japan* (Honolulu: University of Hawaii Press, 1998).
- Abu Hamid al-Ghazali, *The Revival of the Religious Sciences*, Book 40, *The Remembrance of Death and the Afterlife*. trans. T. J. Winter (Cambridge, U.K.: University of Cambridge Press, 1995).
- Roberta Gilchrist and Barney Sloane, *Requiem: The Medieval Monastic Cemetery in Britain* (London: Museum of London Archaeological Service, 2005).
- Clare Gittings and Peter C. Jupp, eds., *Death in England: An Illustrated History* (New Brunswick, N.J.: Rutgers University Press, 2000).
- Leor Halevi, *Muhammad’s Grave: Death Rites and the Making of Islamic Society* (New York: Columbia University Press, 2007).
- Leah Kinberg, “Interaction between This World and the Afterworld in Early Islamic Tradition,” *Oriens* 29–30 (1986): 285–308.
- Randall McGuire, *Death, Society, and Ideology in a Hohokam Community*. Boulder, Colo.: Westview, 1992.
- A. S. Tritton, “Muslim Funeral Customs,” *Bulletin of the School of Oriental Studies, University of London* 9, no. 3 (1938): 653–661.
- James Vreeland and Aidan Cockburn, “Mummies of Peru.” In *Mummies, Disease, and Ancient Cultures*, eds. Aidan and Eve Cockburn (Cambridge, U.K.: Cambridge University Press, 1998).
- Alford Welch, “Death and Dying in the Qur’an.” In *Religious Encounters with Death: Insights from the History and Anthropology of Religions*, eds. Frank Reynolds and Earle Waugh (University Park: Pennsylvania State University Press, 1977).

► drama and theater

INTRODUCTION

People in general enjoy spectacles, from fireworks displays to well-told stories, which implies that theater of some sort probably dates from early in the existence of modern humans. In the stone age societies that have survived to modern times, singing, dancing, storytelling, and the acting out of stories tend to be important aspects of community life. Indeed, such displays seem to help to bind communities together.

Some historians place the beginning of drama with the ancient Greeks, who may have been the first people to develop a theory of dramatics. But this would be to dismiss the elaborate dances of the ancient Egyptians and the rituals of death and new life celebrated in Mesoamerica as well as to exclude the performing arts of the Islamic world before the 1800s, when Western drama was introduced, and in Africa even to the present day—simply because the peoples of these places did not conceive of drama and theater in the same way as the ancient Greeks. During the medieval era the peoples of the world developed many different traditions for public performances, from the intimate dance parties for women in Muslim homes to the huge community events of the Maya. If there is a common thread among the different performing arts of the varied cultures of the medieval era, it is that in each performance an audience was looking for something extraordinary. In the dances of North Americans the extraordinary might have been bridging the gap between the spiritual and material worlds through dance. In Europe it might have been capturing the nature of the divine, if only for an instant, in the portrayal of biblical events. In China it might have been in the perfecting timing of the pitch of a singer's voice with the notes of a flute.

It may be in the hope of witnessing something extraordinary that audiences found their pleasure and their disappointment. In the Byzantine Empire actors were often held to exacting standards by audiences who knew plays by heart. The failure of an actor in gesture or word to match audience expectations could have led to disappointment and even anger, but a performance of exquisite precision, with every cadence right and every gesture measured just so, could leave an audience amazed and eager to return for another performance.

The idea of a returning audience was important, because returning audiences meant more money for the professional performers or satisfied followers to the religious or government leaders who sponsored the sacred dramas, dances, or other performances. The relationship between a performance and the audience was a tricky one, and it was one that government and religious authorities had trouble controlling. Ancient Roman leaders had seen value in keeping populations

distracted from their troubles by giving them violent games and comic theater, but other leaders saw danger in the theatrical arts.

Writers and performers sometimes found themselves in the difficult position of wanting to remain alive and wanting to satisfy audiences who may have been very angry toward authority. In the Byzantine Empire and the Near East a way out of the position would be to avoid cities and to play only in remote areas, far from the interest of central governments or religious authorities. On the other hand, few performers became rich from what the rural poor could pay. Governments and religious authorities often tried to shut down forms of public performance that threatened the status of leaders or seemed to stir audiences to behavior that seemed out of control. Such audiences were out of the authorities' control. Still, efforts to suppress local dance traditions in North Africa, the Passion play of late medieval Europe, and satires and parodies of all kinds almost everywhere at one time or another usually failed. The shadow puppet plays in Cairo would relocate when their performance was suppressed—moving out of the city if necessary—and they would continue to draw audiences that laughed at and argued with the characters.

This brings up another nettlesome problem for performers: the degree to which an audience should be encouraged to participate in the action. Should the performers—singers, dancers, or actors—behave like dictators themselves, governing everything an audience is allowed to do, or should they behave like a Vice figure in a European morality play and strut among the audience, exchanging jibes and jokes according to what the audience seems to want? The answer to that question in the medieval era differed from performer to performer and was shaped by custom, skill, and the hope of having another audience again on another day.

AFRICA

BY DIANNE WHITE OYLER

Drama and theater in medieval Africa does not correspond to our present-day notion of drama. The modern Western concept of drama was established in 350 B.C.E. by Aristotle in the introduction to his *Poetics*. According to Aristotle, a drama must be performed on a stage to communicate a message through dialogue and movements provided by a text to an audience drawn into an imaginary world. In the medieval African setting, however, the stage was not limited to a specific type of building or location. The action might occur at any place in the community where the actors and the audience could engage the world of the unknown. Performances were staged outdoors in public locations in the community. In addition, there was no separate class of performers in the

medieval African theater. All members of the community participated in the production as either the leaders or the audience.

African drama during the medieval period was both religious and secular. Many of these productions were ritual dramas on religious topics. The type of drama that was staged for a preliterate audience was oral, and as it was passed down from one generation to the next, community members were charged with maintaining its accuracy. Small changes occurred during this process until the text became fixed through transcription. This type of drama is considered unconventional by contemporary standards because it seems to lack dialogue and plot. In the performance of ritual drama, however, dialogue is replaced by the interchange of songs among the performers, which brings the drama to an emotional climax. Written drama in this period was confined to societies that had generated indigenous writing systems before the Arabic, Greek, or Roman alphabets were imported. These alphabets were not used until the continent became more closely involved in an emerging global economy.

Religious drama in Christian and Islamic Africa focused on liturgy. Christian liturgical enactments began in the church to teach the general population about events in the Bible or in church history. When these performances became too secular, they moved out of the sanctuary and generally were referred to as mystery plays. In a similar fashion Islamic mystery plays commemorated important events in Muslim religious history.

Although the retention of oral and written texts was managed differently, the theatrical performances included some of the same techniques, including storytelling, singing, music, movement, and dance. These performance techniques provided nuances of the story that could not be represented adequately on the written page. For example, the performer might use repetition to create a mood or to provide continuity from one part of the story to another, using one or more techniques to produce the transition.

One important feature of African theater in the medieval period was audience participation. African theatrical performances were not passive experiences. The priests, the organizers and directors, and the members of the audience were active participants in the production, which might contain the use of call-and-response techniques among the actors or between the actors and the audience. The production might also include a chorus using repetitive phrases to heighten the tension as the story is being told.

Both written and unwritten dramas were performed for communities in which most of the members were not literate. The performance might be either private, for an immediate family with few or no outside viewers; or public, presented

at religious shrines where the priest, theater organizers, and members of the audience participated in the performance. Written texts were produced for religious plays staged at the temples of specific gods. Before staging the play, theatrical performances prepared the audience for its participation in the event.

In a preliterate society the audience judged the quality of a theatrical production on the basis of performance techniques and their own aesthetic sense derived from the local context. These audiences also judged the accuracy of the rendering of the unwritten text because members of preliterate societies shared the knowledge of the unwritten text as a part of their socialization. While the performance might change to reflect the aesthetic preferences of different communities, the unwritten text—the facts as the community understood them—remained unchanged. The same can be said of the audiences of written dramas. The audience judged the production according to aesthetic standards based on the general sensibilities of the community. While preliterate audiences compared the content to their common knowledge of the story, literate audiences evaluated the production on its accurate portrayal of the written document.

Many societies in western and central Africa participated in masking dramas, which portrayed the relationship between the lives of the community and the lives of the spirit world. This specialized knowledge was entrusted to specific groups whose responsibility was to represent anonymously the spirits, who were identified by masks. The actors' bodies were completely covered. The mask might represent the spirit in a courtroom setting, in which a conflict among members of the community was resolved, or in a religious setting, in which the community was brought back into harmony with the moral values of its worldview.

Other societies in these regions participated in ritual dramas of spirit possession. Specialized knowledge of this type of ritual drama was entrusted to specific individuals or to a group who sought to be conduits between the spirit world and the everyday physical world. They asked the gods for wisdom in solving problems that appeared to have no solutions, such as problems of fertility. The spirit-mediums called upon the spirit world. When the mediums made contact with the spirits, they fell into a trance, allowing the spirits to speak through them to provide insight into the problem. Even though Islam or Christianity became dominant in many parts of Africa, spirit-possession dramas coexisted as a cultural practice or went underground. The dramatic performances required women to dance and sing in honor of spirits who had no place in Islamic or Christian societies. The local communities, however, felt that they must acknowledge the spirits.

The most important dramatic performance in these regions of medieval Africa was in the oral tradition, a form of storytelling usually in the form of an epic poem. The oral tradition, a story that is passed down from generation to generation, is chanted or sung and is accompanied by musical instruments such as drums, stringed instruments, or xylophone, dance, and audience participation. Although each ethnic group has a term to designate its official storyteller or historian, the general term used by the French is *griot*. The griot caste of oral tradition specialists is responsible for maintaining the collective memory of the local community or, in the case of the king, a royal genealogy and historical record. In addition to being responsible for this specialized knowledge, these specialists must learn complex language skills, mnemonic devices, and performance art. Even though this is specialized knowledge, the entire community participates in the rendering of the oral tradition because they know the stories, the genealogy, and the history from their own points of view and judge the presentation on the basis of aesthetic quality and content accuracy. One important oral tradition from the medieval period is the epic of Sundiata, which includes songs, short stories, ritual dances, and music to recount the founding the empire of Mali in 1235 by Sundiata Keita.

During the medieval period people in preliterate Egyptian societies performed unwritten ritual dramas, while those in literate societies performed ritual dramas recorded in indigenous writing systems, hieroglyphs as well as Greek in the region of the Nile Delta. Coptic Christian priests used dramatic techniques in presiding over funerary festivals in their churches, while some Christian churches in Egypt, Axum, and North Africa produced mystery plays. The Arabic dramatic tradition migrated to Africa through the military conquest of North Africa in the seventh century and through trade and migration to eastern and western Africa through the eighth century. The indigenous people who converted to Islam maintained their own dramatic traditions in addition to those that were borrowed from their new religion.

The Muslims brought with them the dramatic rendering of pre-Islamic poetry that had been collected and transcribed by Islamic clerics. This poetry was performed using such performance techniques as song, dance, rituals, ceremonies, and instrumental music. The narrator traced the sequence of events, creating verbal imagery through the dramatic techniques of imitation and impersonation. Narrators or storytellers in the genre of *hikaya* ("story" or "tale") presented another type of dramatic performance by singing the account and accompanying themselves on musical instruments, occasionally punctuating points in the narrative with gestures or movement. One type of storyteller recited romance stories at coffee shops in the evening during religious festivals.

During the medieval period the region of northern Africa known as the Maghreb—modern-day Tunisia, Algeria, and Morocco—was a crossroads of commerce and culture. The indigenous Berbers had a distinctive oral literature that included poetry, folktales, and drama based on local topics. The peoples of the Maghreb had a type of puppet theater as well as oral narratives that were performed as songs at local festivals. The celebrations included dances, songs, and chants from pre-Islamic to religious rituals. The *al-halqa*, or "circle," was a popular theater with a narrator who beat time on a drum, telling familiar stories to an audience that gathered in a type of theater-in-the-round.

THE AMERICAS

BY ALESSIA FRASSANI

Drama, including ritual dance, music, and chanting, is an important aspect of indigenous American art, religion, and political ideology. Dramatic performances were embedded into religious festivals and political celebrations rather than being pure entertainment. With the notable exception of the *Rabinal Achí* of highland Guatemala, no literary theater exists from pre-Columbian America. Archaeological and historical findings, on the other hand, inform us about parades, pageants, and civic ceremonies that were carried out according to ritual or agricultural calendars, to celebrate victories in war or the accession of kings and emperors, and to honor ancestors. Amerindian drama relied heavily on audience participation. Everyone was required to maintain the proper ceremonial behavior and perform such specific rituals as bringing offerings.

Sources for drama in the medieval Americas are either archaeological or literary/historical. The latter sources are available only for the period immediately before the Spanish conquest. Starting in the 1530s Spanish officials and clerics, eager to document the peculiarities and achievements of the newly encountered civilizations, began to compile texts and descriptions of Aztec and Inca theatrical and religious performances. The Spanish were struck by the religiosity of the Amerindian people and their fondness for ceremonial and deferential behavior towards rulers and deities. Pre-Columbian cultures were basically oral; writing had a restricted role and was practiced only by the elite. Painting and weaving were the most important means of preserving information, but they were almost completely destroyed by the Spaniards.

For the period before the Spanish conquest, stone carvings, murals, and vase paintings are the only durable testimony to public display of the gods' and rulers' power. Dance and music were perceived to be vehicles for communicating with the gods and forces of nature. Many elaborate costumes

and courtly gestures of the Mayan rulers found on stone carvings have been interpreted as dance costumes and poses meant to enhance the role of the kings as intermediaries between cosmic forces and their divine right to wage war and kill enemies. Battle and presentation scenes on murals also have been interpreted as ritual reenactments of war episodes, carried out within the city borders of the winning party after the actual battle.

Sacrifice, a central element of Amerindian religion, also played an important part in the dramatic arts. It might take the form of simple offerings of food and objects or involve self-inflicted wounds and even human sacrifice. In any case, it was perceived as a necessary act to ensure the continuity of agricultural cycles, royal lineages, and all human activities within the larger realm of nature. Practiced widely in the Americas, the sacrifice of war captives, children, or young women was perceived as the highest form of worship and was the culminating act of public rituals that lasted several days. The victims were sometimes honored like gods for months before the celebrations in which they were killed.

Native North Americans are well known for their rich artistic heritage of dances, music, and public spectacles. Most of the information was recorded by travelers, explorers, and merchants in the 19th century; little archaeological evidence exists to prove that these documented customs were observed in earlier centuries. Given the widely scattered locations of indigenous settlements among both sedentary and nomadic tribes, communal performances were the primary vehicle of social interaction, economic exchange, and family formation. Agricultural or seasonal cycles played a major role. An early British visitor to the southeastern region of North America named John White depicted a dance performed by a group of 15 people circling around carved poles. The performers are adorned with little more than bird feathers. Music is produced by rattles. Scholars have speculated that this dance might have been a harvest ceremony, given the time of year depicted.

According to early sources, animal dances dedicated to family ancestors or to ensure good luck in hunting also were common. Through the dance, which enabled the performers to become animals briefly, family members could communicate with their dead and honor their past. Other forms of drama involved blood sacrifice, such as the Sun Dance among the northern Plains Indians. During this ceremony, boys were introduced to adult society by having their chests cut open and then sewn up by a medicine man. The rite was closely related to warfare and meant to instill courage in the young warriors. Similarly, the native people along the northwestern coast of North America performed highly dramatic rituals during which the actors transformed themselves into frightening and powerful creatures, either mythical or real,

and ritually “ate” the initiates before reintroducing them to the real world as adults.

Between 600 and 800 the Mayan civilization, located in the southern lowlands of Mexico, Guatemala, Honduras, and Belize, underwent a period of expansion. The elites in the major population centers monopolized ritual and drama to sustain a powerful political ideology. Dances enabled the rulers to transform themselves into animals and supernatural beings, thus publicly demonstrating their divine qualities. Depictions of Mayan rulers standing in a frontal position with one heel lifted have been recognized as indicating that the ruler was dancing. Hands raised above shoulder level and wrists held in a twisted position are also indications of dance. The movements and gestures were highly codified; they had specific meanings related to Mayan sacred beliefs. The notion that the ruler’s performance of a public dance had a special power can be traced to a mythological dance executed by two primordial Mayan heroes. According to the *Popol Vuh*, the Mayan account of creation, the twins Hunahpu and Xbalanque performed a dance in front of the lords of the underworld in order to rescue their father from death. In this way Hunahpu and Xbalanque gave humankind the power of defeating death through ritual dancing.

A similar concept of dance as renewal associates Mayan depictions of dancing rulers and gods with the young maize plant. The agricultural cycle of the plant is replicated by the human figure. The position of the legs and outstretched arms indicates dancing, while the elongated head and foliated headdress and back rack signal the dancer’s association with the sprouting plant.

War and sacrifice are other common themes associated with ritual dancing among the ancient Maya. The murals at Bonampak in the southern lowlands and Cacaxtla in central Mexico depict reenacted scenes of battle and the ritual torture and killing of captives. The Bonampak murals date to 790; they are found in a three-chambered windowless edifice. They record a public drama that had taken place not long before the painting was executed. In the first room royal dignitaries are getting ready for the dance, while musicians and attendants holding large fans are rehearsing the performance. The main dancers, including the ruler, wear jaguar pelt costumes and headdresses with quetzal feathers. The second room contains a depiction of a theatrical recreation of warfare. Music is playing during the furor of the battle, and more dramatic effects are achieved by the elaborate costumes of the fighting warriors. In the third room the ruler’s accession ceremony culminates in a sacrificial dance with blood-letting rituals. On the stairs of a giant pyramid numerous figures balance themselves by spreading their arms, waving fans, and wearing oversized plumed headdresses.

Hundreds of miles away from Bonampak there are murals in the Tlaxcalan town of Cacaxtla that show clear Mayan influences. The theme of the murals is related to a ritual war dance as depicted in the Bonampak examples. A series of wall paintings in the main plaza depicts a mythological battle scene. Jaguar warriors dressed in animal pelts with turquoise decorations on their back are shown defeating eagle warriors, who are almost naked and unarmed and recognizable only by their plumed headdresses. Both predators, the bird and the land animal, are associated with military and heroic virtues throughout Mesoamerica.

While most of the evidence of pre-Columbian Maya theater comes from archaeological investigation, an extraordinary text from the town of Rabinal in the Guatemala highlands provides the only extant traditional Mayan dance drama. All forms of pre-Columbian drama were prohibited by the Spaniards after the conquest, which makes the survival of this piece all the more remarkable. Scholars agree that the characters, themes, and overall structure make this piece a truly indigenous drama with no influence of European theater. Recorded by a Belgian priest in the 19th century, the *Rabinal Achí* is still performed today in the Mayan Quiché language. The story takes place in the 14th century and recounts the events surrounding a rebel warrior, the Man of Quiché, who was tried and executed by a former ally, the Man of Rabinal. The play has few characters; most of the dialogue is exchanged between the opposing Rabinal and Quiché warriors. Instructions for the disguises and adornment of the characters show a striking similarity to the depictions at Bonampak and Cacaxtla. The warriors wear jaguar and eagle costumes and are addressed as if they were animals.

The drama has a high moral tone, as the Quiché warrior first challenges the Man of Rabinal and eventually accepts his death by beheading. The piece ends with the farewell of the renegade from Quiché to the mountains and valleys of his youth. The text has a typical native form, with phrasing organized into repetitive verse couplets in which slightly different words and concepts complement one another to create new meanings. This rhetorical device is known throughout Amerindian cultures and is related closely to the oral nature of native drama and literature. The text of the *Rabinal Achí* was also passed down orally for many generations before it was finally recorded in 1856 with its original content and structure intact.

The development of dramatic arts among the Aztecs (ca. 1350–1521) cannot be separated from the rise of the imperial power that dominated central Mexico until the arrival of the Spanish. Ritual and theatrical performances were tightly related to religion and its ideological use by the Aztec political elite. The most important sources for Aztec drama are Span-

ish accounts, especially those written by friars, who tried to divert the natives' love of dramatic public performances from "pagan" to Catholic beliefs. Two friars, Bernardino de Sahagún and Diego Durán, compiled the most important accounts of central Mexican festivals, describing the chronological arrangement, meaning, and forms of the most important dances, hymns, celebrations, and ritual enactments.

From these sources we know that religious drama among the Aztecs was performed according to a ritual calendar. A year was composed of 18 months of 20 days each. Every month was celebrated by a specific set of religious activities. The calendar followed the agricultural cycle, with festivals closely related to rainfall and the planting, growth, and harvesting of the maize plant, the staple food of Mesoamerica. There were special schools in which young men and women were trained as theologians, scribes, and poets in order to preserve the ancient theatrical, literary, and religious traditions. In Nahuatl, the Aztec language, these schools are known as *calmecac* and *tepochochcalli*. The latter school, literally "school for the youth," was open to commoners, while the former, meaning "house of learning," was only for the offspring of the nobility. Although elaborate paintings recorded the songs, hymns, and other religious celebrations, the students were required to learn this information by heart. As adults, they would eventually perform rituals in various capacities.

The common people also participated in public rituals following a carefully ordered series of rituals and offerings. Among all these characters and performers, one stands out as horrible to the contemporary mind. *Ixiptla* is the Nahuatl term for the sacrificial victim of an annual Aztec ritual. The person was chosen on the base of age, gender, and physical qualities and was required to impersonate a god. The chosen person spent months or an entire year preparing for the role, which entailed being treated as a deity with respect and worship. The "actor" learned how to behave, dress, sing, and chant as a deity. The final rehearsal took place the day or night before the celebration, when the music, chanting, and dancing of the accompanying retinue began.

The so-called intermediate area of the Americas, including the Isthmus of Panama on the mainland, the Caribbean Antilles, and the northern portion of South America, did not witness the social, economic, and political changes that affected Mesoamerica to the north and the Andean region to the south. As a consequence, information is scarce and available only for the period immediately preceding the first contact with the Spanish in the 1490s. Among the Taíno of the Greater Antilles (present-day Puerto Rico, Cuba, Haiti, and the Dominican Republic), shamans known as *behiques* performed the most important and delicate public rituals together with the *caciques*, or political leaders. Chanting ac-

accompanied by such traditional instruments as gourd maracas was used during curing rituals. The ceremonial ingestion of *cohoba*, a hallucinogenic substance, further enhanced the power of the performer.

Social memory and customs were preserved through public rituals that involved communal dancing, music playing, and recitation of oral history. Although little information exist about the so-called *areytos*, or religious ceremonies, Spanish witnessed some of such gatherings and confirmed that they were the main vehicle for passing down to future generations the knowledge and wisdom of the ancestors. Ceremonies might last several hours and sometimes kept the clan members dancing all night.

The Moche, who flourished between 200 and 500 C.E. along the northern coast of present-day Peru, are famous for their rich tradition of pottery depicting drama and dance scenes. Musicians often are portrayed in full round, holding and playing panpipes, conch shells, drums, flutes, and whistles. Performers wear large gold earspools and have facial painting or scarification. Standing musicians often have one foot in front of the other, probably indicating that they are dancing. The most complex dance scenes, however, are found in fine line vase painting, a tradition that evolved in Moche art over the course of hundreds of years.

The Moche danced in processions that involved dozens of people. Performers proceeded by rhythmically leaning forward to the beating of drums and creating long lines by holding hands or a long rope. The vases depict group dancing spiraling from the bottom to the top of the vase. In some cases the upward movement clearly indicates the climbing of a platform pyramid topped by a temple. The long line is sometimes interrupted by musicians and usually ends with a leading character facing the dancing crowd. He often holds a goblet used to collect and consume human blood. This figure, together with the appearance of headless or naked characters among the retinue suggests that the dance was performed during sacrificial rituals. The practice of ceremonial human sacrifice has been confirmed by the finding of numerous skeletons and the presence of decapitation scenes in wall decoration.

The Incas dominated a vast territory in the Andean and coastal region of South America from the 1430s to the Spanish conquest in the 1530s. As a result there are written historical sources that complement the archaeological data. The written sources are mostly Spanish chronicles written by eyewitnesses who talked to natives born before the conquest. Some basic elements of Incan drama are similar to their Aztec counterparts in central Mexico and date from about the same period. These similarities, however, are not due to contact between the two cultures but rather to a similar imperial ideology that controlled state rituals and shared pan-Ameri-

can cultural features. Inca imperial power rested largely on a series of public ritual activities surrounding the figure of the emperor and intended to reinforce the social order. Oral tradition, sacrifice, and agricultural cycles continued to be crucial features of dramatic performance. Incan dramas were recited aloud by actors who were members of the nobility. Although some devices were used to memorize the texts, the tradition was passed down to future generations only through oral recitation and chanting. The prose, therefore, was highly poetic and repetitive in nature for ease of memorization. Actors usually engaged the audience in dialogues and choruses. Royal philosophers called *amautas* were responsible for writing historical commentaries and accounts that glorified Inca history and celebrated past rulers. Such recitals were held right before agricultural festivals that engaged the population at large, but were usually restricted to members of the elite.

The Incan calendar was composed of 12 months of 30 days, beginning with the month of Capac Raymi in December, which marked the beginning of the rainy season in the tropical highlands. Also important was the Inti Raymi, the harvest ceremony in June. Celebrations were held in Cuzco, the Incan capital but simultaneously connected the political and religious center with the distant peripheries of the empire. Participation often meant that family members (including children) left the village for several days to attend services in a regional *huaca*, or sacred place.

The most important component of the cyclical festivities was the *taqui*, a Quechua term that refers to participation ceremonies by singing and dancing. Dancers often held a rope of multicolored threads while moving in procession in and around the *huacas*. This was a tradition that had been carried through since the time of the Moche, who lived in the Peruvian region almost a thousand years earlier, demonstrating that the Inca did not invent but rather continued and renovated a long-lasting Andean dancing tradition.

A particularly controversial text titled *Ollantay* is sometimes thought to be at least in part an original pre-Columbian tragedy. The written text dates from the 19th century; some scholars maintain that it reflects too many influences from the classical tradition of Spanish drama to be considered a truly original Inca piece. The plot is set in the 15th century during the reign of the Inca Pachacuti and his son, Tupac Yupanqui, and relates the long and troubled love affair between Ollantay, a general of the Inca army, and Cusi Coyllur, the daughter of the emperor Pachacuti. Their relationship is initially opposed by the emperor because Ollantay is not of royal blood. The courage, honor, and mercy demonstrated by the warrior in a battle against the Inca general sent by the emperor to defeat him nonetheless serves to reunite the couple after 11 years of separation. The recognizably Inca elements

of the drama include the historical setting, the accurate descriptions of Inca imperial policies and organization, the archaic language employed, and a series of refrains typical of Incan poetry.

ASIA AND THE PACIFIC

BY CARYN E. NEUMANN

Drama and theater in the medieval era often differed little from one country in Asia and the Pacific to another. The spread of the major religious doctrines of Hinduism, Buddhism, Confucianism, and Islam brought similar themes to Asian plays. Trade, territorial expansion, and the restless nature of the stage performer all combined to blend dramatic styles across national boundaries. Chinese theatrical traditions dominated in eastern Asia, whereas Indian traditions were predominant in southern Asia; Japan developed its own powerful dramatic traditions. Most of the major Asian theater styles intermingled classical and folk traditions. Original interpretations of the material were not encouraged.

Chinese drama attained its peak of formal and artistic perfection as well as its greatest popularity during the Yuan (or Mongol) Dynasty in the 13th century. About 160 Yuan dramas survive, with 150 consisting of an introduction, four acts, and, occasionally, an epilogue. The sole contemporaneous source of information on Yuan Dynasty playwrights is the *Lu-kuei pu* (Register of Ghosts) by Chung Ssu-ch'eng, written in 1330, about 60 years after the height of Yuan drama had been reached. Kao Wen-hsiu, Po Jen-fu, and Kuan Han-ch'ing, all of northern China, were the most famous and prolific playwrights of the era. Plays were typically performed on stages in temples, a traditional site for Chinese drama. Secular theaters held performances on a platform with a collapsible railing to keep the spectators at a distance. The actor deviated little from the script, while combining song, dance, stylized pantomime, and other stage skills in the performance. The best-known Yuan dramas are *Li K'uei Carries Thorns*, from 1279, about a clerk who becomes a bandit; *Rain on the Hsiao-Hsiang*, from 1246, a folktale about tribulations endured by an exiled man and his daughter; and *The Mo-Ho-Lo Doll*, from 1279, about the Indian Buddhist god Mahoraga ("Mo-ho-lo" in Chinese).

Korea's geographic position has meant that the country has been heavily influenced by Chinese culture and arts. In turn, Koreans introduced performing arts from the continent to the Japanese. The Japanese also were strongly influenced by the introduction of Buddhism in the sixth century, which blended with the Shinto traditions of the country.

Between the seventh and 10th centuries *gigaku* became one of the most popular performing arts in Japan. The art

form came from Korea in 562 when a Japanese envoy returned home with musical instruments, masks, and costumes belonging to *gigaku*. The dance itself, however, was introduced by a Korean performer, Mimashi, who visited Japan in 612. He reportedly had studied in China.

Gigaku apparently involved a procession of at least 40 people performing dances, pantomimes, and music. The leader (*chido*) opened the parade by appearing in a red-headed mask with a wide mouth, a long nose, widely opened and bulging eyes, dark eyebrows, and sometimes whiskers on his chin. His function was to purify the air from any evil influences. He carried a spear and might be accompanied by two assistants. The *chido* would be followed by four people impersonating lions. Lion masks were believed to have the power to heal sickness and exorcise evil spirits. Two actors would portray one lion. They were both draped with one large



Male mask, Japan, early 16th century; the use of masks in dance, court ritual, processions, and religious ceremonies expanded and flourished under the patronage of the Japanese imperial court during the seventh and eighth centuries, when a wide variety of performance, dance, and musical forms reached Japan from Korea, China, and southeastern and western Asia. (Freer Gallery of Art, Smithsonian Institution, Collected by Seymour J. Janow and gifted in his memory by his Family, F2003.5.10)

piece of cloth or with hairy hides. The legs were covered with red trousers and the feet with straw sandals. Children, wearing vermilion masks with large ears and smiling faces, accompanied and led the lion. Fan carriers followed the lions. Groups of musicians and spear carriers brought up the rear. Once the procession reached the stage, the performance consisted of a lion dance, a play about five women that included strong sexual overtones and phallic elements, and a dance by an old man that would end the show.

The Japanese *kagura* appeared in the eighth century as religious entertainment. Dances and songs were performed for the gods, often by actors wearing masks. In the *shishi kagura* wandering Shinto priests with lion (*shishi*) masks performed for the purpose of exorcism and the prevention of sickness. Also in the eighth century the *bugaku* was introduced from Tang China. This art form reflected a high degree of dramatic freedom that was characteristic of the Japanese court arts until the 11th century, when the innovative impulse diminished in favor of stylized forms dictated by highly ceremonial court etiquette. *Bugaku* involved dance accompanied by music.

By the later part of Heian Period (737–1185), *bugaku* expanded to include the chanting of Chinese poems and the performance of folk songs. The performances generally illustrated the values of a peaceful culture. A typical example is *Shundeiki* (Flowers in the Spring Garden). In this play four noblemen dance under the cherry blossoms. The performers generally would wear the official uniform of their court rank and white footgear of thickly knitted silk, with a thin deerskin sole. Props used in *bugaku* consisted of 9-foot-long spears; full-size swords with elaborately ornamented scabbards and hilts; maces; drumsticks; an 8-inch-long coiled serpent; and an oversized jewel painted in five colors. The false jewel would sometimes be made of earthenware and would be deliberately broken during the performance, sending bits of shredded paper into the audience.

The best-known medieval Japanese dramatists are Kan-ami Kiyotsugu (1333–84) and his son, Ze-ami Motokiyo (1363–1443). Both well-known actors, they specialized in the theatrical art of Noh, a Buddhist-influenced drama with a plot that combined music and dancing. Noh plays were filled with quotations and allusions from classical Chinese and Japanese poems, legends, and myths. Noh themes focused on real-life emotions—love, hate, sorrow, vengeance, and jealousy—but the plays were highly stylized. Patronage by the shogun Ashikaga Yoshimitsu elevated the social status of Ze-ami and Kan-ami from the lowest class of society, where actors normally resided. Ze-ami's best-known work, the *Kadensho* (Book of the Transmission of the Flowers) is a treatise on Noh that is based closely on the instructions of his father. Ze-ami names Ichu as one of the best actors of his

father's time while also paying tribute to the younger actor Zo-ami for perfectly blending flute playing and fan dancing. Kan-ami and Ze-ami were pioneers in the effort to synthesize the various Japanese stage arts and to unite them with the realism of the Noh drama.

Cambodian drama and theater were introduced into Laos in 1354 when Prince Fa Ngum left Cambodia to establish an independent Lao kingdom. In costuming, staging, music, and dance, Laotian drama is generally the same as the Cambodian style. However, *mohlam*, a distinctive Laotian style of singing that is accompanied by a musician playing a Lao reed panpipe, continued to be popular during the medieval period. In *mohlam luong*, the Laotian musical style combined with Cambodian dramatic style for a hybrid play.

In Indonesia, *wayang kulit*, or shadow drama, is an ancient form that continued to be widely popular in the medieval period. Mythological heroes and heroines borrowed from the epic stories of the Mahabharata and the Ramayana as well as other legendary books made appearance after appearance on stages. *Wayang kulit* features carved leather puppets manipulated by one puppeteer for about nine hours. The puppeteer, who does not move from his position behind a white cloth screen during the entire performance, speaks the dialogue of each character, chants narration, and sings mood songs. *Wayang orang*, or dance drama, also enjoyed considerable popularity, with music provided by a gamelan ensemble, an orchestra group featuring percussion instruments in particular. It is essentially *wayang kulit* with live actors and a narrator chanting between scenes. The Malaysian *wayang kulit* is clearly related to the Javanese form and apparently was introduced during the medieval era, though its history is murky.

In India several hundred Sanskrit plays survive from the period between 400 and 1000. The plays are romantic works that emphasize the harmony between good and evil while ignoring the brutal realities of life. Ritual was essential to the staging of these works. The plots are often extremely minor, the acting non-naturalistic, and the language highly formalized. Music, dancing, and spectacle were major elements. As in China, temples served as the main theater buildings. As was common elsewhere, acting was a miserably paid profession; as a class, performers were little better off than agricultural workers. Medieval Indian traveling troupes worked in exchange for food and board. At the end of a performance a plate was sent around for donations of coins. Rural troupes often earned their best income from wealthy landowners who would hire a company to entertain during a festival or special family occasion. Women's roles frequently were filled by men and boys. In the period from the 11th to the 16th century there was an increasing push to drive women from the

stage, partly as the result of segregation of women as a tenet of Islam.

EUROPE

BY KIRK H. BEETZ

The early history and development of medieval European drama and theater are murky and have been the subject of debate and speculation among historians for more than a hundred years. There were apparently two fundamental sources for the dramatic forms that developed in Europe: Roman theater and Christian festivals. By the end of the Western Roman Empire in the fifth century dramatic forms called mimes and pantomimes were the most popular theatrical presentations among Romans. Mimes either were unscripted or involved thin stories arranged around jokes, and they featured singing, dancing, acrobatics, and magic acts. They tended to focus on sex and on current events. Dancing, in particular, became a popular entertainment in itself. Pantomimes usually focused on tragic myths and were performed by actors who did not speak. These actors were much admired for their ability to tell stories entirely through skilled gestures, and audiences often knew by heart the gestures required in a particular pantomime. Both mimes and pantomimes continued to be performed into the 600s, when they seem to drop from recorded history for most of Europe. It is likely that acting companies continued to travel though southern Europe performing mimes for hundreds of years longer, perhaps evolving into the companies that staged morality plays.

In the Byzantine Empire the broad comedy that had typified mimes remained very popular. Sexual humor, parodies of political and religious leaders, and jokes about people's foolish behavior in everyday life attracted enthusiastic audiences not only in cities but also in rural areas. If actors hoped to become rich, they needed to establish themselves in Constantinople, but numerous actors scratched out their livings by traveling from audience to audience throughout the empire. Tragedies also attracted audiences, although little is presently known about the tragedies. Byzantine audiences enjoyed listening to singing, and Byzantine tragedies probably included singing or may have been sung in their entirety.

Byzantine pictures of dancers show them wearing costumes reminiscent of those of Persian dancers, and the folk dances of Syria also may have been influential. Dancers seem to have been mostly women and children, who emphasized the swaying of their bodies with clothing that flowed and swirled around them. Dancers often performed in groups, and they may have included acrobatics in their performances, perhaps adapting a custom from Egyptian dancers, who were recorded by ancient Greeks as incorporating acrobatic stunts

in their dances. In Constantinople and perhaps others cities performances that resembled cabaret shows became popular. These shows had a mix of singing, dancing, juggling, and magic acts.

Church authorities tended to believe theatrical productions to be immoral, and they tried to have all performances of plays, singing, and dancing outlawed. Some performers of acrobatics or dancing were prostitutes who made their livings from the patronage of well-to-do clients, creating a seedy image of immorality for those involved in theatrical productions. However, banning theatricals was contrary to the desires of the public at large, and church authorities found themselves fighting for no more than to have performances banned on Sundays.

For the origins of medieval European liturgical drama, historians often look to the performance of the *Quem quaeritis?* This Latin phrase means "Whom do you seek?" It stems from a brief portion of the Easter liturgy, during which Mary the mother of Christ, Mary Magdalene, and Mary the sister of Lazarus approach Christ's tomb and meet angels. An angel asks, in Latin, "Whom do ye seek in the sepulchre, O followers of Christ?" The three Marys answer, "Jesus of Nazareth, the Crucified, O heavenly ones." The angels declare, "He is not here; he is risen, just as he foretold. Go, announce that he is risen from the sepulchre." This little bit of dialogue was introduced to churches large and small in the 900s, probably with nuns playing the three Marys and priests playing the angels in front of the congregation.

The brief *Quem quaeritis?* probably stemmed from the same impulse that inspired clergy to hire artists to depict biblical scenes and figures in statues, paintings, and windows—because these figures helped a mostly illiterate public visualize and understand important aspects of religious thought. Thus, Easter celebrations expanded to include plays. The most important Easter plays were the Passion plays, which may have evolved out of the *Quem quaeritis?* performances that themselves had become ever longer and more complex. A Passion play makes reference to Christ's Passion, his Crucifixion. These plays were popular throughout Europe. At first, Passion plays were serious, dignified portrayals of Christ's suffering and death, but it became the responsibility of the laity to stage and perform the plays, and the laity introduced topical commentary into their performances. By the 1400s the plays had lost much of their dignity and were given over to crude comedy, distressing religious leaders enough that they tried to have the plays banned.

The performance of plays in or on the grounds of churches expanded in the 1100s to include miracle plays. These plays focus on the lives and deeds of Christian saints and heroes. Dozens of them depict parts of the life of Christ's

mother, Mary. They emphasize Mary's role as healer and consoler of people. The oldest extant miracle play, from France in the 1110s, centers on Adam, though most miracle plays tell of people who lived after Christ's birth. These plays depict how people interact with God, and they tend to concentrate on good deeds, conversions to Christianity, and miracles wrought by God through human beings.

Historians disagree as to when mystery pageants evolved; some place the origin of the pageants as recently as the 1300s, while others note that dialects in some of the plays date them to a hundred years earlier. To complicate matters, the pageants often were revised and sometimes were replaced altogether with new ones. How the plays were staged is also the subject of much argument. Some pageants were certainly performed on carts that served as stages and that were drawn through streets of towns or cities, but there is evidence that mystery pageants also were performed in circular theaters or in churches. The best-known and most complete collections of mystery pageants come from England. Pageants and records of pageants have been found in Germany, France, Italy, the Czech Republic, and Hungary.

Mystery pageants were performed as parts of mystery cycles. A complete mystery cycle included pageants covering Old Testament events and figures who presaged Christ, Christ's life through his Crucifixion, and events related to Christ's Resurrection. There frequently were more than 40 pageants in a single cycle. It is known that these cycles were presented in market towns in England and the rest of Europe on mobile stages, usually pulled by oxen or mules. Each pageant in the cycle was the responsibility of a local trade guild that paid for the cart, the scenery, and the costumes. For instance, out of the 48 pageants of the city of York's mystery cycle, the tanners were responsible for the *Creation*, and the *Fall of Lucifer*, the shipwrights for the *Building of the Ark*, the masons for the *Coming of the Three Kings to Herod*, and the carpenters for *Resurrection*. The cycles were presented each spring, with audiences assembling at way stations to watch each pageant as it passed. With different groups responsible for different aspects of Christ's life, it was possible to have several different actors portraying Christ as well as several actors playing other recurring figures.

It is likely that the writers were nuns, priests, monks, and friars. The two playwrights who are most highly regarded by modern literary scholars are the Wakefield Master and the York Realist—their identities as yet unknown, although their plays are recognizable because of the styles of their authors. The Wakefield Master seems to have been called upon to revise some of the plays of the Wakefield cycle and to write a few new ones. The hallmarks of the cycle include a keen sense of dramatic tension and a graceful use of language. The York

Realist is called a realist because of the realistic portrayals of characters and situations in these plays. The *Crucifixion* by the York Realist is still performed in modern times, in America as well as Europe, and it is notable for its chilling depiction

THE YORK REALIST

The first surviving record of the York mystery cycle dates from 1376, when someone left a note about the rent for storing three of the wagons used in the annual performances. By then the performances were a well-established part of life in York. The pageants were performed during the festival of Corpus Christi (about seven weeks after Easter) and drew large crowds of people. Between 1425 and 1433 a master hand wrote or rewrote a total of eight new pageants for the York mystery cycle, focusing on the events surrounding Christ's Crucifixion. This writer is known as the York Realist because of the realistic portrayals of the characters. In the York Realist's pageants characters have the everyday cares and interests of ordinary people, even when they are involved in extraordinary events.

The York Realist wrote these pageants in verse, yet the dialogue of the characters seems sharp, to the point, and commonplace. Of the York Realist's eight pageants, the *Crucifixion* best displays the writer's genius. It has only five characters: Christ and four Roman soldiers. For most of the performance the soldiers have the stage to themselves, with the wooden cross they are constructing. They have workaday attitudes toward their efforts and are even a bit bored. They try to get their jobs done with the least amount of effort as fast as they can. They talk much as members of their audience would have, and their joking could induce laughter in their audience.

Out of this scenario comes the full horror of the events that transpire. The soldiers have drilled holes for nailing Christ's hands and feet to the cross. They have miscalculated the location of the holes, and as they struggle to stretch Christ's arms to fit over the drilled holes, they continue to joke wryly. This drama is a stark portrayal of banal evil, and audience members who earlier laughed at the soldiers' jokes are in the uncomfortable position of laughing along with monsters. When Christ forgives the soldiers for their sins, he is forgiving the audience for their sins as well. Rarely has any dramatist succeeded so well in speaking directly to the heart of the audience.

of the banality of evil as Roman soldiers go about their business of tormenting Christ.

Morality plays were probably the most popular form of drama during the late medieval era in Europe, yet less is known about them than the other forms of medieval theater. Only two are widely known: *Everyman* and the *Castle of Perseverance*. *Everyman* is the title of a play in English from the 1550s, derived from *Elckerlijc*, a Flemish play of the 1400s. *Everyman* is the epitome of what a morality play was intended to be. Its characters are all symbolic, with the main character representing every individual person. Everyman is told that he is about to die, and he must find those who would go with him to speak on his behalf before God. He goes from friend to friend, asking to be accompanied to the afterlife, but his money cannot even get them up off the floor, and Friendship will accompany him to the grave but no farther. Only Good-Deeds goes with him to the afterlife. The strongly moralistic aspect of the symbolism gives rise to the term *morality play*. However, *Everyman* is not a dull play; it is full of humor and surprises.

The *Castle of Perseverance* is at present the earliest-known complete morality play. It is an English play, and one of its fascinations for modern historians is that its manuscript includes diagrams of a theater. The play was performed by a traveling company of actors. They erected a circular wooden wall, probably just outside a town or village, allowing only one entrance, through which customers were admitted. Audiences apparently sat in circles around the center, in which a wooden tower was erected. Actors could pop up among the audience, and the play's action could make its way among the audience. Key figures in morality plays were the Vices. These representatives of evil were allowed to make the jokes that good characters could not, and they were often the delight of the audience—wandering among the audience and cracking jokes about audience members as well as about characters in the play. This method suggests that there probably was a bit of improvisation by the acting company during each performance, adjusting jokes and jibes according to the audience's responses.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Many publications that address the topic of drama and theater in the Islamic world flatly state that the Islamic world had no drama—or at least not until the introduction of European plays in the 1800s. This is an odd bit of cultural myopia, because the Islamic world always had dramatic productions that were immensely popular, often making performers and playwrights famous and wealthy. Perhaps the reason much Muslim theater still goes unrecognized by historians is that Muslims created

their own kinds of theater to suit their tastes. For instance, the staging of plays with humans as actors was morally dubious for Muslims, as such performances could be perceived as violating the same religious laws that forbade painters to depict real people in their work. Consideration for these laws may have led to the very sophisticated Islamic tradition of shadow puppetry, in which real events could be depicted without figures being displayed other than as shadows.

The origins of puppet theater in the Islamic world are themselves shadowy. Islamic puppeteers may have been influenced by Chinese shadow puppet shows, since Muslims had extensive contact with China and are known to have borrowed ideas from the Chinese. Shadow puppetry involved figures manipulated by wires whose shadows were cast onto a canvas screen, with the screen draped between the audience and the puppets. The puppets were usually colorfully painted. The two best-known medieval forms of puppet shows were *khayal al-zill*, meaning “shadows of the imagination,” and *karagöz oyunu*, a form named for its main character, Karagöz. The puppeteer was called *rais al-khayal*, a “shadow master.” A *rais al-khayal* might work alone, putting on small shows on backstreets of cities or in homes in villages. He was expected to perform with his own unique style and interact with the audience; viewers would argue with characters or call out their approval or disapproval of what characters were doing, making each performance a combination of the show itself, audience participation, and the *rais al-khayal* responding to the audience.

A popular *rais al-khayal* could become wealthy and could have several people working for him. Most plays had a *muqaddim*, a narrator and commentator on the action, who could be voiced by the *rais al-khayal* or by a hired actor. A successful troupe could employ several actors to voice the characters, with boys used for the female voices. Rather than make the puppets himself, a *rais al-khayal* could employ a *qassas*, meaning “cutter,” who would make the puppets out of camel skin. A *qassas* worked with a *megariz*, who was responsible for affixing the wires used to manipulate the puppet. A puppet would be about a foot tall, with the camel skin stretched thin enough to be somewhat translucent.

The term *khayal al-zill* originated in the 900s in Cairo, where shadow puppet shows were commonly staged at night. The *khayal al-zill* was especially popular during Ramadan—the month of fasting in Islam—with performances occurring in the evening when the day's fast was broken. A *rais al-khayal* was expected to know at least 30 plays, one for each night of Ramadan. His audiences were usually only men and boys. The *khayal al-zill* was performed for hundreds of years, but the genre's quality rose and sank like genres in the dramatic traditions of other cultures. Playwrights provided scripts

for the *khayal al-zill*, and their subjects ranged from complex theological themes to comedies featuring crude sexual humor. For most of the medieval era the most popular plays were ones that featured exciting battles, and most plays ended with a rousing battle scene; those that did not ended instead with a stirring song. Some political leaders tried to suppress the *khayal al-zill*, as plays often satirized government policies. Efforts to suppress the satirical plays rarely succeeded, however, because they often were what audiences most wanted to see; stages were portable, so authorities had difficulty both in preventing people from staging the plays in homes, tents, or outdoors in remote byways and in dissuading people from attending performances. Word of mouth was usually enough publicity to draw an audience.

The *karagöz oyunu* probably developed among the Turks. This form was named for the everyman character Karagöz, who was the protagonist of every play. Karagöz typically was a boisterous nitwit whose adventures tended to be broadly comical, featuring much slapstick. Topics could involve the high and mighty, but everyday people living ordinary lives were the more common subjects. Disagreements among characters usually were resolved through beatings. Audiences would cheer their favorite characters and laugh uproariously, making performances wild and happy affairs. The characters in the plays were puppets manipulated on a stage above the head of the puppeteer, who would wrap cloth or canvas around himself in a convention his audience understood to mean that he could not be seen.

Of the medieval Islamic world's dramatic traditions, the *ta'ziyah* is probably the most familiar to Western audiences because it involves a story told in action by actors. *Ta'ziyah* is the term for the figurine effigy at the shrines of Shia imams, particularly Husayn ibn Ali, the grandson of the prophet Muhammad. The dramatic form is often referred to as a "Passion play" by Western scholars because it is about the death of an important religious figure, like the Passion plays of medieval Europe were about the Crucifixion of Christ.

The *ta'ziyah* event commemorates the martyrdom in 680 at the battle of Karbala of Husayn ibn Ali, an important figure in the history of the Shia branch of Islam. The play is still presented during the month of Muharram, usually in places where the population is entirely or almost entirely composed of Shiites, because the play could be a source of antagonism for other Islamic sects. In fact, among many Shiite and Sunni scholars the custom has come under considerable criticism, with some often suggesting that it be abandoned.

The presentation usually involves most of a community in weeks of preparation and is often a grand spectacle: For nine days many devout followers of the tradition publicly recite the events of the life of Husayn ibn Ali, often with great

dramatic emotions. During those days men whip themselves bloody while gathered in the streets. On the 10th day a coffin representing that of Husayn is paraded through the streets, followed by a horse representing Husayn's warhorse as well as by men still bloody from their days of whipping themselves. After a male choir and a female choir wail lamentations, the play is presented, lasting about three hours. The play ends with a battle during which, as accompanied by a roll of drums, Husayn's effigy is slain. Afterward, participants go to mosques and shrines to reverently complete their commemoration of Husayn's death.

The dance traditions of the Islamic world are much misunderstood even within the modern Islamic world. The term *belly dance* probably made its first appearance in English in 1899, when the phrase was used to attract audiences to a fairly serious effort by Egypt to present its customs to audiences at a world's fair in the United States. To the modern ear, however, *belly dance* implies a sensuality that was not necessarily part of the performances in question. Arabic has many terms for the dances that were popular in the medieval Islamic world, but the two that seem to be most common are *raqs sharqi*, meaning "dance of the East" or "Oriental dance," and *raqs baladi*, meaning "folk dance." The *raqs sharqi* were dances intended for performance in front of audiences, whereas the *raqs baladi* were social dances. Both terms probably originated in Egypt during the medieval era.

Most modern studies of the history of dance in the Islamic world have been written by dancers who wished to know more about dances that were passions for them. The sources of dances in the Islamic world are many, and during the medieval era they were combined and modified in hundreds of different ways to suit the interests of dancers and audiences. Almost all *raqs sharqi* derived from social dancing. In the Maghreb, in North Africa, men and women danced together, naked except for short skirts. The use of draperies held in hands during dances may have evolved from efforts to have women cover their breasts while dancing, although such use of handheld draperies may have originated far away in India, likewise in efforts to cover dancers, who there often gave public performances in the nude before the Muslim conquests. In Egypt both religious and secular dances had often been performed in the nude before the coming of Islam. During the medieval era female dancers who performed unclad or nearly unclad were often prostitutes.

Religious leaders tried to abolish all dancing, as well as music, but despite threats of damnation and oppressive laws ordinary Muslims continued to dance. In the Near East dancing became segregated between the sexes, with men dancing for men, out of sight of women, and women dancing for women, out of sight of men. By the 1300s the male musicians

who played for women dancers at large gatherings were required to wear blindfolds. The dances performed by women are the best known, as women have been the major preservers of Muslim traditions of dance. One form that is well known and performed worldwide involves carefully controlled movements of the abdomen. This kind of dance may have developed in Arabia in the 800s as a way for women to develop their abdominal muscles so as to make childbirth easier. During the medieval era, such dances were performed by women only for women until the 1300s, when men among the Turks adapted some of the movements for their own dances. The women dancers wore a variety of outfits, including light robes that flowed with their movements, often exposing their abdomens. Their dances were improvisational, involving many movements of hands and body that were traditional and

would be recognized by their audiences. Careful placement of feet was essential, with the rhythm of music being conveyed as flowing through the legs and manifesting itself in the rocking of the hips. All movements required well-developed muscle control.

See also ADORNMENT; AGRICULTURE; ART; CALENDARS AND CLOCKS; CLOTHING AND FOOTWEAR; CRAFTS; DEATH AND BURIAL PRACTICES; EDUCATION; EMPIRES AND DYNASTIES; FAMILY; FESTIVALS; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; ILLUMINATION; LANGUAGE; LAWS AND LEGAL CODES; LITERATURE; MUSIC AND MUSICAL INSTRUMENTS; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SOCIAL ORGANIZATION; SPORTS AND RECREATION; TEXTILES AND NEEDLEWORK; WRITING.

The Americas

~ Apu Ollantay (*Incan drama, ca. 1470*) ~

ACT 3, SCENE 7

The garden in the palace of Virgins of the Sun. . . .
(Enter the INCA TUPAC YUPANQUI with YMA SUMAC, OLLANTAY, UILLAC UMA and RUMI ÑAUI; URCO HUARANCA, HANCO HUAYLLU and PIQUI CHAQUI in the background.)

Tupac Yupanqui. But this is the Aclla Huasi;
My child, art thou not mistaken?
Where is thy imprisoned mother?

Yma Sumac. In a dungeon within these bounds
My mother has suffered for years,
Perhaps even now she is dead.
(She points to the stone door.)

Tupac Yupanqui. What door is this?
(Enter MAMA CCACCA and PITU SALLA. Mama Ccacca kneels and kisses the Inca's hand.)

Mama Ccacca. Is it a dream or reality,
That I behold my sovereign?

Tupac Yupanqui. Open that door.
(Mama Ccacca opens the door.)

(CUSI COYLLUR discovered chained and fainting, with a puma and a snake, one on each side of her.)

Yma Sumac. O my mother, I feared to find
That you had already passed away;
Pitu Salla! Haste. Bring water.
Perhaps my dove may still revive.

(Exit Pitu Salla.)

Tupac Yupanqui. What horrid cavern do I see?
Who is this woman? What means it?
What cruel wretch thus tortures her?
What means that chain bound around her?
Mama Ccacca, come near to me
What hast thou to say to this?
Is it the effect of malice
That this poor creature lingers here?

Mama Ccacca. It was thy father's dread command;
A punishment for lawless love.

Tupac Yupanqui. Begone! begone! harder than rock.
Turn out that puma and the snake,
Break down that door of carved stone.

(To Mama Ccacca.) Let me not see thy face again.
A woman living as a bat;
This child has brought it all to light.

(Enter Pitu Salla with water. She sprinkles it over Cusi Coyllur, who revives.)

(continued)

(continues)

Cusi Coyllur. Where am I? Who are these people?
Yma Sumac, my beloved child,
Come to me, my most precious dove.
Who are all these men before me?

(She begins to faint again and is restored by water.)

Yma Sumac. Fear not, my mother, 'tis the King;
The King himself comes to see you.
The great Yupanqui is now here.
Speak to him. Awake from thy trance.

Tupac Yupanqui. My heart is torn and sorrowful
At sight of so much misery.
Who art thou, my poor sufferer?
Child, tell me now thy mother's name?

Yma Sumac. Father! Inca! Clement Prince!
Have those cruel bonds removed.

The Uillac Uma. It is for me to remove them,
And to relieve this sore distress.

(Cuts the rope fastening Cusi Coyllur to the wall.)

Ollantay (to Yma Sumac). What is thy mother's
name?

Yma Sumac. Her name was once Cusi Coyllur,
But it seems a mistake. Her joy
Was gone when she was prisoned here.

Ollantay. O renowned King, great Yupanqui,
In her you see my long lost wife.

(Prostrates himself before the Inca.)

Tupac Yupanqui. It all appears a dream to me.
The "Star"! my sister! and thy wife.
O sister! what newly found joy.
O Cusi Coyllur, my sister,
Come here to me, and embrace me,
Now thou art delivered from woe.

(Music.)

Thou hast found thy loving brother;
Joy calms the anguish of my heart.

(Embraces Cusi Coyllur.)

Cusi Coyllur. Alas! my brother, now you know
The cruel tortures I endured

During those years of agony;
Thy compassion now has saved me.

Tupac Yupanqui. Who art thou, dove, that hast suffered?
For what sin were you prisoned here?
Thou mightest have lost thy reason.
Thy face is worn, thy beauty gone,
Thy looks as one risen from death.

Ollantay. Cusi Coyllur, I had lost thee,
Thou wast quite hidden from my sight,
But thou art brought again to life—
Thy father should have killed us both.
My whole heart is torn with sorrow.
Star of joy, where is now thy joy?
Where now thy beauty as a star?
Art thou under thy father's curse?

Cusi Coyllur. Ollantay, for ten dreary years
That dungeon has kept us apart;
But now, united for new life,
Some happiness may yet be ours.
Yupanqui makes joy succeed grief,
He may well count for many years.

Uillac Uma. Bring new robes to dress the princess.

(They put on her royal robes. The High Priest kisses her
hand.)

Tupac Yupanqui. Ollantay, behold thy royal wife,
Honour and cherish her henceforth.
And thou, Yma Sumac, come to me,
I enlace you in the thread of love;
Thou art the pure essence of Coyllur.

(Embraces her.)

Ollantay. Thou art our protector, great King,
Thy noble hands disperse our grief;
Thou art our faith and only hope—
Thou workest by virtue's force.

Tupac Yupanqui. Thy wife is now in thy arms;
All sorrow now should disappear,
Joy, new born, shall take its place.

(Acclamations from the Chiefs, and Piqui Chaqui.
Music: huancars (drums), pincullus (flutes), and pututus
(clarions).)

From: Clements Markham, trans., *Apu
Ollantay: A Drama of the Time of the Incas,
Sovereigns of Peru* (London: J. Murray, 1910).

Europe

~ Everyman, excerpt (English version,
ca. 1550, of an older Flemish play) ~

Here beginneth a treatise how the high Father of
Heaven sendeth death to summon every creature to
come and give account of their lives in this world and is
in manner of a moral play.

Messenger. I pray you all give your audience,
And hear this matter with reverence,
By figure a moral play—

The Summoning of Everyman called it is,
That of our lives and ending shows
How transitory we be all day.
This matter is wondrous precious,
But the intent of it is more gracious,
And sweet to bear away.

The story saith,—Man, in the beginning,
Look well, and take good heed to the ending,
Be you never so gay!

Ye think sin in the beginning full sweet,
Which in the end causeth thy soul to weep,
When the body lieth in clay.
Here shall you see how Fellowship and Jollity,
Both Strength, Pleasure, and Beauty,
Will fade from thee as flower in May.

For ye shall hear, how our heaven king
Calleth Everyman to a general reckoning:
Give audience, and hear what he doth say. . . .

God. . . . Where art thou, *Death*, thou mighty messenger?

Death. Almighty God, I am here at your will,
Your commandment to fulfil.

God. Go thou to *Everyman*,
And show him in my name
A pilgrimage he must on him take,
Which he in no wise may escape;
And that he bring with him a sure reckoning
Without delay or any tarrying.

Death. Lord, I will in the world go run over all,
And cruelly outsearch both great and small;
Every man will I beset that liveth beastly
Out of God's laws, and dreadeth not folly:
He that loveth riches I will strike with my dart,
His sight to blind, and from heaven to depart,

Except that alms be his good friend,
In hell for to dwell, world without end.
Lo, yonder I see *Everyman* walking;
Full little he thinketh on my coming;
His mind is on fleshly lusts and his treasure,
And great pain it shall cause him to endure
Before the Lord Heaven King. . . .

Everyman. O, to whom shall I make my moan
For to go with me in that heavy journey?
First *Fellowship* said he would with me gone;
His words were very pleasant and gay,
But afterward he left me alone.
Then spake I to my kinsmen all in despair,
And also they gave me words fair,
They lacked no fair speaking,
But all forsake me in the ending.
Then went I to my *Goods* that I loved best,
In hope to have comfort, but there had I least;
For my *Goods* sharply did me tell
That he bringeth many into hell.
Then of myself I was ashamed,
And so I am worthy to be blamed;
Thus may I well myself hate.
Of whom shall I now counsel take?
I think that I shall never speed
Till that I go to my *Good-Deed*,
But alas, she is so weak,
That she can neither go nor speak;
Yet will I venture on her now.—
My *Good-Deeds*, where be you?

Good-Deeds. Here I lie cold in the ground;
Thy sins hath me sore bound,
That I cannot stir.

Everyman. O, *Good-Deeds*, I stand in fear;
I must you pray of counsel,
For help now should come right well.

Goods-Deeds. *Everyman*, I have understanding
That ye be summoned account to make
Before *Messias*, of Jerusalem King;
And you do by me that journey what you will I take. . . .

(continued)

(continues)

Everyman. Methinketh, alas, that I must be gone,
To make my reckoning and my debts pay,
For I see my time is nigh spent away.
Take example, all ye that this do hear or see,
How they that I loved best do forsake me,
Except my Good-Deeds that bideth truly.

Good-Deeds. All earthly things is but vanity:
Beauty, Strength, and Discretion, do man forsake,
Foolish friends and kinsmen, that fair spake,
All fleeth save Good-Deeds, and that am I.

Everyman. Have mercy on me, God most mighty;
And stand by me, thou Mother and Maid, holy
Mary.

Good-Deeds. Fear not, I will speak for thee.

Everyman. Here I cry God mercy.

Good-Deeds. Short our end, and minish our pain;
Let us go and never come again.

Everyman. Into thy hands, Lord, my soul I commend;
Receive it, Lord, that it be not lost;
As thou me boughtest, so me defend,
And save me from the fiend's boast,
That I may appear with that blessed host
That shall be saved at the day of doom.

In manus tuas—of might's most
For ever—*commendo spiritum meum*.

From: Ernest Rhys, ed., *Everyman and
Other Old Religious Plays* (London: J. M.
Dent, 1909).

FURTHER READING

- James R. Brandon, *Theatre in Southeast Asia* (Cambridge, Mass.: Harvard University Press, 1967).
- J. I. Crump, *Chinese Theater in the Days of Kublai Khan* (Tucson: University of Arizona Press, 1980).
- Clifford Davidson and John H. Stroupe, eds., *Early and Traditional Drama: Africa, Asia, and the New World* (Kalamazoo: Western Michigan University Press, 1994).
- Diego Durán, *Book of the Gods and Rites and the Ancient Calendar*. Trans and ed. Fernando Horcasitas and Doris Heyden (Norman: University of Oklahoma Press, 1971).
- Jody Enders, *Death by Drama and Other Medieval Urban Legends* (Chicago: University of Chicago Press, 2002).
- John Feeney, "Shadows of Fancy," *Saudi Aramco World* 50, no. 2 (March/April 1999): 14–21.
- John Gassner, ed., *Medieval and Tudor Drama* (New York: Applause Theater, 1987).
- Benito Ortolani, *The Japanese Theatre: From Shamanistic Ritual to Contemporary Pluralism* (Princeton, N.J.: Princeton University Press, 1990).

- Norine Polio, *Three Examples of Precolumbian & Early Colonial Drama*. Available online. URL: <http://www.yale.edu/ynhti/curriculum/units/1985/4/85.04.01.x.html>. Downloaded on October 20, 2006.
- Miguel León Portilla, *Pre-Columbian Literatures of Mexico*. Trans. Grace Lobanov and Miguel León Portilla (Norman: University of Oklahoma Press, 1969).
- Rabinal Achí: A Mayan Drama of War and Sacrifice*. Trans. Dennis Tedlock (Oxford, U.K.: Oxford University Press, 2003).
- Christine Richardson and Jackie Johnston, *Medieval Drama* (New York: St. Martin's Press, 1991).
- A. C. Scott, *The Theatre in Asia* (London: Weidenfeld and Nicolson, 1972).
- Caroline Stone, "Of Muppets and Puppets," *Saudi Aramco World* 30, no. 5 (September/October 1979). Available online. URL: <http://www.saudiaramcoworld.com/issue/197905/sesame.opens.htm#of.muppets.and.puppets>. Downloaded on August 20, 2007.
- Greg Walker, ed., *Medieval Drama: An Anthology* (Malden, Mass.: Blackwell Publishing, 2000).



► economy

INTRODUCTION

Economics is about possibilities. The nature of an economy, its breadth, and its wealth all affect what people can do. Medical care, houses to live in, healthy diets, scientific research, and much more are limited by how much an economy can support. In looking at the economies of the world from 476 to 1500 from the perspective of several hundred years later, there was an overall expansion of economies that allowed creative, highly motivated people to build the ships of exploration, to devise the labor-saving machinery, and to create the arts that made the modern world possible.

Not every economy expanded. Some remained unchanged; others collapsed. Even for the strongest, those of China, the Islamic World, and late medieval Europe, there were profound setbacks caused by plagues, wars, environmental catastrophes, and bad governmental policies. Economic changes often were responses to crises caused by disruptions to economies. For instance, the development of feudalism in Europe was largely a response to the profound insecurity created by the collapse of the economy after the fall of the Western Roman Empire in 476. People needed food, housing, and protection from physical harm, none of which could be adequately provided when Roman coins ceased having value, food production dropped, and trade could no longer provide enough food and other goods to towns and cities.

As to why some economies seem to have gone unchanged during the medieval era, historians, archaeologists, and economists have been unable to arrive at a consensus. Take Australia as an example. Archaeological research indicates that the people of Australia, as recorded by Europeans during the Age of Exploration, were living much as they had several thousand years earlier. Even the most traditional of societies is likely to change in some ways over several hundred years, but the economics of the lives of Australians does not seem to have altered during the medieval era. They were primarily hunter-gatherers whose technologies and customs were geared to extracting livings out of the natural world without using agriculture. Such an economy cannot support high densities of population, and therefore Australia never had the concentrations of people found in Mesoamerica, China, India, the Near East, and southern Europe. On the other hand, many economists have noted that concentrations of populations in special locations such as towns seem to be necessary for generating the wealth associated with advanced economies. So which must come first? Did the Australians first need to generate enough wealth in food or goods to support a denser population, or did they first need to develop denser concentrations of population in order to generate greater wealth in food and goods?

An economy is the product of human endeavor, and it requires interaction among people. When people choose not to cooperate, for example, to fight wars, economies can respond in various ways. For many cultures wars of conquest were

profitable enterprises. Seizing the lands of northern India, the Byzantine Near East, North Africa, Spain, and Sicily brought wealth to Arabs, just as wars of conquest had brought wealth to ancient Rome. A problem for Rome was that when it started defending its borders rather than expanding them, the booty from conquest stopped flowing into its economy. The Arabs ran into that problem and another one. They sometimes eliminated the people who had made local economies successful. For instance, once-prosperous farmlands in the Near East stopped being worked because their farmers were eliminated, thus knocking out the agricultural underpinnings of some of the conquered lands. The results weakened economies, which placed stress on Arab governments and created disunity in the Islamic world. In general, the consequences of wars during the medieval era were calamitous for economies. The wars of the Byzantine Empire to protect itself from its neighbors placed severe strains on its peasants in the form of almost unendurable taxes; the conquest and looting of northern India by Muslims left much of the local population destitute; and the conquests of the Mongols severely depopulated some regions to the point that economic activity ended, as in much of central Asia through which the Silk Road ran.

The building of great monuments, which would at first glance seem to be indications of strong economies, was an illusion of economic power in many places. The great edifices of Constantinople, the mosques of India, and the monuments of China were sometimes built by a population that was nearly destitute, surviving on meager food in poor housing. In many cases, construction workers were slaves, poorly cared for and often worked to death because conscripting new slaves was cheaper than caring for them.

This aspect of economies gives rise to the question of what makes an economy successful. Would the economy of the Byzantine Empire be considered successful because for nearly a thousand years it held fairly steady and strong, even though most of its people suffered impoverished lives, fearing the tax collectors? How does a disparity between the rich and the poor factor into the matter? The medieval economy of the Mayan peoples, with its robust trade and huge cities, would seem to have been a success, but a consensus has developed in recent years among historians that the Mayan cities' dense populations and impressive monuments came at the cost of the forest environment; that the ecological destruction was so severe that the Maya no longer could feed or house themselves; that many perished in the ecological catastrophe; and that the Mayan culture survived only by a radical change in their economy, shifting to a subsistence economy in scattered, low-density settlements.

Perhaps economies are too complex to judge as successful or unsuccessful. Perhaps the merits of an economy de-

pend on one's perspective. A member of an aristocracy might view a wide disparity of wealth between upper classes and lower classes to be both natural and desirable. A lover of literature or the arts might note that the greatest proliferation of literary and artistic achievements has tended to come from societies in which there is a great deal of wealth available to support writers and artists. Many modern people would look to see how well the needs of the entire population were being met and would look for a broad distribution of wealth.

AFRICA

BY KIRK H. BEETZ

The economy of medieval Africa was vigorous, boisterous, and dynamic. In many African cultures every person knew about economics and participated daily in economic activities. Among some western African cultures the words for *life* and *economy* were equivalent. Children learned early the mathematical computations necessary for understanding trading and the value of goods, and they were involved in the complex give and take of economic practices. Even some board games were intended to teach children the basic mathematics they would need to conduct business with others. Both Arabs, who began trading with Africans early in the medieval era, and Europeans, whose efforts to trade in the interior of Africa began in the 1400s, were surprised by the often superior bargaining skills of the Africans.

STATELESS ECONOMIES OF WESTERN AND CENTRAL AFRICA

The medieval economies of western and central Africa are difficult to understand, partly because the farther into the interior of Africa archaeologists and historians have gone, the less information they have found to study. Further, these economies were often stateless, existing without the benefit of organized governments. To understand the economies of these regions requires a look at the environment of their vast territories, which stretch from the western seaboard, beginning just south of the Sahara, and sweeps over steppes, rivers, and dense forest until reaching the territories of Ethiopia and the trading cities of the eastern seaboard. Two environmental factors posed special problems for the peoples of the regions: the soil and insects. These two factors limited food production and transportation, making a significant impact on the economy.

Insects affected people, animals, and crops. The tsetse fly and the anopheles mosquito are disease-carrying insects. The mosquito carries malaria, a disease that was most often fatal in medieval times and could severely reduce a community's ability to be economically viable. The tsetse fly carries dis-

eases fatal to draft animals. Thus cattle—the mainstay of pastoral life in the Sahel, the steppes south of the Sahara running west to east across the continent—could not survive in large numbers in the forests of western and central Africa. The tsetse fly also attacked horses and camels. Consequently, from Lake Chad to Timbuktu, donkeys were used frequently for transporting trade goods. Otherwise only men and women could carry goods away from the systems of the Senegal and Niger rivers, balancing loads on their heads. Additionally, farmers had no beasts of burden to help them till their lands; they had to rely on human muscle. Even when a farmer succeeded in cultivating a crop, it could fall prey to another insect that severely affected the region's economy: the locust. Periodically hordes of locusts swept through farming areas in the grasslands of western and central Africa, consuming entire crops.

The other major environmental factor was the nature of the soil. In ancient times farming peoples from western Africa began migrating east and southeast into the interior. They used rivers to travel through dense forest to places where they could clear land and settle. By the 500s these farmers had reached the headwaters of the Congo River and were continuing to displace the indigenous hunter-gatherer peoples. They used a form of slash-and-burn agriculture for their lands: An area would be burned, the ashes helping to enrich the soil a little, and it would be farmed for seven years before being allowed to lie fallow for 15 years or so. The soil was very poor, with most of its nutrients within a few inches of the surface. Heavy plowing, the farming method used in Europe and China, would have destroyed the fertile surface of the soil, turning up dirt unsuited for growing crops. Western and central African farmers had to use hoes to prepare the soil for seeding, which restricted how much land they could till. Thus the soil severely restricted the types and amounts of crops farmers could grow. Without sufficient crop surpluses available, the economies of western and central Africa could not grow. Areas with richer soils, such as river deltas, tended to be more prosperous because farmers had harvests, creating larger surpluses than in other regions with poorer soils.

Despite poor soil, insects, and various natural disasters that periodically destroyed fields and left many people without food, starvation was not inevitable in these stateless societies. Food was redistributed to those in need from those who still had it, without a governing body to organize relief efforts. This happened because of the notions about wealth and economy held by most people living in these regions during the medieval era.

An Arab or European trader or explorer visiting a village in the stateless societies was likely to be disappointed on asking to speak with the village leader. Usually the person

with the highest ranking in the community would emerge from a house no different from any other house and would be dressed like everybody else or naked, because in many areas any type of cloth was a luxury. The visiting trader or explorer expected certain trappings of office typical of an Arab or European leader: fancy clothing, expensive jewelry, and a big house with several servants. To the African villagers, however, their unassuming ruler was very wealthy. That wealth was based on the leader's network of relationships and was part of an economic system that anthropologists call social banking.

Stateless African societies were organized around family, clan, and village. A complex web of relationships governed how people behaved toward each other. The status of a person in a stateless society depended on the number of people who were obligated to that person and on the number of people to whom that person was obligated. A person built wealth by performing favors, helping others in their work, and settling disputes. Twice each growing season every farm had to be weeded, usually requiring more work than one farmer could do. Members of the farmer's family, clan, and village would help with the labor, not in return for money or goods but in exchange for the obligation the farmer would owe them. In turn, the farmer would help others, repaying obligations and creating new ones owed him.

When money or luxury items were brought into a social banking system, the owner of the money or goods seldom kept them. Instead money went to people needing to purchase items for their homes or families, cloth went to people needing clothing, jewelry went to people needing ornamentation for weddings or other events, and so on. Thus material wealth was spread throughout the community. By giving away material wealth, a person gained the wealth that actually mattered to the Africans, those numerous obligations. Through social banking, the person in a community with the least material wealth could be its most esteemed and wealthy leader. By contrast, a person who hoarded material goods and lived in luxury could be the most despised member of the community and its poorest in terms of "deposits" in the social banking system. Stateless societies were based on reciprocity—the concept of "I help you now, and you help me later." According to the African definition of *reciprocity*, receiving payment for providing help was not as important to the giver as having a person obligated to help in return when needed. The giver did not need to receive back what he or she gave to be considered wealthy.

Through the relationships of giving and receiving, the stateless economies of western and central Africa survived cataclysmic disasters such as hordes of locusts, fires, droughts, wars, and plagues. Those who had food gave it to those who

had none. For those who had no shelter, homes would be built. The giving and receiving extended to neighboring villages. Almost all trade was within a local area, and villages built relationships with each other, making it natural for people of one village to help those of another. The economic system was not perfect, because invasions by slavers or prolonged famines could overwhelm a village economy, but in general the social banking system helped people survive hard times.

A stateless economy was flexible. All land was held in trust for all members of a village, but it was understood that once a person was given an area to farm it was his or hers to farm until death. A person or family in the village could give a stranger permission to farm some land that the person or family normally cultivated. At that moment the stranger became a member of the village and a partner in the local economy, because the stranger had become part of the village's wealth by becoming obligated to a member of the village. Through hard work, the stranger could create a surplus of food on the land, and that surplus could become part of the community's storehouse of surplus food to be used to feed those in need. This brought the stranger obligations from the community, and the stranger would then rise in status and no longer be considered a stranger.

Another kind of stateless economy in central Africa during the medieval era was in the community of hunter-gatherer peoples of several ancient lineages. The hunter-gatherers formed a thin population spread through the dense forests of the interior, seldom forming groups larger than about a dozen people. It is tempting to look at them as homeless people with little material wealth and thus little economic impact, but they seem to have been canny traders who contributed much to the wealth of communities around them by trading animal skins and ivory for goods such as iron tools and decorative beads. Those animal skins could travel far, and the ivory would be shipped as far away as China, bringing outside wealth into Africa.

CITY-STATES AND EMPIRES OF WESTERN AND CENTRAL AFRICA

Until the 1400s, when Europeans began trading and looting along the Africa's western seaboard, most international trade came either from the north, through the Sahara, or from the east, where there was vigorous trade with Asia. The geography of Africa was a powerful limiting factor in foreign trade. The Sahara alone was formidable, and many traders perished when attempting to cross it to reach western and central Africa. Routes through the desert into the Sahel were dictated by the places where travelers could stop for food and water. At those places arose cities, which were established as trading centers.

Some medieval trading centers still exist—for instance, Timbuktu—but they are only remnants of what they were during the medieval era, when they were the best places for traders to transfer their goods from camels to donkeys or human bearers. Timbuktu was a great seat of learning, with a sophisticated urban culture, great houses, and busy markets. Other significant cities were Audoghost and Oualata to the west and Gao, Takedda, and Manan to the east. Each of these cities was a state unto itself, often dominating hundreds of miles of the surrounding territory. Food came mostly from farms near the cities. The material wealth of the city-states came from the high tariffs they charged for traders to pass through or to exchange goods. Few northern traders went farther south, preferring to both sell their goods and buy others in the city-states to take back north.

The economies of these city-states depended entirely on trade, primarily salt and gold. The peoples of western and central Africa imported salt either from the west coast, where it was made from evaporating seawater, or from the north, where it was mined from large deposits. Gold came from the region of the modern-day Republic of Guinea and from the forests of modern Ghana. The economies of the cities benefited from taking percentages of the gold and salt that passed through them. Along with gold, traders from the south brought many goods such as exotic woods, animal skins, and gems, whereas traders from the north brought cotton cloth, beads, tools, and weapons as well as salt.

It was difficult to carry goods through the forests of western and central Africa, making travel on waterways desirable when possible. Along the rivers of the region arose trading cities such as Ghiarou, Niani, and Jenne-jeno of western Africa and Katsina and Kano of central Africa, with Benin arising near the Niger Delta to the south. Trade in these cities involved few foreigners. Primarily local people made the perilous journey north to acquire and bring home goods that had crossed the Sahara desert. The cities of the interior were economic engines for their regions, generating wealth by serving as clearinghouses for local goods to be exchanged for salt and luxury goods such as cotton cloth. These cities also helped local populations trade among themselves, exchanging such items as kola nuts, fish, and millet.

City-states may have formed the basis for the emergence of empires in the regions, but much is still unknown about the early histories of such empires. Two are fairly well known by name: Ghana and Mali. The southern border of the Ghana Empire was about 100 miles north of the northern border of modern Ghana. Little is known about the origins of these two empires, although oral histories recorded by visitors indicate that both were built by warrior-kings who conquered neighboring lands, forcing them either to become part of their na-

tions or to pay tribute. Much of the rise and fall in economic success of the two empires depended on neighboring peoples paying tribute. The tribute was usually paid in goods and slaves.

Both the Ghana and Mali empires had important gold mines. The empire of Ghana was never able to exert direct control over its mines, which were established deep in nearby forests in locations that remained carefully guarded secrets. Monarchs of the empire of Mali claimed direct control over gold mines to make sure the profits went to the empire and especially to the monarch. But even some Mali mines escaped the control of the government. In each case the government became rich in the gold trade by controlling the opportunities for gold to be traded, making sure the miners traded only with representatives of the empire. Since ancient times the people who worked those mines had taken pains to keep the locations of their mines secret, and even during the medieval era some successfully kept them secret. This did not mean that they escaped government oversight altogether, because to trade their gold they had to go to markets that were regulated by the government. Under the law of Ghana all gold had to be traded to the monarch, and miners had no choice but to exchange their gold for goods whose values were regulated by the government.

The empire of Ghana taxed the production of goods within its borders, taking a share of whatever was produced, and it taxed trade goods both entering and leaving the country. With the wealth generated by trading gold with North Africa, the empires of Ghana and Mali could maintain large, well-equipped armies. The empires used their armies to ensure that their neighbors paid tribute and to enslave people captured from the interior, fostering a slave trade that generated much wealth for the empires.

TRADING ECONOMIES OF ETHIOPIA AND EAST AFRICA

Ethiopia's medieval economy was complicated by its relationship to the Muslims, who gradually took control of much of the territory surrounding Ethiopia. From ancient times the kingdom of Axum near the coast had traded extensively with the Near East and the rest of Asia, and it shared close relations with the Arabs. Early in the medieval era pressure from Muslim armies forced the Axumite kingdom to collapse, and the center of government moved west from Axum into the Ethiopian highlands. Although Ethiopia built magnificent structures, most notably Christian churches, it did not have a seat of government as most empires did. Instead, the monarchs of Ethiopia tended to move about, living in large tents. This was not a unique practice. For example, before the Norman invasion of 1066, English kings tended to travel from

place to place in their country because no one place could feed their entire court for more than a short time. This may have been one of the reasons the Ethiopian monarchs were nomadic; other possible reasons include making sure their presence and leadership were evident and acknowledged in their far-flung lands and making it hard for invaders to locate them in times of war.

With trade to the east and south often disrupted by Islamic incursions, Ethiopia developed strong relationships to the north and west. To the north was Egypt. Beginning with the Islamic takeover of Egypt in the 600s, Ethiopia paid a tribute of 365 slaves each year to Egypt, a practice that continued into the 1300s, despite occasional changes of regime in Egypt. In exchange for this tribute, Ethiopians on pilgrimages to Jerusalem were given safe passage through Egypt and access to Egyptian markets. For most of the medieval era Ethiopia was a powerful empire that exacted tributes from its other neighbors. The rulers of Eritrea paid tribute in silk and cotton from China and India, armor and weapons from the Near East, gold, and Arabian horses. Provinces outside the Ethiopian highlands paid tributes with shares of their harvests as well as with cattle, mules, ivory, gold, honey, and wax. In 1332 Ethiopia conquered Dawaro, Bali, and Sharka, small states to the south that were then forced to pay tribute.

The internal economy of Ethiopia resembled that of feudal Europe during the Middle Ages. Fiefs were held by chiefs, knights, monasteries, and even the monarch, and according to accounts from outsiders, the peasants were ill treated. Peasants were required to pay one-third of their harvests to their feudal masters. In northern Ethiopia trade with foreigners was spurred by a need to acquire portable goods that could be paid as taxes to the government. The monarch took the entire court when traveling around Ethiopia, including bureaucrats, servants, and soldiers. Moving the monarch every three months or so from one place to another required between 50,000 and 100,000 donkeys and thousands of bearers. The monarch and nobles had between 5,000 and 6,000 tents. On a smaller scale provincial governors and local chiefs replicated this process of moving their governments.

During the medieval era several powerful city-states arose along the east coast of Africa, from south of Ethiopia through modern-day Mozambique. Among these city-states were, from north to south, Warsheikh, Mogadishu, Bur Gao, Ungwana, Malindi, Gedi, Mombasa, Mtambe Mkuu (on Pemba Island), Unguija Ukuu (on Zanzibar Island), Mkan-dini, Dar es Salaam, Kivinja, Kilwa, Murrapania, Sofala, and Chibuene. These city-states existed entirely for trade, and they became—like the great trading cities of medieval Italy—trading empires with great fleets and domination over the territories around them. At least two of these city-states, Kilwa and

Unguija Ukuu, minted their own coins and developed cash economies—that is, economies in which goods were bought and sold mostly with money rather than exchanged through bartering. Coins from other empires have been found by archaeologists, including Chinese coins from 618 to 1279, indi-

GLORIOUS KILWA

The city of Kilwa was founded in about 800 on an island on the coast of present-day Tanzania. The water between Kilwa's island and the mainland was only knee-high during high tide. Archaeology has been able to trace the city's development from a gathering of mud-and-wattle homes to a walled city with structures made of coral stone. Although Kilwa always had some mud-and-wattle buildings even at the height of its prosperity, during the 12th century buildings made of stone mortared with lime began to dominate the city. From about 1200 to the late 1400s Kilwa was one of the most prosperous cities in Africa.

Its economy was based on trading goods from the interior of Africa to visitors from Asia. Sailing into Kilwa's waters during the city's height, visitors would have been impressed by the city's walls and towers. Docked outside its walls were African boats made of woven reeds and big ships from Arabia, India, Sri Lanka, and Indonesia. Most Chinese traders hitched rides on Indian ships. The shores of Kilwa were alive with sailors, traders, and government officials in charge of regulating trading.

Within the city were narrow streets bounded on either side by three- and four-story stone houses, probably the homes of rich merchants. In its marketplaces would have been Arabs, western Africans, Indians, Sri Lankans, and Chinese, all using Kilwa's copper coins to buy and sell. For their long voyages home, these visitors would buy millet, sorghum, oranges, lemons, figs, pomegranates, sugarcane, and sheep grown on the farms surrounding Kilwa.

The city's internal economy bustled with members of building trades, highly skilled metalworkers, and potters. In addition to extracting tariffs on goods traded within its lands, Kilwa exacted tribute from people as far south as the city of Sofala, on the coast of modern-day Mozambique. With its vigorous economy, great wealth, impressive buildings, and crowded markets, Kilwa may have been like one of the fantastic lands described in the *Arabian Nights*.

cating the wide range of the trade accomplished by the cities on the east coast of Africa as well as how long they maintained their prosperity.

Trading cities exacted stiff tariffs on goods passing through their ports, but they were essential for exchanging goods from the interior of southern Africa for goods from Asia. Ivory and gold from the interior of southern Africa were much coveted in Asia; the Chinese especially prized African ivory. Goods such as cotton cloth and glass beads from India and porcelain from China were common in the port cities, and trade of imported goods extended into the African interior. Tax officials carefully monitored everything brought into and sent out of their cities. Tariffs were so steep that one-third to one-half of imported cloth had to be paid to city governments. For instance, Mombasa exacted one mitqal in gold for every 1,000 lengths of cotton cloth and then took half of the cotton cloth. A mitqal varied in amount from place to place in Africa but was usually about an eighth of an ounce. The value of the ivory and other African goods obtained in trade for the remaining cloth was so high that traders could still make great fortunes.

The economies of the large trading centers began to decline for two reasons: the rising power of Arab traders and the arrival of the Portuguese. For most of the medieval era ships from Indonesia, China, Sri Lanka, India, and the Near East regularly sailed in great numbers to the African trade cities, but in the 1300s trade became increasingly dominated by Arabs, who exacted taxes and tribute by controlling the shipping lanes along the African coast. In the late 1400s an increasing number of Portuguese ships began docking at African ports. The Portuguese were impressed by the well-organized cities with their beautiful homes and the great ships, many bigger than those of the Portuguese, anchored in the cities' harbors. The Portuguese looted the ships, invaded the cities that had welcomed them, carried off the people of the cities to be sold into slavery in Portugal, and plundered everything they could carry. Crewmen and soldiers were promised one-twentieth the value of whatever they brought to their ships. Then the Portuguese burned the cities. A few, such as Kilwa, recovered somewhat, but they were never again as prosperous as they had been.

HUNTER-GATHERERS AND PASTORALISTS OF SOUTHERN AFRICA

Vast swaths of southern Africa were plains or deserts. From west of Kilwa across southern Africa and then north through the Kalahari lived both hunter-gatherers and nomadic pastoralists. Among the pastoralists were the Khoisan people who lived from the southern tip of Africa north into central Africa. Cattle ownership was the basis of the wealth of a person,

clan, or tribe. Not much is known about the economic lives of the medieval Khoisan people, although archaeologists have been slowly filling in some of the information. The eastern Khoisan traded with the cities of the east coast, providing animal skins, ivory, milk, and beef to the cities in exchange for pottery, beads, and cereals. As with the peoples of western and central Africa, their culture had a component of social banking, with mutual obligations among people forming the nucleus of kinship.

The San of southwestern Africa were mostly hunter-gatherers who either moved across the land in small groups or lived in small villages from which they would forage. Climate and geography affected the choices they made, with people living in the desert tending to move frequently to find water and food and those living in wet areas tending to settle in one place and venture forth for days at a time to hunt and gather food to bring home. It seems that from their first encounters, Europeans misjudged the San. Because they rarely wore clothing and lived in small huts, the San appeared primitive and unsophisticated, but they were intelligent traders who formed a complex economic system.

Each San community was relatively self-sufficient, but importation of salt from the north was vital for many of the people of the Kalahari. Their need for salt often brought them into contact with the Hausa and other peoples of the Congo River region. The peoples south of the Congo River area tended to be settled folk who raised crops and kept cattle, and they often intruded into areas the San considered their own, resulting in inconclusive wars. In spite of occasional hostilities, the San often found work among the farmers and herders, earning material goods and social banking. The San had more than their labor to trade; in whatever environment they happened to live, they exploited the natural resources. This meant that people living near rivers and lakes could get clay with which to make pottery, those living in grasslands or the forest could collect animal skins, and those who lived along the west coast could gather sea salt they created through evaporation of small human-made ponds. With their various surplus products, San communities traded with each other and their neighbors. The common language they maintained throughout their vast territory enhanced the San's ability to trade among themselves, and many San also spoke the languages of their neighbors.

CITY-STATES AND EMPIRES OF SOUTHERN AFRICA

Among the most poorly understood cultures of medieval Africa are those of the city-states and empires of the southern African interior, including the people who built Great Zimbabwe, the stone monuments that were once the heart of a

large city on the Zimbabwean plateau. Foremost among these peoples may have been the Shona, who seem to have begun conquering their neighbors early in the medieval era. They created empires that had vigorous economies based on farming, manufacturing of household goods, and trade, mostly with the city-states on the east coast. Great Zimbabwe was once considered the capital of a single empire centered on the Zimbabwean plateau. However, with the discovery in the 1970s of another stone capital at Manekweni in the lowlands, archaeologists began to realize that the Shona and other local peoples actually formed several empires that stretched from the modern-day nation of Zimbabwe almost to the Kalahari, encompassing forests and grasslands as well as tens of thousands of people. More than 150 additional sites of stone structures built like Great Zimbabwe have been found. The ruler of Great Zimbabwe seems to have been the most powerful monarch of the region, a sort of king of kings who exacted tribute and military cooperation from the lesser monarchs.

Much speculation but little hard data surround the economies of these empires. Based on archaeological discoveries the territories appear to have spread in bands from east to west. This territorial structure could have been shaped by the necessities of trade: The rulers focused on the movement of goods from east and west and on ensuring that the goods passed westward into the interior or eastward to the seaports as quickly as possible. The governments exacted tariffs on all goods entering and leaving their territories—a double payment for anyone seeking to pass safely through an empire without stopping to trade. The wealth of an empire, and hence of its ruler, depended on making sure that traders could pass through their lands securely, and thus well-trained armies were maintained to protect them.

Outside the imperial borders were mostly nomadic pastoralists such as the Khoisan. These peoples were subdued by the imperial armies but not necessarily absorbed into the borders of the empires. Instead they paid tribute to their powerful neighbors. This was not an entirely one-sided arrangement, because the pastoralists gained access to trade goods in larger quantities than they otherwise would have, and they found buyers of their goods who might never have ventured among the pastoralists without the security of provided by the military forces of the empires.

THE AMERICAS

BY MICHAEL J. O'NEAL

During the millennium following the ancient period until contact with European explorers and conquerors, the economic systems of the Americas in many respects differed little from the systems that had prevailed in earlier times.

The peoples of the Americas continued to survive primarily through agriculture, though significant economic activity included trade, mining and metalwork, pottery making, civic improvements such as road and temple building, and the like. In North and South America an ethnic culture, with emphasis on clans and families, allocated labor and resources, usually under the command of a leader. Some of these cultures remained nomadic, although in many places people adopted a more complex and sedentary form of life. In Mesoamerica, in the region that corresponds roughly to modern-day Mexico and parts of Central America, large city-states dominated the economic activities of the regions that surrounded them. Severe climatic change, however, disrupted the economies of the Americas. The Anasazi of the American Southwest and the Moche of South America, for example, underwent significant decline and virtual extinction as a result of major changes in climate that led to drought, reduced crop yields, warfare over resources, and famine. The result was profound changes in the centuries preceding the arrival of the Europeans—primarily the French and Spanish in North America and the Spanish in Central and South America.

NORTH AMERICA

The cultures of North America left behind no written records, so historians and archaeologists have to make inferences about their economic systems on the basis of the archaeological record, in some instances supplemented by oral traditions. Further impeding the work of historians and archaeologists is the cultural disruption that took place during the centuries before European contact and in the early centuries after that contact took place. Severe climate stresses, warfare, and, later, European-borne diseases forced many cultures to abandon their settlements. The archaeological record is sometimes disrupted because of internal warfare. In many cases people moved hundreds of miles away. Their elders were lost to disease. As a result of these stresses, there was a lack of cultural continuity. In some cases, peoples wound up migrating back to their original homelands and did not know that they had done so.

During the millennium before European contact some native North American cultures developed fairly extensive economic systems. Many, however, did not. While numerous examples could be cited, one is the so-called Belle Glade culture, which lived in the area surrounding Lake Okeechobee in Florida. Remains of this culture show that it survived from about 1000 B.C.E. to 1700 C.E.; archaeologists specify the Belle Glade III Period as extending from about 700 to 1300. However, the culture never developed a sophisticated economic system. The people remained hunter-gatherers, living off deer, fish, mollusks, turtles, and snakes. They engaged

in some agriculture but cultivated only a very small amount of maize. They made pottery that was entirely undecorated. While clearly hunting, fishing, pottery making, and shelter construction are activities that contribute to an economy, there was little in the way of an organized economy that included manufacturing, mining, trade, and so forth. This was the case for numerous North (and South) American cultures during this era.

Many of the cultures of pre-Columbian North America are referred to under the heading “mound builders.” These cultures were the distant ancestors of numerous North American native nations. They are called mound builders because they constructed large earthworks used for residential, ceremonial, religious, and burial purposes—in effect, building communities atop large, artificial mounds of earth. Many of these mounds were pyramid shaped. Others were in the form of flat-topped pyramids. Still others were in the form of ridges, circles, squares, and rectangles, and some were even shaped like animals or objects. While many of these mounds were destroyed by later agricultural pursuits, others can still be found and have become tourist attractions in the 21st century, preserved in national parks. The Native Americans of the Belle Glade culture constructed low mounds, primarily to provide housing above the water of low-lying, swampy areas. The most prominent mound builders, though, were the peoples who were part of the Mississippian culture, a loose collection of groups that flourished along the Mississippi River and its tributaries.

The mound builder culture is conventionally divided into three periods. The Archaic Period extended back to the second and third millennia before the start of the Common Era. The so-called Woodland Period began roughly in 1000 B.C.E. and extended to roughly 1000 C.E. The third period refers to the Mississippian culture, which extended from about 800 or 900 to 1600 C.E. Again, not much is known about the economic organization of the Mississippian culture. Clearly, a chief economic activity was the construction of the mounds themselves. Archaeologists have calculated that the amount of labor needed to construct some of these mounds extended into the millions of man-hours. One such mound was more than 1,300 feet long and built in the shape of a serpent. Clearly, this type of activity required a great deal of organization. The very existence of such a structure implies that the culture had to be sedentary rather than nomadic; that a social hierarchy existed to direct construction, organize labor, provide resources, and perform similar tasks; and that the various Mississippian cultures shared some sort of common heritage that led them all to construct such mounds, even though otherwise the cultures had marked differences.

Supporting the economic activities of many pre-Columbian Native American communities was agriculture. By this time, cultivation of maize, or corn, had spread throughout much of North America, and maize had become a staple crop. (The word *maize* is used because, in Europe, *corn* refers to any type of grain; *maize* refers specifically to what modern-day Americans call corn.) Archaeological evidence shows that among the Mississippians, maize cultivation was conducted on a fairly large scale, suggesting that populations grew and lived in fixed, permanent communities. Again, large-scale agriculture implies the existence of an economic system to direct production. Land had to be allocated, workers had to plant and harvest the crops, crops had to be stored and distributed, and so on.

Pre-Columbian Americans learned a number of techniques for surviving through maize-based agriculture. For instance, they learned that they needed to supplement their diets with other sources of protein and with certain other nutrients. Thus, they planted beans along with maize; the beans used the tall maize stalks as support—as, in effect, beanpoles. They also planted squash as a form of ground cover to keep down weeds. They rotated crops, planting nitrogen-fixing crops to reconstitute the soil for later maize planting. And they treated corn with alkali to release essential nutrients, particularly niacin (though pre-Columbian Americans would not have given it this name). Although little is known about the particulars of this activity, that it took place is certain, so a hierarchy of agents in the economic system, from supervisors to laborers, had to have existed.

The economic system of any people is tied directly to the culture's social organization. Elites are the people who direct economic activities, coordinate trade, allocate land, and determine how the fruits of economic activity are distributed. Among the Mississippian cultures, it is clear that economic and other activities were directed by a small class of elite people. In some cases this role may have fallen to a single chieftain; in other cases, an oligarchy, or group, of prominent people were probably in charge. Also, religious figures played a role in the economy, for they would have had authority over such matters as the shape and placement of mounds and the nature of the structures built on them for ceremonial purposes. Further, the mound itself, as the center of the community, would have given the administrative and economic personnel who lived there control over the economic activities of people in outlying regions.

One of the most prominent mound-building Mississippian cultures is referred to as the Cahokia culture, which flourished from about 700 to about 1400 in what is now Illinois. Cahokia is representative of numerous similar cultures that inhabited North America during this time period. At its

height Cahokia may have been home to 15,000 people, making it the largest city ever in North America until Philadelphia reached that size in the 1800s. Cahokia was the site of 120 mounds, including the massive 100-foot-tall Monks Mound (so named by French monks who discovered the site in the 1700s). Archaeologists estimate that Monks Mound, which covers 14 acres, would have required some 14 million baskets of soil, all carried by hand from nearby sites. Additionally, on the grounds in front of the mound was a 50-acre plaza that evidence shows was leveled out of undulating ground. These construction projects were a major economic activity for the Cahokians.

The economic organization of Cahokia was similar to that of any region dominated by a single large city. In the outlying regions people grew crops, which they bartered for goods made by city dwellers, such as potters and metalworkers. (The Cahokians, along with other Mississippian cultures, did not smelt ore; what metal tools they had were fashioned directly out of soft metals.) The alluvial plain in the area, where the Mississippi, Illinois, and Missouri rivers come together, was 80 miles wide at points, providing rich land for agricultural production. Additionally, the Cahokians grew other crops, primarily seed crops, which were stored in granaries that probably were located in the mounds. An immense labor force accomplished these tasks without the benefits of steel tools such as plows or draft animals. To direct all of this activity, a social elite lived in houses constructed atop the mounds.

The city was part of an extensive trading network that stretched up and down the Mississippi River and west as far as the Rocky Mountains. Goods were bartered, since there was no money, and rulers maintained their grip on power primarily by conferring economic benefits on common people. Also, they maintained peace with neighbors by paying tribute, usually in the form of ornaments such as beads and seashells, which were obtained through trade with cultures many hundreds of miles away. Traded items included not only agricultural products but also hardware, such as hoes made with flint blades and axes with stone heads. Imported items included copper from Minnesota, salt, chert (a stone used in tool making) from Oklahoma, and mica from as far away as the Carolinas.

In addition to these activities, the Cahokians were also astronomers. Archaeologists have discovered a ring of cedar posts outside Monks Mound. Archaeologists call these posts "Woodhenge," to echo the name of the stone monuments called Stonehenge in England. These posts were aligned in such a way as to point toward where the sun rises at the spring and fall equinoxes and summer and winter solstices and thus are a type of solar calendar.

The Cahokian culture essentially evaporated by about the end of the 14th century. No one is certain why, but historians offer a number of theories. Chief among them is environmental degradation, warfare, or some combination of the two. The Cahokians built a stockade around the city in about 1100, suggesting that some of their neighbors were not on entirely friendly terms with them. Then, as the population grew, resources became scarcer. Small increases in the water level of the surrounding rivers could have made large portions of cropland unusable.

The Cahokians consumed vast quantities of wood not only for firewood but also for the construction of structures, including the stockade, which periodically had to be rebuilt; just the stockade consumed about 20,000 relatively large trees. Deforestation caused soil erosion, further reducing the amount of tillable land available to a growing population and creating marshlike conditions in many places along the rivers. People had to go farther and farther away to find firewood, and game animals became scarcer. At the same time, buffalo herds began to appear to the west, perhaps luring people away from the crowded city to the plains, where meat was plentiful—much as modern-day people move in response to changes in the labor market, housing prices, and similar economic factors. Other Mississippian cultures up and down the river were becoming more powerful. As a result of any or all of these factors, the economic system of the Cahokians collapsed, taking with it the entire population.

MESOAMERICA

Economic patterns in Mesoamerica continued those established during the ancient period. Mesoamerica was inhabited by a succession of large and powerful city-states that relied on agriculture and trade for survival. These cultures also left behind a considerable amount of monumental architecture.

Numerous civilizations from Mesoamerica could be cited, but perhaps the most dominant one during the pre-Columbian period was that of the Maya. The reach of the Mayan civilization extended throughout northern Central America. It included modern-day Guatemala, Belize, and parts of El Salvador and Honduras as well as the Mexican states of Tabasco, Chiapas, and, on the Yucatán Peninsula, Yucatán, Campeche, and Quintana Roo. Historians conventionally divide Mayan history into three periods. The earliest, the Pre-classic, extended back into the centuries before the Common Era until about 250 C.E. During the Classic Period, from about 250 to 900, Mayan civilization reached its zenith. Sometime around 900 Mayan civilization went into decline and eventually collapsed. Its position as the dominant Mesoamerican culture would later be assumed by the Aztec, the people the



Black limestone mask, Santiago Ahuizotla, Mexico, 150 B.C.E. to 700 C.E.; masks like this one, in the Teotihuacán style, were brought to the Aztec capital as tribute after wars. (© The Trustees of the British Museum)

Spanish conquistadors encountered on their voyages to the New World in the 16th century.

The Mayan Classic Period was a period of intense economic activity. Mayan culture was highly urbanized, with major cities including Palenque, Calakmul, Chichén Itzá, Caracol, Copán, and smaller cities including Bonampak, Altun Ha, Dos Pilas, and Uaxactun. Most of these cities were located in the southern lowlands, though there were some population centers in the northern highlands. One of the Maya's most significant economic activities was pyramid construction. For example, Calakmul is the site of the largest pyramid platform, at almost 150 feet squared, to have survived from the Classic Period, but numerous other pyramids, used primarily for ceremonial purposes, are found throughout the region. Additionally, the Maya produced an extraordinary number of temples, administrative buildings, palaces, monuments, and stone slabs celebrating the lives of rulers. Unfortunately, many of these buildings and monuments were made of soft, chalky limestone, so time has not been kind to them.

Mayan society was highly stratified, with a king at the top, a relatively small number of clan rulers, and a large peas-

ant labor force. The Maya achieved enormous wealth first through the development of agriculture. Through such innovations as terraced and raised fields and extensive irrigation systems, the Mayan economy was able to support a large population; several Mayan cities had populations of more than 50,000, and some may have had as many as 100,000 or more. Historians believe that one of the factors that led to the decline of Mayan civilization was a drop in agricultural output caused by drought, deforestation, and soil erosion.

Later in the Classic Period, though, the backbone of the Mayan economy was trade. One of the commodities at the center of Mayan trade was salt. Historians estimate, for example, that the city of Tikal consumed more than 131 tons of salt annually, using it in their diet and as a preservative as well as for religious and ceremonial purposes. Much of this salt came from salt beds that lined the coast of the Yucatán Peninsula. During the dry season from January to May salt marshes were left behind, where, it is estimated, up to 22,000 tons of salt were extracted from the spongy ground. Many geographically isolated islands traded salted fish for other commodities they could not provide for themselves. Indeed, throughout Mayan realms, places that could not otherwise support themselves acquired valuable commodities, including food, by bartering for them with salt.

This type of trade turned a number of Mayan cities into “middlemen” in trade and exchange. One good example is Tikal. The city itself did not have many resources. The source of its wealth, though, was serving as a hub for the exchange of salt from the north with such commodities as obsidian and jade from the Chiapas highlands and elsewhere. Another major hub was Cancun, as evidenced by the city’s 270,000-square-foot, 170-room palace. So important was this type of trade and exchange that the decline of cities such as Tikal was attributable in large part to changes in trading routes. Tikal, for instance, was a major hub, but when the population of Mayan lowlands declined, Tikal served as a transfer point for fewer and fewer goods. Contributing to its decline was the rise of sea trade, which allowed goods to be transported far more quickly and efficiently.

Meanwhile, Tikal, Copán, and other Mayan cities conducted a vigorous trade in salt and obsidian, a volcanic glass used to make tools and ornamental objects. This obsidian was transported in a form called spall, referring to flakes and smaller chunks. Much of the obsidian came from central Chiapas communities such as El Chayal, Ixtepeque, and Teotihuacán. Obsidian, though, did not simply pass through these communities. A major economic activity was the processing of obsidian into usable sizes and forms. It is estimated that Tikal, for example, had about 100 obsidian workshops in the year 700. These workshops employed not only skilled crafts-

men but also a large number of porters, usually slaves, who moved the commodity about as it arrived in the city and was distributed to workshops and then shipped out to other communities. The Maya did not use wheels or beasts of burden, so slaves carried products under their own power. In many places in Mesoamerica roads were built with very light-colored stone so that goods could be transported at night rather than during the heat of the day.

In control of all these activities were members of an elite class who maintained their power from the wealth they obtained through trade. This elite class formed alliances with similar elites in other cities, sometimes through marriage and other kinship alliances. By exchanging salt, obsidian, and other commodities such as jade and the mineral pyrite (used for mirrors), they maintained their control over the people in their region. The prestige of certain goods can be measured by the proximity of workshops to elite neighborhoods and royal palaces. In particular, the manufacture of embroidered cloth was considered a prestige activity; ownership of such cloth for clothing was a sign of high status.

Much of this trade was conducted over land routes, but trade by sea was equally important for some communities. A good example is the island of Ambergris Caye, located off the coast of Belize. A large merchant class maintained a virtual monopoly over seagoing trade. One of the island’s major exports was salt. Salt was traded for obsidian, jade, and similar materials, used on the island to manufacture pottery, which was then traded for other commodities the islanders needed, including food. Other goods included amber, embroidered cloth, cacao (beans that were the source of chocolate), and turquoise. Some of the goods were luxury goods, such as quetzal feathers and jade, used by members of the elite as symbols of their power and wealth. Others were more utilitarian household goods, the demand for which was rising during the Classic Period as populations increased.

All of this trade was conducted without benefit of money, although cacao beans were often used as a form of currency—contradicting, perhaps, the old saying that “money doesn’t grow on trees.” Goods were priced relative to one another and exchanged in barter transactions. The personal wealth of those who controlled trade and manufacture was acquired from the goods themselves, which could then be bartered for food, clothing, and other goods.

The decline of Mayan civilization can be traced back to the collapse of its economic system. Historians have offered several theories about why Mayan cities lost power, influence, and wealth by the end of the Classic Period. One theory is that populations grew beyond the ability of the land to carry them, leading to famine. Others point to warfare between city-states, requiring cities to devote more of their economic

THE ROLE OF OBSIDIAN IN THE MESOAMERICAN ECONOMY

The importance of obsidian in the Mesoamerican economy cannot be overstated. Obsidian flakes and tools have been found at nearly every archaeological site in the region. Obsidian was valued as a cutting tool because of its crystalline structure. The cutting edge of an expertly made obsidian blade is literally one molecule thick, making it immensely sharper than even the highest-quality steel blade. In fact, modern surgeons have begun to use blades of obsidian, often made using Mayan technology, because these blades do less damage to surrounding tissues and create less scarring. Some eye surgeons, in particular, have turned to obsidian blades because of the delicacy of the surgeries they perform.

The ancient Maya used these blades for nearly any purpose for which a sharp tool was necessary. Crops were harvested with machete-like blades. Meat was butchered with obsidian knives. Projectile points such as arrowheads and spear points were almost universally made with obsidian. One of the Maya's most lethal weapons was a club with razor-sharp obsidian studs along its length.

The use of obsidian for ritual and ceremonial functions demonstrates the intersection between the economy and culture. The obsidian trade was important to the Mayan economy in part because obsidian was used for ritualistic purposes. Obsidian was often included among burial goods. It was thought that obsidian was a kind of blood that came from the earth—understandable, since obsidian was formed by volcanic eruptions—so it was often used in bloodletting rituals.

Obsidian manufacture was a major economic activity for the Maya, analogous to steel manufacturing in modern life. Obsidian has an extraordinarily fine crystalline structure, making it relatively easy to fracture. The first step was to remove the cortex, or the outer layer of rock. The next step is called lithic reduction. “Lithic” refers to stone, and “reduction” refers to the process of striking the material with a hammerlike instrument to chip off smaller pieces from the core. Out of these smaller pieces, called flakes, tools could be formed, or the material could be shaped into ornamental objects.

All of this activity required a large labor force and coordination of activities. Obsidian had to be mined, although sometimes it could be found in rock outcroppings or in riverbed nuggets. The raw materials had to be transported. Skilled craftsmen processed the material. Then finished products had to be transported to their destinations.

resources to military expeditions and the construction of walls and other fortifications for defense. Others point to population movements, making cities in the trade network obsolete. Because these cities could not obtain commodities such as obsidian, their outlying agricultural communities could not obtain tools needed for working the land.

The economic system of the Aztecs, who dominated Central America during the 1400s and early 1500s, was based on agriculture. While corn was the most important crop, workers also grew squash, beans, avocados, tomatoes, potatoes, and numerous other crops. Additionally, the tropical lowland provided such commodities as rubber, cotton, and cacao beans. The Aztecs had no currency, but these cacao beans, from which chocolate is made, were often used as a medium of exchange. Otherwise, goods were bartered.

An important part of the Aztec economy was the marketplace, such as the one at Tlatelolco, which was the largest in the Americas. There, people could find virtually every product available in Mesoamerica. Later, the Spanish explorer Hernando Cortés estimated that as many as 60,000 people

visited it each day. Other smaller markets could be found in other cities throughout the Aztec world. Additionally, merchants carried their goods on trading expeditions. Numerous porters carried goods in long caravans. Much of this type of trade took place between the lowlands and the highlands. Lowlanders provided cacao beans, rubber, feathers, jaguar hides, and cotton; highlanders provided manufactured products such as knives.

SOUTH AMERICA

The Andean mountain region of South America is best known for the rise of the Incan culture, which flourished for about a hundred years before conquest by the Spanish. However, the Incan culture had two major precursors that laid the infrastructure for Incan civilization. One of these cultures was that of the Tiwanaku. Located in modern-day Bolivia, Tiwanaku was a critical economic and administrative center for an empire that may have been home to more than a million people; the city of Tiwanaku itself was about 3 square miles and by about the year 800 may have been home to up to

40,000 inhabitants. The city began as a small village in about 200 B.C.E., but at its height it was arguably the most important city in the Andes.

The backbone of the Tiwanaku's economy was agriculture, and most economic activity related to agricultural production and engineering. The city and its surrounding area were located at a high elevation, with relatively warm days but cold nights. Further, the region had poor soil and somewhat sparse rainfall. Accordingly, Tiwanaku devoted its labor and resources to a number of agricultural innovations. Its farmers practiced raised-bed agriculture, increasing the yield of the land. In combination with an extensive irrigation system, terraced fields on hillsides, and raised beds in the shallows of rivers and lakes, the region was able to harvest more potatoes from an acre of land than farmers can today using modern methods and fertilizers. Connecting the fields was an elaborate system of canals, which in time were stocked with fish for consumption. These canals not only provided water but also absorbed heat from the sun, providing a kind of thermal "blanket" to prevent crops from freezing at night. Thus, virtually 100 percent of Tiwanaku's economic activity was devoted to agriculture. Farmers, of course, cultivated and harvested crops, but engineers, road builders, stonemasons, and other craftsmen devoted their time and resources to building and maintaining the infrastructure that supported agriculture.

The other major culture that was a precursor to the Inca was that of the Wari. While the people of Tiwanaku were peaceful farmers who showed little interest in extending their realm, the Wari were a warlike culture that spread through military conquest. They lived in modern-day Peru, reaching the height of their power between 700 and 1200.

The Wari were able to achieve their power because they had numerous economic resources. These resources included minerals, petroleum, fish, sugar, wool, cotton, pottery, foodstuffs, and coffee. The Wari fed themselves by using terraced fields for agriculture, making their fields far more productive and increasing the amount of land available for cultivation. Extensive irrigation systems watered the fields. Beyond that, though, the Wari economy relied on trade and was a stop-over on a trade network that extended from the Pacific coast inland. To foster this trade, the Wari built an extensive road network, roads that were later used by the Inca culture. These roads also were used for the movement of troops who conquered neighboring regions and absorbed them into the Wari Empire. Additionally, the Wari economy revolved around construction and engineering. The Wari constructed numerous cities that were laid out in precise ways, some of them crisscrossed by underground tunnels. Their stone buildings even had ventilation systems and were resistant to earth-

quakes. Wari city planners and engineers would be the envy of modern people who perform these tasks.

All of this construction activity implies a system of organization, a class structure with skilled tradesmen, a large labor force, supervisors to oversee the activities, and a class of entrepreneurs to conduct trade. Unfortunately, though, historians know little about the day-to-day workings of the culture, primarily because the Wari left behind no written records. Much the same can be said of other South American cultures that rose, prospered, and fell during this era.

The Inca Empire, which dominated the western coast of South America from the late 12th century into the 1400s, built an economic system based on an abundance of resources, including water; agricultural land; mines; precious and semiprecious metals, such as gold, silver, and copper; and a large force of peasant labor. The Inca economy was a command economy, with the state controlling resources, products, and the allocation of labor, although local barter between individuals was tolerated. A system of tribute called *mita* funded the state's enterprises. The economic system depended, first, on the ability of the state to marshal a large labor force in the construction of cities, irrigation projects, the terracing of mountain land for agriculture, and especially the empire's vast network of roads, which linked every part of the empire and was used by llama caravans carrying goods. Additionally, a corps of runners and couriers carried messages as well as fresh fish from the coastline to the interior. These couriers, who were posted at intervals, could cover up to 1,200 miles in as few as six days.

ASIA AND THE PACIFIC

BY KENNETH R. HALL

Domestic welfare in Asia improved during the medieval age because of the increased agricultural productivity of essential grains and cash crops. Different localities specialized in marketplace products such as cotton, indigo, sugarcane, tea, and pepper. Long-distance trade was supported by the development of road or river networks that linked upstream urban centers and coastal regions. In some cases Asia's medieval-era urban centers were coincident with the centers of political power, as was the norm in China; in other cases, as in India and Japan, they arose from marketplaces that developed around a major ritual complex or commercial emporium that was linked to other centers of trade. Urban residents, who might number 400,000 or more, consumed substantial quantities of food and demanded luxury goods. This had an enormous impact on the surrounding countryside, which provided food and local handicrafts. It also necessitated increasing numbers of local artisans and merchants

and ensured regular economic and cultural contact among the various urban centers of Asia.

THE SPREAD OF SETTLED AGRICULTURE

Medieval Asian and Pacific societies benefited from ample and freely available productive land that supported the basic economic needs of the region, which was generally underpopulated before 1500. Asians and Pacific islanders moved from less fertile to more productive unoccupied areas by foot or boat; they also migrated as the result of natural catastrophes (such as volcanic eruptions and earthquakes), prolonged unfavorable weather conditions, environmental or geological change, or to avoid contact with other mobile and potentially hostile populations. The geography of the region is diverse. The several dry and less fertile zones included China's Gobi Desert, southern Asia's Thar Desert, and the many desert regions of Australia; the rugged mountainous regions, such as the Himalayas, that surround the northern borders of southern Asia; the sparsely settled volcanic Southeast Asian and Pacific islands where mountains and jungle coincide; and the substantial grasslands of central Asia and Australia, where there was a pastoral tradition and where meat and milk products, rather than grains, were dietary staples.

Before the medieval era the rich alluvial soils of the Indus, the Ganges, and the Yellow River plains of northern India and northern and central China had sustained the transition from upland shifting to settled, lowland cultivation. This move was supported by new technology, such as improved tools, better water management, and a sense of seasonality, which included the use of a calendar; all these improvements allowed farmers to cultivate lands that had been useless swampland or that had been subject to heavy annual flooding. By the early medieval era settled and increasingly populous village societies in other regions of Asia were cultivating millet and other traditional grains.

The traditional Asian productive units were family centered and based in a village. The Chinese village was a collection of traditional extended-family households that consisted of the male family head, his wife, their children, his parents, and his brothers and their wives and children. Japanese village households were nuclear, consisting of the male head of family, his wife, their children, and his parents. Brothers established branch households by clearing new lands or by colonizing frontiers. The other regions of Asia and the Pacific had local variations of these.

Wet-rice cultivation became common in Southeast Asia, central and southern China, coastal southern Asia, the region of present-day Sri Lanka, southern Japan, and southern Korea from 500 to 1000 C.E. Initially in the areas of modern-day Thailand, Cambodia, and Vietnam wet-rice seeds were dis-

tributed at the beginning of the monsoon season on a plowed floodplain that had been divided into small fields bordered and contained by elevated earth. The rice seedlings matured after the terraced fields annually flooded with the water of monsoon-swelled rivers and lakes. The wet-rice crop grew quickly and needed little work, and it was harvested after the floodwaters receded.

Other regions of Asia adapted a more labor-intensive transplanted seedling method that was developed in the Cham regions of today's central and southern Vietnam in the first centuries C.E. In contrast to the broadcasting method, seed was annually sown in small, flooded seedling beds before rather than at the beginning of the rainy season. While seedlings took root, farmers and their families prepared nearby terraced fields; they weeded and broke up soil with wooden, stone, or metal-tipped hoes until the monsoon rains soaked the earth. Seedlings then were transplanted by hand with enough space between them for each plant to grow.

In the wet-rice regions of Asia there were three food staples: rice, fish, and coconuts. Rice might be affected by periodic disease, rodents, and insects. Fish (from the ocean, rivers, flooded rice fields, or fish farming in water-storage tanks) and coconuts, however, were virtually free of pests and diseases. Fish usually was dried or fermented and was the major garnish to rice. Properly prepared, rice and fish could be stored for more than a year. Coconuts (the source of fruit, sugar, oil, and palm wine) could not be stored as long but were available at three-month intervals.

Most people ate rice, whether dry or wet, in preference to other grains or starches. Reliance upon other staples was socially unacceptable except during rice famines, when rice cultivators could normally turn to root crops (such as taro and tapioca, which were grown as supplemental crops in wet-rice areas) and yams (which were gathered from nearby forests or were cultivated in rain-fed fields). Sago palms were another alternate source of starch. During the dry season local populations grew a variety of vegetables such as beans, tomatoes, and peppers. Early Asian rice cultivators also supplemented their diet by networking with highland hunters and gatherers, in part to negate the highlanders' potential to raid their productive villages but also to exchange their diverse agricultural produce for meat and forest products, such as wood, bamboo, and tree resins.

Despite potentially high productivity, with the exception of China urbanization in the early wet-rice producing regions was unusual. In part this was due to cultural preference, the geographical isolation of the productive regions, the intensive communal labor commitments of wet-rice cultivation, and the seeming lack of need for supralocal political commitment.

Control or protection of access to water was an important issue that had social and political consequences. In regions where rainfall was plentiful, where there were many water sources useful for irrigation, or where there was no threat from outsiders (such as raids by upland populations and semi-nomads from the grassland steppes), there was little need or opportunity for a political elite to manage or dominate the water system. However, where there was a limited water source or a wider need to coordinate water management, political development was likely. While some historians emphasize the role of local initiative in the development of wet-rice agriculture, others highlight the critical role of a single powerful individual or external institution—religious or political—as the initiator or consequence of wet-rice cultivation and emphasize the subsequent requirements of surplus productivity to pay the political or managerial elite.

Historians debate whether terraced agriculture—and irrigated wet-rice agriculture as a whole—required the efforts of a well-organized and hierarchical “hydraulic” society and how this contributed to the development of early centralized political systems. In a so-called hydraulic society the great majority of individuals were subordinated politically and ritually to those who built and maintained the terraces, water canals, and storage tanks that comprised the water-management system. In such a society the needs of the individual were secondary to the welfare of the group. The social system reflected the natural hierarchical structure of terraced farming, with both water and power flowing from top to bottom.

THE CHINESE POLITICAL ECONOMY

China’s economic vitality can be measured by its urbanization. By the Song era (960–1279) China had five cities with populations over 1 million; 50 had populations of at least 100,000. The Italian merchant Marco Polo (1254–1324), who visited China at the end of the 13th century, described China’s cities as the greatest in the world, with marketplaces where anything one might desire was available. In the minds of China’s Confucian scholars, this prosperity depended on each person’s fulfilling their societal responsibility: Peasants produced grain and cloth; artisans transformed China’s natural resources into finished products; merchants facilitated the circulation of China’s various products; and rulers managed money, which had become the essential basis of commercial exchange.

The previous dynasty, the Tang (618–907), had abandoned the use of bolts of silk as supplementary currency and introduced copper coinage and a low-denomination unit of exchange. By 1085 Song mints were producing 6 billion copper coins per year, which circulated throughout Asia as the regional basis of increasing monetized exchanges that periodically

created shortages of copper cash in China. By the end of the Tang era Chinese merchants traded receipts from deposit shops where they had left money or goods. To insure against periodic credit and monetary shortfalls, Song administrators licensed shops to issue these certificates of deposit; these licensures evolved into the world’s first government-issued paper monetary system.

In the Song era Chinese merchants formed partnerships and joint-stock companies, and they developed management systems that separated owners and managers. In large cities merchants and artisans were members of guild organizations according to the types of products they produced and sold. The guilds set production standards and prices and arranged sales to wholesalers and shop owners. The government negotiated with these guilds in its acquisition of goods or assessment of taxes.

During the Tang and Song eras the center of China’s economic productivity shifted from northern China to the Yangtze River basin in central China. This was due to the greater potential productivity in central and southern China, where warmer temperatures allowed the harvest of two crops per year. The south also had more rivers and streams that reduced the cost of transport and allowed the development of regional specialization. The Tang initially constructed and the Song extended the Grand Canal that linked the Yangtze and the Yellow River basins, which allowed mass shipments of rice and other goods from south to north.

In 742 China’s population was roughly 50 million; with expanded rice production in central and southern China and other economic innovations, China’s population reached 100 million by 1102. Farmers responded to the new economic opportunities by increasing their productivity. They brought new fields under cultivation, built new water-management systems, and developed innovations such as steel-tipped plows, wheelbarrows, waterwheels, and double-cropping (the planting of two crops in alternate rows or a succession of carefully timed crops).

Farmers’ surpluses allowed them to acquire charcoal, tea, oil, wine, and cloth from the marketplace. They even began to purchase grain for their daily consumption and to specialize in the cultivation of cash crops, notably sugar, oranges, cotton, silk, and teas. Some rural people moved to urban centers, where they became craftsmen, or took jobs in the transportation industry, notably in providing inland and coastal transportation. By the Song era China’s shipbuilders were building compartmentalized ships that could carry 500 sailors and extensive cargo on China’s rivers and canals and in the adjacent ocean. Among the variety of products Song merchants sold were Chinese silks, porcelain, stoves, plowshares, cooking equipment, iron nails, printed books (from

newly invented printing presses), and exotic imports from the other regions of Asia.

China's prosperity was a potential burden on peasant producers; those who were less productive become tenant farmers who were dependent on landed gentry. Severe debt led to debt bondage, wherein the husband might sell his wife and children or himself into slavery to pay family debts. China's economic transformation provided both opportunity and pressure on the Chinese government. Government tax revenues soared, but so did government expenses.

The Tang government tried to ensure their rural public's well-being by implementing an "equal field system," which provided roughly 19 acres of land to each farming family. This innovation was also a way to remove the economic resources of the state's two opponents, the landed gentry and the Buddhist Church, which at that time had vast wealth based in their extensive landholdings. Locally powerful gentry used their influence with local officials to maintain their families' continued land control, and they were the beneficiaries when peasant families lapsed into debt.

To ensure the availability of key commodities against merchant hoarding, the state held monopolies over such supplies as rice, cotton, salt, and iron. The Tang implemented "ever normal granaries," which were filled with annual tax assessments at the time of harvest, to guard against periods of famine. The statesman Wang Anshih (1021–86) of the Song unsuccessfully tried to implement a broad social welfare program that included guaranteed loans to farmers (to allow them to avoid debt), fixed commodity prices, unemployment insurance, and old-age pensions. The Song tried to moderate the revenue-collection systems that had traditionally applied to northern China, which were based in annual household assessments. The Song system taxed the acreage cultivated in the newly developed wet-rice regions of central and southern China.

In search of additional revenues, to be more efficient and fair in the assessments of taxes on peasant production, to insure food for the imperial court and the army, and to divest control over the milling of grains from merchants and local nobles, Song monarchs made the milling of grains a state monopoly during the late 10th and 11th centuries. A new water mill agency, staffed by state eunuchs (castrated men), took direct control over mill construction and their operations at the strategic intersections of the state's waterways. Song-era art and literature portrays the efficient management of mills as symbolic of the orderly Song state. By 12th century, however, subsequent Song monarchs had privatized the mills, to the advantage of local merchants, Buddhist temples, and landed aristocrats, and later dynasties could not or were disinterested in reestablishing this monopoly. With similar objectives, early

Song monarchs created new bureaucratic agencies to manage the import of foreign commodities at China's coastal ports, but by the 12th century they had relinquished this further state initiative to better manage China's economic affairs.

When the Mongols took control at the end of the 13th century, they initially implemented a decentralized system of land grants. Their military commanders, nobles, and army units received revenue collection and exploitation rights over a designated territory. However, because the Mongol warrior-commander assignees had military responsibilities elsewhere, they were often unable to collect their entitlements. In their absence bandits, rebels, and local militia fought to take control. The Mongol rulers eventually reappointed Chinese administrators but extracted taxes by licensing tax collectors, called tax farmers, most of whom were Muslim merchants from central Asia who had bid against each other for these entitlements. Former Chinese officials in part agreed to cooperate with the Mongol rulers so they could use their administrative posts to shield Chinese society, and especially their own landed wealth, from Mongol rule.

When the Ming (1368–1644) deposed the Yuan (Mongol) Dynasty and restored Chinese authority, they avoided the ruinous experiences of the Mongol tax collectors. Ming authorities incorporated gentry in their *lijia* system, in which the local elite took responsibility for equitably assessing, collecting, and transporting local taxes, paid mostly in grain, in theory to support the community. But when these local collections fell short of what the Ming bureaucrats needed to cover their basic government services, they levied additional local tax assessments that impoverished local peasants. Eventually the Ming implemented an inclusive monetary tax to achieve some degree of equity. In their attempts to survive the severe Ming tax initiatives, new lineage associations formed. These local associations held designated land in common and supported cooperative ventures to provide emergency support for those in need and to fund joint ancestral rites, ancestral temples, and schools. In time these hierarchical lineage associations became major economic and political forces and a vital local institutional means of protecting local interests against those of the imperial government.

TEMPLES AS ECONOMIC CENTERS IN INDIA AND ELSEWHERE

In contrast to China, where government regulation beginning in the Tang era prevented religious centers from having enough economic resources to challenge the authority of the state, in India and elsewhere temple complexes were alternatives to political centers in their support of economic activity. Temples were also major consumers of goods and in various ways stimulated trade. Well-endowed temples accumulated

large quantities of land, livestock, and valuables such as gems, precious metals, and coins from the donations of pious pilgrims. Much of this wealth was used to support daily rituals in the worship of temple deities as well as periodic festivals. Oils and incense were lighted for the gods' pleasure, perfumes and flowers were sprayed and spread on their images, and offerings of food were made several times a day. Temple administrators, priests, cooks, gardeners, guards, musicians, and dancers all were paid temple employees. Sculptors, metalworkers, and other artisans who constructed and maintained temples found additional employment in the towns that grew up around sacred temple centers, as did merchants who catered to the temple's direct needs and its pilgrim trade. Representative inscriptions from southern India and Cambodia report that major temples could feed more than 1,500 pilgrims on a normal day and about 4,000 on festival days.

Merchant guilds agreed to make voluntary contributions to a specific temple, usually calculated as a percentage of goods sold. While merchants had been patrons of temples from earlier times, beginning in the 12th century skilled artisans, notably wealthy weavers and workers in precious metals, were occasional patrons. As their economic standing rose, weavers and other artisan communities began to demand more social recognition; they sought prominent roles in temple ceremonies and membership on temple-management committees.

TAXATION, CURRENCY, CLOTH, AND SLAVERY IN INDIA AND JAPAN

In India during the post-Gupta era (ca. 650–ca. 1500), as in Japan under the Kamakara (1192–1333) and Ashikaga (1336–1573) shoguns, a regionally based military elite who periodically accepted subordination to enterprising warrior-dominated courts provided security to their rural dependents in return for a share of local production. At the local level in Japan administrative stewards and constables, who had managed aristocratic estates during the previous imperial period, merged into a hereditary military elite, called the samurai, who were ultimately bound by service contracts to a supreme military lord, or shogun. The shogunate system, called the “tent government,” depended on the shogun's willingness to acknowledge the local territorial income and administrative rights of his samurai lords. The shogun's income derived from his personal estates rather than revenue transfers from his subordinate samurai's local income collections.

In India competition between the military and long-standing semiautonomous agricultural and ritual communities and powerful merchants culminated in the formation of the Deccan Plateau-based Hindu state of Vijayanagar in the 14th century. Vijayanagar controlled the entirety of southern India, while northern India remained politically divided. In

part, the Vijayanagar state was the consequence of a rapid economic expansion in southern India from the 10th century onward. This enabled the nonlaboring landholding elite, in partnership with regional monarchs, to consolidate private ownership over previously uncultivated lands and thus undercut the authority of the corporate communities of peasant cultivators. By the 14th century social unrest and dynastic conflict pitted the landlords against peasant cultivators, artisans, and merchants, to the advantage of the intervening warriors.

Vijayanagar's monarchs incorporated the regional warrior elite (*nayaka*) as provincial governors, who asserted their political and economic authority from regional military garrisons, in contrast to the previous age when troops clustered around the royal courts or their patrons. The new warrior elite regarded local agricultural institutions as stumbling blocks to effective rule and destroyed them; then they initiated local alliances with individual elite and cooperative temples. In 1429 widespread peasant and artisan rebellion against the initially unreasonable revenue demands of the partnering landlords (*kaniyalur*) and Vijayanagar's *nayaka* officers necessitated more direct royal intervention and consolidation of state authority but to the advantage of the *nayaka*, who cooperated in the restoration of local order. Subsequently, Vijayanagar's kings incorporated the locally based *nayaka* warrior elite as the state's agents but with promises of tax concessions and the restoration of preexisting landholding rights to the peasantry. The empowered warrior elite were obligated to make stipulated remissions of local revenues to the king and to personally maintain numbers of cavalry to meet the king's demands in times of war. Local linkage among *nayaka* warrior elite, merchants, artisans, and temples was mutually profitable. Through the late 17th century there was sufficient opportunity for local producers and the warrior elite to share in the enhanced regional economy, in part driven by the regional cotton-weaving industry that was linked to the profitable Indian Ocean trading networks, to ease social tensions.

In both India and Japan ambitious rulers increased the rate of land tax that was assessed on the estimated rate of annual yield, or their share collected directly at harvest time in the grain-threshing room. In India officials or their representatives negotiated with long-standing village governing committees composed of village and caste elders in making local revenue settlements. Either merchants paid their taxes directly to royal officials who supervised urban marketplaces, or a marketplace or merchant and artisan organization made collective payments to the state.

Some historians regard the revenue collections by the military elite as exploitative and parasitical—as payments for little more than protection against a potential raid by warrior

or samurai troops. More sympathetic historians counter that India's warrior system, in particular, maintained the autonomy of village societies and provided them the security required for their continued productivity and social stability.

While there was earlier small-scale use of high-volume gold and silver coinage in the various regions of India, by 1300 smaller-denomination brass and copper coins were being issued in India and China to facilitate the greater number of marketplace exchanges. Unlike China, India at that time did not progress to the use of paper currency, although India's major commercial centers were known for their money-lending potentials and were networked to other major marketplaces by an assortment of personal, partnership, guild, caste, or merchant association connections.

By 1300 India's textiles had become a major medium of exchange throughout Asia as an alternative to monetary transactions. The best Indian textiles were woven in Gujarat, such as the extremely expensive silk and cotton cloth with woven patterns and the less expensive, plainly woven and coarse cotton textiles decorated with woodblock prints. High-quality Chinese silk, Javanese dyed cotton batik, and Indian cloth with woven patterns were in high demand for use in religious rituals throughout Southeast Asia; the less expensive Indian and Javanese cotton cloth replaced local bark cloth or nudity as the attire of the local upwardly mobile.

In volume and character, slavery in India, as elsewhere in Asia, changed during the 13th and 14th centuries. In earlier times individuals became slaves because they were in debt, as a legal penalty, or as a result of being captured in warfare or by pirates. In the 13th century increased military capacity, notably the first use of gunpowder warfare, encouraged raids against neighboring territories to capture and enslave populations, who were sent to cultivate frontier lands. This increased productivity either directly (through income rights) or indirectly (through taxation) sustained the substantial expenses of that era's courts and their luxurious lifestyles. Northern India's regional authorities enslaved populations that refused to pay taxes and sold them in flourishing slave markets, from which they were sent to destinations in central Asia. In this same era several ports in Southeast Asia were major slave markets, largely supplied by local warfare and the rampant piracy in the regional waters and adjacent coastlines of the China Sea and Indonesian archipelago.

KOREA'S MEDIEVAL-ERA ECONOMY

Korea's medieval economy was based in a rigid and restrictive social hierarchy. Distinguished Confucian aristocrats with ties to the imperial capital were in control; commoners were rice farmers who provided a share of their produce and their labor as tax payments to the state and its aristocrats; and

the "lowborn" were bound in service bordering on slavery to the Korean elite and government officials. The "lowborn" were hereditary agricultural laborers, domestic servants, and workers in government gold mines and porcelain factories.

These court monopolies supplied the consumptive demands of Korea's elite, supported Korea's overseas trade, and provided the commodities for Korea's mandatory tributary payments to the Chinese court. With the exception of silk, which was woven by villagers and collected as a mandatory tax payment to the state and its elite, government bondsmen rather than independent artisans produced other fine manufactured goods and crafts. A small Korean merchant class serviced the state's elite with high-quality Korean products and luxury imports from neighboring China and Japan. Most of Korea's higher-level trade took place in the imperial capital. Rural poverty, the result of the exorbitant drain of local productivity to subsidize the court-based elite and periodic famines, restricted commoners' access to larger marketplaces. Local marketing was characterized by barter exchanges of local production rather than cash-based transactions.

Royal officials and the military received a mixture of assigned salaries and hereditary rights to produce from delegated property. Powerful absentee noble families, who preferred to live in the capital city rather than in the primitive countryside, military commanders, and richly endowed and powerful Buddhist temples controlled the remaining unassigned lands, which were organized into regional estates. Unlike the military elites who came into power in medieval Japan and India, Korea's military elite was not closely linked to the land or the agricultural population by residency. They were centered in regional command posts or at the imperial capital, and they depended on a professional managerial class to control their rural estates and to collect their share of local produce.

In the 1390s the Yi rulers (1392–1882) attempted to rectify the hereditary Korean landholding system by confiscating all the landed estates, burning the old land registers that recorded preexisting landholding rights, and then redistributing assignments of lands to a wider network of royal officials and military, known as merit subjects. Despite their intentions, the reassigned land again became the hereditary property of elite families.

ASIAN TRADE NETWORKS

Throughout the medieval era peoples and cultures of the Indian Ocean and the adjacent regions to its east were linked in a maritime network that extended from the port cities of the eastern coast of the African continent all the way to Japan and Korea. The Tang and Song governments took great interest in commercial exchanges with the regions to China's south.

Their interest stemmed from periodic insecurities along the Silk Road caravan route across central Asia. This resulted in regular market shortages that made China's merchants unable to satisfy the Chinese aristocracy's continuing demand for Western products or the Chinese government's need for the substantial tax revenues it assessed on imports.

From 500 to 1000 Buddhism and Hinduism reinforced the enhanced India-China commercial network along the Silk Road and the Indian Ocean passageway, as evidenced by the archaeological remains of large temple complexes built in this era in Southeast Asia (modern-day Indonesia, Cambodia, Vietnam, and Myanmar), southern India, Sri Lanka, and northeastern India. In Southeast Asia trade-derived opportunities supported the rise of new political economies, including Sumatra-based Srivijaya, Champa and Vietnam on the Vietnam coastline, Angkor in Cambodia, Mataram in Java, Sri Lanka, post-Gupta (after 650) India (Bengal and southern India), and the Korean and Japanese imperial regimes. Exchanges of metals, religious artifacts, ceramics, and exotic jungle products assumed new significance, in contrast to the earlier trade that was based in the exchanges of India's textiles, pepper, and bronze artifacts for China's silk, Middle Eastern incense, and Southeast Asia's spices.

The volume of Indian Ocean trade surged in the 11th century thanks in part to the regional stability established over the Middle East by Muslim Abbasid caliphs (749–1258) and Seljuk Turks (1038–1194). Middle Eastern merchants took to the Indian Ocean to seek Asian goods in exchange for their own. This, paired with a stable Chinese market, caused southern India and Sri Lanka to become new international commercial hubs, filling roles as strategic intermediaries in the trade between the Middle East and Southeast Asia. In Southeast Asia, Java became prominent because of its central role in providing international access to the spices of the Moluccas, or Spice Islands, of Indonesia's eastern archipelago.

By this time regional centers were working together as one great integrated Indian Ocean trade network. The increased volume of trade attracted a multiethnic community of trade specialists that included Middle Easterners, Indians, Southeast Asians, and Chinese. All the sojourning traders made seasonal voyages using the Asian monsoon winds, which blew from southwest to northeast from June through August and reversed to blow from northeast to southwest from December through March.

China's Ming rulers supported the new Melaka emporium on the southwestern coast of the Malay Peninsula, which was empowered to maintain the security of the vital Strait of Malacca passageway. Between 1405 and 1433 the eunuch admiral Zheng He and his fleet of Chinese battleships reinstated the Chinese tributary trade system, wherein Indian Ocean

countries sent periodic embassies to China's courts to present diplomatic "gifts" of their prize marketplace commodities in return for honorific material symbols and official proclamations that confirmed their local authority. Partly in response to these Ming initiatives, Asia's 15th-century trade volume substantially increased, as did the number of participants in Asia's marketplaces and the diversity of traded commodities. This prosperity attracted the attention of Europeans, whose desire to acquire Asia's exotic commodities resulted in Europe's 16th-century Age of Discovery.

EUROPE

BY KIRK H. BEETZ

When the last emperor of the Western Roman Empire abdicated in 476, the economy of the region was in decline. During the 400s the populations of European towns and cities decreased. Even the city of Rome itself, which once had more than a million residents, saw its population dwindle to a quarter of a million. The fundamental problem was that the rural economy could not support the urban economy. People in the cities, unable to get enough food from local farms, often had to flee their homes to the countryside. During the sixth century the situation worsened. The wars of the Germanic peoples further disrupted trade, often destroying the routes that had brought food and other goods into cities. Urbanites who fled to the countryside typically did not farm effectively and eventually perished. Those who succeeded in staving off catastrophe barely grew enough to feed themselves. For roughly 400 years Europe was mired in a subsistence economy, in which people grew barely enough food to keep themselves alive. Very little was left over for sale to others.

During the sixth and seventh centuries the populations of European cities outside Italy and the Byzantine Empire declined so that no city or town had more than 10,000 residents. Some historians argue that this was true for Italy too, but other historians believe that Rome retained a population of about 20,000. Italy had the advantage of being in the middle of the Mediterranean Sea, with access to some of the wealth available from trade routes heading west, east, and south across the water.

The European economy saw its first period of growth during the eighth century in the north and west, when cities like Ipswich in England and Dorestad in the Netherlands were home to international trade. That growth was sustained in the ninth century during the reigns of the Carolingian kings, especially Charlemagne (r. 768–814), who tried to standardize European coinage and encourage trade. Around 900 the European economy began to grow because new technology made farming more productive and trade routes were open-

ing up, connecting the various parts of Europe economically. At the same time Vikings raided much of Europe, sometimes going far inland to attack places like Paris. The destruction and thievery of the Vikings did much to slow Europe's economy, but they also forged new trade routes. The two most important were a route from Denmark south along the coast to Spain, with stops at Britain, Flanders, and France, and a route southeast from the Baltic Sea down to the Byzantine Empire and the Islamic Near East.

From about 900 to 1200 feudalism was the dominant political structure in most of Europe. Feudalism was defined primarily by economic relationships. After the fall of the Western Roman Empire, many people had few choices for survival. One was to go under the protection of a powerful lord. In return for that protection a person had to agree to help work the lord's lands and to pay the lord an annual fee. Another choice was to become a soldier in service to the lord. During the ninth century the cavalry was the most important part of European armies. Often, if he could afford to do so, a man would sell his land to buy a horse and basic military equipment and become a knight. Another option was to become a serf, a person who was tied to the land and could not leave without their lords' permission.

The 11th century in Europe was a period of steady growth in wealth and populations. A trade route down the center of Europe, from Flanders to Italy, became well established. In the Champaign region of France, northern traders who made the annual trip south established a yearly trade fair, held at various locations throughout the years. The trade fairs attracted farmers and villagers throughout France and merchants ready to purchase their goods. Equally important, the merchants met with regional traders who would buy goods and carry them home to distribute to local peddlers, thus spreading goods over wide ranges. Sometimes the peddlers were paid in kind—that is, they traded their goods for other goods—but increasingly they were paid with coins. Many trading centers minted their own coins, but the Byzantine Empire, Venice, and England produced the coins that were the most trusted and therefore the most widely used.

By the 13th century Europe was developing a cash economy, in which people paid for purchases with coins rather than in kind. Europe's population grew to about the same level it had reached in the 300s. The cash economy was slowly breaking down the feudal societies, because that type of economy thrived best when trade was free, and free trade required that people be free to trade. The serf chained to a plot of land was not free. Towns depended on people being free to manufacture goods and to buy and sell them. Thus towns rejected the authority of feudal lords, often choosing to govern themselves with elected town councils. Such freedom did not

come easily, and people often had to fight against feudal leaders for the right to live freely. The cash economy was making living in towns attractive, and many serfs fled their lands to find freedom in towns.

The 14th century brought catastrophes to many parts of Europe and an economic downturn in the middle of the century. Towns tended to have narrow, sewage-laden paths winding among tightly packed houses. This helped foster the spread of disease. The most notorious disease was the Black Death, or bubonic plague, which was spread by fleas from rats. Other diseases such as smallpox were sometimes considered part of the Black Death. The Black Death was worst from 1358 to 1360. By 1400 the European population had declined by 40 percent to 50 percent from where it had been in 1300. Not all parts of Europe were hit equally. Eastern Europe seems to have been hit harder than western Europe, and northern France did better than southern France. Nevertheless, the places that suffered the least still lost at least 10 percent of their populations. The plague hit rural areas as well as cities, towns, and villages. With fewer farmers, Europe's agricultural productivity declined sharply, leading to a short-



Alms box for donations to the poor, Britain, 15th century (© Museum of London)

age of food in both rural and urban areas. The solution many landowners turned to was the use of slaves. To have enough laborers to work the lands, landowners in the regions hardest hit by the plague imported slaves from Spain, Italy, and eastern Europe. But just as some areas were not as hard hit as others, in some areas the demand for manpower resulted in higher wages. Not until the middle of the 1500s would populations recover to about the numbers of the 1300s.

THE BYZANTINE EMPIRE

The economy of the Byzantine Empire was remarkable for its stability over 800 to 900 years. From the mid-300s, when it was the Eastern Roman Empire, to 1261, when bad economic policies resulted in a steep decline, the Byzantine Empire managed to remain an economic powerhouse, and its coinage was so reliable that it was the preferred money in much of the Near East and southern Europe. While the rest of Europe had a subsistence economy based on agriculture and barter until the late 900s, the Byzantine Empire had a cash economy, and shops in its cities and towns had trade goods from all over the world.

The Byzantine economy was heavily managed by the government, which set quotas for goods to be brought into its cities, set prices for many products, and told manufacturers what they could make and in what quantities. Cities were the primary consumers of goods grown or manufactured in the empire and of imported goods. City officials called prefects monitored all buying and selling within their cities and often regulated prices. The urban economy was managed by two groups: government agents and guilds. Government agents, especially tax collectors, examined anything brought into a city, anything taken out of the city, and anything manufactured and sold in the city. By keeping records of all they observed, government agents helped maintain a stable economy, one with enough of everything needed for life and without too much of anything (which could cause inflation). Tax collectors, the most determined record keepers, were feared and loathed throughout the empire because they could seize money or property as required for people to pay their taxes.

Guilds had long existed in the Roman Empire. In general they offered members limited protection against government policies and set qualifications for membership. Mostly they functioned as fraternal organizations, building guild houses where members could meet for dinner and socialize. They elected officers who could be members of a low social class and would gain prestige they could not have won outside their guilds. The Byzantine government changed the guilds by strictly regulating how they were organized and what they could do. By the ninth century Constantinople had 23 guilds. Each guild could elect its own president, but

the president had to be approved by the local prefect. Guilds determined who could practice a craft and controlled where a shop could be located, how many employees a shop could have, how much a shop could produce of an item, and the price of that item. Of paramount importance were bakeries, because they made bread, the fundamental food of the subjects of the empire. The government taxed bread, and increases in the tax sometimes caused riots and outright rebellions. On the other hand, the imperial government owned warehouses to store grain, and it required bakeries to buy from those warehouses, where costs were fixed. During shortages the warehouses ensured that bakeries had the flour they needed and that bakers were not driven into bankruptcy while keeping bread affordable for the poorest people. During surpluses bakeries could not buy cheap grain and undersell their competitors, a practice that could allow large bakeries to drive small ones out of business. Because of the government-owned grain warehouses, cities and towns always had bakeries available to serve every neighborhood.

Certain guilds were considered so important to the economy that they were made imperial guilds, answerable directly to the emperor. These guilds received preferential treatment over other guilds. Among the imperial guilds those for metalworking, making the purple dye that was reserved for the imperial family's clothing, and silk manufacturing. Oldest of these guilds was that of the purple dyers, established in about 610. The imperial guilds manufactured primarily luxury items, items that were very desirable. Silk was probably the most valuable of the imperial goods, and the empire prohibited its exportation, even after the empire acquired silkworms and learned to make its own silk cloth.

Although the Orthodox Church frowned on lending money for interest, the practice was tolerated because it helped the national economy expand. The moneylenders were the goldsmiths, mostly Greeks. At first the government loosely regulated interest rates. Emperor Justinian I (r. 527–65) forbade charging more than 12 percent interest, but most rates were between 4 percent and 8 percent. Eventually interest rates were set by social rank, with aristocrats paying the lowest rate of 4.5 percent, merchants paying 8.5 percent, and most other people paying 6.5 percent. In the last few centuries of the empire Italians took over most of the moneylending. The government would confiscate any money lent outside government-sanctioned shops. The national bank controlled currency exchanges, and it was the only place people could legally buy and sell the currency of the empire and of other countries. Again, the government would confiscate any currency exchanged outside the national bank.

Taxes were always heavy. The government charged a 10 percent tax on all goods entering or leaving the empire. Land

was taxed. Every 15 years land was reappraised, and the tax on it was accordingly adjusted. One of the most oppressive aspects of the tax was that if a landowner fled his or her land without paying the taxes owed, the neighbors of the land had to pay the taxes in addition to their own. Further, the government imposed one tax on all the land in a village, including all farmlands. All residents, rich or poor, were responsible for paying the tax, called the *annona*. To avoid the *annona*, many freemen abandoned their farms to find work in cities, leaving much arable land uncultivated.

The imperial government aggravated the problem with *pronoia*, a practice used in the early years of the empire but mostly set aside until the 1100s. *Pronoia* was a kind of land grant that freed people who had done service to the empire from paying taxes on their land during their lifetimes. These privileged people often bought land to add to their holdings, tax free. In 1261 the *pronoia* was made hereditary, taking land permanently out of taxation and increasing taxes for everyone else. *Annona* and *pronoia* badly damaged the farming industry and, combined with trade concessions to Italian city-states, brought the empire's economy near collapse. Lacking sufficient funds in its coffers, the Byzantine Empire found it hard to prepare and provision the armies it needed to keep the Turks at bay.

ITALIAN CITY-STATES

The politics of Italy for most of the medieval era was chaotic, with invasions by Germanic, Byzantine, and Muslim armies as well as frequent wars among the Italians themselves disrupting economic life. But Italy had three important economic advantages: It was located in the middle of the northern Mediterranean Sea and therefore in the middle of trade by water to both the East and West, it was the southern terminus for much of the trade from northern Europe, and its cities, even though badly depleted of their populations, retained some of the organization of ancient Roman times, helping them to control aspects of their economies.

By the 12th century cities in Italy were emerging as significant economic centers; one of the most important was Venice. In 425 the Huns had sacked the city of Aquileia, an important glassmaking center. Its people fled to islands in a lagoon, where they founded Venice. Glass manufacturing became an important source of income for the city, helping its economy thrive while most of Italy suffered from a severe economic downturn. At least two important factors led to Venice's rise to power. First, its laws forbade any citizen to own estates outside the city, cutting down opportunities to build farming estates and focusing the attention of citizens on trade as their primary source of income. Second, Venice's location in the northeast of Italy was ideal for trade with the Byzan-

tine Empire, of which it became a part. The traders of Venice were able to broker special deals with the Byzantine Empire that lowered their tariffs for moving goods into and through the empire. In addition, in the 1260s Venice received special trade concessions from the Byzantine Empire as a reward for its aiding the empire in a war against its northern neighbors. The result of these concessions was that Venice was able to draw trade, and therefore income, away from other parts of the empire, contributing to the significant economic decline that resulted in the empire's death. Venice also contributed to the eventual downfall of the Byzantine Empire by making deals with the Arabs that strengthened Arab armies.

During the medieval era Italian merchants extended their trade to China and deep into northern Africa. The gold they brought north from Mali in Africa helped relieve a shortage of gold in Europe, which in turn made Italy an essential part of the overall European economy. At the same time that trade was booming, Italian agriculture became productive enough that farmers could grow cash crops—that is, crops farmers grew solely to sell for money, not to contribute in any way to the farmers' subsistence. Thus both in urban areas and rural areas, cash was increasingly available for investing in economic endeavors such as building windmills to process grain and ships to carry goods to faraway lands.

To manage the cash that could be invested, Italian city-states invented the basics of modern banking. It was probably Venice that developed the first modern-style banks. Moneychangers had been around for centuries. They exchanged one form of currency for another. This meant that they were usually found in cities that saw a great deal of trade with foreign countries. In the 13th century some moneychangers took the next step in their work: They began accepting cash on which they paid interest. Then they invested the cash in business enterprises, hoping to realize profits after paying the interest they owed. Particularly in Venice, Genoa, Florence, and Pisa, trade economies were booming, offering numerous opportunities for investment that resulted in financial gains. With the large pools of money they amassed, cities financed armies and navies to project their authority across land and sea and invested in foreign economies to give them influence beyond the borders of Italy. Further, the newly wealthy families of Italy believed they should help their people regain the glory of ancient Rome, as they imagined it to have been. Thus the Italian city-states financed the Renaissance, giving employment to authors, artists, and architects and encouraging the boom in learning and the arts that would transform the culture of Europe.

ECONOMICS OF THE CHURCH

When the emperor Constantine the Great (r. 306–37) made Christianity the official religion of the Roman Empire, the



Silver penny of Ethelred II, minted in Lewes, England; 1003–16. Changing coin designs was a hidden form of tax, since all coins had to be exchanged for the new designs; the moneyer would charge a fee and pay the king for the right to issue the coins. (© The Trustees of the British Museum)

event had pragmatic consequences. For centuries the Roman government had supplied free bread to the unemployed and homeless in its cities, but economic problems had made this impossible for the government to continue in many European cities. In those cities Christians had taken up the charity of feeding the poor. So vital were the Christians' charitable efforts that many cities could not survive without them, and Christian bishops even took over many of the administrative duties of city governments. Thus, making Christianity an official religion had the effect of incorporating Christian charities and administrators into the national government. From 500 to 1000 Christians' role in government became even more important as bishops became the only source of law and order in cities whose finances had collapsed. One way the Roman Catholic Church of the medieval era financed its work, both religious and secular, was through charging parishioners a tax, called a tithe. Although the word *tithe* implied 10 percent, local churches often demanded and received much higher percentages of the work and wealth of the people living in their parishes.

The church divided Europe into collectorates, which were regions created to make taxation easier. Each collectorate had a collector who acted on the pope's authority. A collector was responsible for gathering the tithes and lump-sum fees for church services. The fees were usually gathered from clerics living in a collectorate and were sent to the pope. The

clerics replenished their funds by increasing the tithe owed by the laity or by imposing another tax called Peter's pence. The often-oppressive tithe, fees, and tax eventually made the general public resentful of the church. By 1100 Europeans were complaining of the church's abuses of its authority to levy taxes. Many church leaders seemed to have almost no interest in religious faith but a great deal of interest in acquiring luxuries for themselves. In the early 14th century many people began asking for reformation of the church's finances.

Another important way for the church to raise money was through simony. Simony was the selling by the pope of church offices over which he had authority. By 1400 every church office had a fixed price, and the number of offices appointed by the pope was increasing. A person wishing to acquire an office usually bought an expectative, which put the purchaser in line for the office. When the person holding that office died, whoever had purchased the next expectative took the office, and after him would be the purchaser of the next expectative, and so on.

SCANDINAVIA

During the medieval era most Scandinavians lived on the lowlands that outlined their countries, with the inland mountain ranges scarcely populated. The economy of Scandinavia was based on agriculture. Although most people were farmers, fishing was also important to the economy. Scandinavian

traders amassed wealth by selling wood, furs, amber, and salted fish as far away as the Near East. The traders brought home silver, gold, and luxury items. Silver and gold jewelry gave prestige to their wearers. But Scandinavians tended to be practical about silver and gold items, often melting them down to make coins when there was a shortage of coins or when the owner wanted to make an expensive purchase.

Viking pirates brought a great deal of wealth back to Scandinavia after looting monasteries and convents, villages, and towns. They established three cities in Ireland for trade. They raided Ireland for slaves, who were often transported to the east coast of the Baltic and forced to march overland to be sold in Iran. From 991 to 1014 Danish Vikings forced England to pay a tribute, called the *danegeld*, bringing as much as 36 million gold coins to Denmark. The trading and raiding gave Scandinavia enough wealth to create a cash economy. In the process of settling in Ireland, England, and Normandy, the Vikings established enduring connections between Scandinavia and the rest of Europe that made Scandinavian natural resources, seamanship, and merchants permanent parts of the medieval European economy.

NORTHERN EUROPE AND THE HANSEATIC LEAGUE

Much of northern Europe had never been under the control of ancient Rome, and its economy had seldom been more than a subsistence one. During the 700s international trading centers developed in England—in London, York, and Ipswich—and in Sweden, most notably in Birka. By the 900s England was a major producer of wool, and much of England's wool was traded to Flanders. Flanders manufactured fine woolen cloths, giving rise to towns where cloth manufacturers could set up shop and trade their goods. The cloth of Flanders became highly valued throughout Europe and was a major part of northern European trade with Italy and the Byzantine Empire. In the 11th century northern Europe exported large evergreen tree trunks from Norway and Sweden for use in European building; amber, furs, and wax from throughout northern Europe were also in demand as trade items. Surpluses of wheat and rye grown in eastern Europe were transported on the Baltic Sea to ports in the Netherlands, Denmark, and Germany and exchanged for cloth and manufactured goods. The Vikings controlled most of the Baltic trade until the 1100s, with the Swedish town of Visby monopolizing much the remaining Baltic shipping.

The town of Lübeck, founded in the 12th century on land the duke of Saxony had seized, had been a Slavic town. Merchants from Saxony used Lübeck as a base for trading east and west along the Baltic Sea's southern coast. The Hanseatic League was founded as a confederation of merchants who

wished to take advantage of the expanding regional economy by making trade easier. Thus the league was partly the result of an already growing economy, but it also served to accelerate economic growth by making sure that its members had legal agreements to conduct business with many towns. Government authorities often objected to the influence the Hanseatic League had on their economies, but the league was so powerful during the 14th and 15th centuries that it could defy government efforts to control it. For instance, from 1368 to 1370 Denmark waged a naval war against the Hanseatic League and lost; in a reversal of more common relationships between governments and merchants, Denmark was required to pay the league 15 percent of the income from its trade.

A key event in the growth of northern Europe's economy came in 1266, when England's Henry III (r. 1216–72) granted Hanseatic traders from Hamburg and Lübeck charters to establish trading colonies in England. Since the late 10th century England had one of the most stable currencies in Europe. Its silver coins were made by minters given charters by the imperial government to make coins. People often cut coins in half or even into smaller pieces to make exact change for a purchase, so every three years the government declared all old coins to no longer be legal tender, and people had to go to the minters to trade their old coins for brand-new ones. The exchange rate was roughly eight or nine new coins for every 10 old coins. Most of the difference constituted a tax that went to the national government. The result of this policy was that English coins became the preferred coinage for cash purchases in much of northern and western Europe. The agreement of 1266 brought England into a special trade status with northern Europe that boosted the economies of all the lands involved, because England's economy gave added stability to the international economy of northern Europe and England gained greater access to the raw materials of eastern Europe.

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

The seventh-century Byzantine world invaded by Arab Muslims consisted of politically organized, settled societies living in urban settlements (towns and cities), with an economy based on agriculture, free trade, and small crafts. Although pagan elements continued to exist, the population was largely monotheistic and Christian (which incorporated many sects), with Jews and Zoroastrians making up most of the balance. Kinship ties favored family, lineage, clientage, and ethnicity. Seafaring trade crisscrossed the Mediterranean Sea. Overland trade routes carried goods from Syria through central Asia to the Far East and back.

The Arabian Peninsula of the seventh century, by contrast, was primarily a politically fragmented, largely pagan, pastoral-nomadic society living in camps and oases, with strong clan and tribal affiliations. The declining power of several border kingdoms undermined order and encouraged violent clashes between clans. Nomadic Bedouins continually raided caravans, which compromised trade routes. As a result the economies in the parts of Syria and Iraq closest to the Bedouin migration path gradually became pastoral and nomadic, a development that eventually incorporated most of Arabia itself.

By the mid-seventh century Mecca (in present-day Saudi Arabia) was an important center along the caravan route. Caravans brought spices, leather, medicines, cloth, and slaves from Africa and the Far East to Syria. From Syria they brought money, weapons, cereals, and wine into Mecca. Meccans negotiated with both the Byzantines and Bedouins to secure guides, scouts, and safe passage and to safeguard scarce and precious water rights. Consequently, Mecca acquired both political and economic influence.

After migrating to Medina, Muhammad and his followers made continual efforts to enlist the support of other clans and to subdue those clans—including the Quraysh, his own—in Mecca and elsewhere who were resistant to his religious leadership. Muslim forces routinely raided opposing tribes and compelled them to pay the *zakat*, or alms tax, as a sign of solidarity and membership in the Islamic community. Bedouin tribes complied for a while but considered the tax a form of tribute, and after Muhammad's death they refused to continue payments. In response, Muslim forces took military action and were ultimately defeated by the Bedouins. In the short term Meccan trade was disrupted, but once the Meccan tribes were finally subdued and brought under the aegis of Islam, trade resumed.

After conquering most of their neighboring lands, Muslim Arabs established garrison cities to house military detachments. These garrisons served several purposes. First, they isolated the new military elite, with its special privileges and rights to booty, from conquered populations. Second, they ensured military dominance over conquered peoples by providing ready means to squelch any rebellions. Third, and significantly, the leaders stationed in these garrisons implemented the economic and taxation policies imposed on conquered peoples. A pattern emerged in which the conquerors became the new political and military elite and the settled societies were exploited to support them.

After the caliphates of Abu Bakr (632–34 C.E.) and Umar ibn al-Khattab (634–44 C.E.), the third caliph, Uthman ibn Affan (644–56), and his ruling regime in Medina developed two fundamental policies in dealing with conquered popu-

lations. Motivated by a wish to channel Bedouin migrations and use them to greatest advantage, the Uthman regime decided first to ensure that minimal disruption occurred among conquered peoples and second that they would develop relationships with local rulers to implement the new tax policy. Knowing the Bedouin practice of raiding camps and caravans to seize goods and other scarce resources, they understood that the looting of settled populations would undermine their ability to generate future income for the ruling regime. Further, the Uthman regime understood the need for cooperation from the local elites, because the Muslim Arabs had neither the knowledge nor the manpower to administer sedentary societies. Thus the Muslim Arab conquests of the seventh century preserved the continuity of the social organization and market economy.

ECONOMIC IMPACT OF THE MUSLIM CONQUEST

The Arab Muslim conquest had significant consequences on the economies of conquered lands. To the east, barriers to trade fell as Sassanian Iran became part of a single political entity with parts of the former Byzantine Empire. Conquering armies required housing quarters, mosques, administrative centers, and sanitation facilities. Construction followed the conquest. Iranian cities such as Samarkand, Bukhara, and Nishapur thrived with continued Muslim expansion to the east. Other cities, such as Isfahan, Rayy, and Qazvin, also grew.

The results in Mesopotamia (in the area of present-day Iraq) were more mixed. Baghdad became the seat of the caliphate and prospered along with other cities such as Basra, al-Kufa, and Mosul. Garrisoned armies followed a similar pattern of building a supportive infrastructure. A natural disaster, however, hampered economic development. Around 627 the dikes along the Tigris River burst, shifting the river flow westward and flooding the lower Euphrates River. To the present day the region is a marshland, and its inhabitants are referred to as Marsh Arabs. Following this event on the eve of the Muslim conquest, the state-supported irrigation system was seriously compromised, and agricultural output decreased. The new regime made some efforts to reclaim agriculture by repairing the irrigation system and planting date palm forests. New governors even imported slaves from Africa to assist with the labor. On the whole, after conquest the agricultural output of Mesopotamia did not reach previous levels.

Mesopotamia, like Syria and Egypt, suffered from yet another negative impact of the Muslim conquest—Bedouin migrations. Large migrations of these pastoral-nomadic people from the Arabian Peninsula into the cities and towns of Greater Syria (present-day Syria, Jordan, Lebanon, Israel, and parts of southeastern Turkey) and Mesopotamia undermined

agricultural areas and commerce, as nomads perpetually sought pasturelands for their flocks. Following their practice of caravan raids, Bedouins also continually attacked villages and towns. Along with a new taxation system, farmers gradually abandoned their fields, townspeople relocated, and local economies became increasingly pastoral and nomadic.

In Syria the Muslim conquest created a new political border between it and Byzantine Anatolia. Although the area north of Aleppo (northern Syria) had been a thriving center of olive cultivation and olive oil production, those industries declined because Syria was cut off from its markets with the Byzantine Empire. Further, the area east of the Ar Raqqa–Damascus–Aqaba axis had been a center for grape cultivation and wine manufacture. It too saw a downturn as a result of the loss of the export market and the Muslim prohibition of alcohol. In addition, economic activity from Christian pilgrimages to Palestine declined. From an economic perspective, therefore, the Muslim conquest brought prosperity to Iran and economic decline in Syria and Egypt and had a mixed impact on Mesopotamia or Iraq.

TAXATION OF CONQUERED POPULATIONS

Conquering Muslims typically made treaties with local notables, which protected the property and social status of the elites in exchange for payment of tribute (or taxes). These treaties built on existing taxation systems, with a local chief or prince serving as the point person for the new regime in collecting owed taxes. In this way the Muslim military leaders did not have to deal directly with individuals and had in place a class of people called *awan*—helpers who would be in charge of dealing with locals and intervene in disputes. A system emerged wherein the *awan* underestimated taxes owed to Muslim rulers, overestimated them to subjects, and retained the difference—a practice that was known and tolerated.

Conquered populations were subjected to a land tax and a poll tax. The land tax and poll tax were broadly considered revenues from *fay*, or immobile booty. *Ghanima*, or movable booty, was seized by conquering armies and distributed as they moved along. The land tax rate depended on the quality and productivity of the land and its distance from the market, among other factors. The tax was levied on the amount of land that one man working with one team of animals could be expected to work in one day. The poll tax was levied on the entire population and then subdivided among villagers. Payment in gold coins was expected. The tax originated from the Koran: “Fight those who do not believe in Allah and the last day and do not forbid what Allah and His messenger have forbidden and do not practice the religion of truth, from among those who have been given the book, until they pay *jizya* out of hand, in a state of humiliation.” This last instruction often

took the form of a blow to the back of the head, as the appointed local leader handed over the required number of gold coins to the Muslim administrator.

The economic consequences of this taxation system were significant. In some cases taxes reached nearly half the value of agricultural output. Taxes limited the attention farmers could give to the soil and the level of investment required to maintain agricultural productivity. Even the choice of which crops to plant was influenced by tax considerations. The tax burden was such that Egypt experienced several revolts by its Coptic peasants in 697, 712, and 725 to 726, indications that resistance to the system as well as to Muslim rule lasted many decades after the conquest. Ultimately, many peasants fled their lands and homes.

The tax system reflected a person’s place in society. Peasants, workers, and merchants paid taxes. Landowners, administrators, clergymen, soldiers, and emperors collected them. To pay the land and poll taxes was not only an economic burden but also a sign of social inferiority.

Another form of taxation was the farm tax: in this scheme, a tract of land was assigned to an individual who agreed to pay the caliphate a fixed sum (usually 10 percent) in exchange for the right to tax the peasantry at the land tax rate (up to 50 percent of the value of the agricultural output). The difference was retained by the person assigned the farm. Such persons were often members of the military who had served the caliphate and were thus rewarded with land grants.

Self-interest, class interest, and clientage thus helped implement this system of taxation. For local elites the system permitted landowning families to send sons to the central government in Baghdad to act as administrators and merchant families to broaden the reach of their trade by setting up offices in Baghdad. For the unfortunate peasants inability to pay these taxes left them with two options: They could convert to Islam or see their children sold off in slavery.

ECONOMY UNDER THE SELJUK EMPIRE (1038–1194)

After the breakup of the caliphate in the 11th century, the Islamic Empire lost its central government in Baghdad, despite the newly formed Seljuk regime’s best efforts to reinstate it. The empire was too far-flung and complex, and large landowners were primarily military and thus disaffected from the needs of agricultural production. The system of tax administration was still in place, but taxes were paid to slave governors or local Seljuk rulers. The lack of clear succession—the legacy of a nomadic heritage—permitted the subdivision and fragmentation of large parts of the empire, thus subverting any consolidation into a central administration. The notion of a Muslim empire rested increasingly on its understanding of Islam itself.

Most Sunni Muslims did not prefer any particular economic system. Although they were well motivated for economic gain, Muslims tended not to see economic activity as a vehicle for either personal or societal transformation. Nor did they try to organize people to achieve specific economic objectives, in contrast to fundamentally economic ideologies, such as communism or Marxism.

During this period, and despite the lack of a central imperial government, Islam became a unifying force in organizing social, political, and economic activity. Persia, Iraq, Syria, Egypt, and North Africa were part of an Islamic polity. Political power was highly fragmented, but gradually a sense of Islamic identity emerged. The countryside continued to provide agricultural output, but with relative stability came the growth of cities, which became centers of manufacturing and crafts: textiles, metalwork, pottery, leather goods, and processed foods. A long-distance mercantile system known as *mudaraba* evolved, in which an investor empowered an agent to trade in quantities of goods or capital and then returned to that investor his capital along with his share of the profits. Such a system required the trust that develops with a mutually understood and practiced system of values.

Whatever the type of manufacturing, units of production tended to be small. Skills passed from father to son, and shops were often handed down through generations. A hierarchy of crafts was established, with activities related to precious metals, paper, and perfume held in the highest esteem and dyeing, tanning, and butchering in the lowest. In addition to skilled crafts, cities were teeming with itinerant peddlers, street cleaners, day servants, and rural migrants. Just outside the cities were places where caravans could rest, animals could receive care, and traders could acquire food and supplies.

Although Muslims were required to pay the alms tax, they continued to have privileged status throughout the Islamic world. Non-Muslims continued to endure excess taxation as well restrictions on dress, behavior, and economic opportunity. The taxation of non-Muslims followed the same principle outlined by Muhammad. In addition to enforcing the laws regarding personal status (marriage, divorce, inheritance, and so on), local Islamic clerics, or learned men charged with maintaining the rules and traditions of Islam, collected taxes, regulated commercial contracts, set the terms of profits that could be made within a contract, and implemented rules and taxes against non-Muslims.

ECONOMIC IMPACT OF THE MONGOL INVASION AND RULE (CA. 1220–CA. 1500)

The single most consequential economic event in the medieval Muslim world was the Mongol invasion, which began

in 1219 and did not end until 1260 at the Battle of Ayn Jalut (near the Syrian coast in then Palestine). Starting in inner Asia, the chieftain Genghis Khan and his four sons conquered all of Eurasia to the Pacific Ocean. As the Mongols moved west to Iran, one city after another fell to their rule, including Samarqand, Bukhara, and Herat. The scope of destruction was widely reported—and often exaggerated—in later historical accounts. It is true, however, that many local populations were systematically exterminated and that most peasants were either driven from their land or made serfs and taxed—all with ensuing catastrophic effects on agricultural output, revenue, and population levels. Crafts such as pottery and metalwork ceased to be practiced for over a century. Urban life ground to a standstill.

Moving farther west, Hülegü Khan, Ghengis Khan's grandson and founder of the Ilkhanid Dynasty, aimed for the heart of the Muslim world. In 1242 Hülegü's forces defeated the Seljuks in Anatolia, picking off one small principality after another. Their continued incursions tipped the balance of power, and new pastoral-nomadic migrants entered and settled in Anatolia, thus putting additional pressure on the eastern border of the Byzantine Empire. As always when settled agricultural communities encounter nomads, agriculture declined in the competition for resources. After a five-day siege in 1258 the caliphate in Baghdad fell to the Mongols, and the caliph and his sons were murdered. More slaughter ensued.

Although the Mongols laid waste to large segments of the Islamic Empire in the 13th century, they started rebuilding once they gained political control. By then the Mongols, who had not espoused any single religion, had themselves adopted Islam throughout their four main political branches. As they rebuilt devastated economies, their impact on commerce was significant.

First and foremost, the Mongols maintained trade routes throughout their conquered empire, which reached westward to the Mediterranean and southward to Egypt. Every 30 miles or so were shelters called caravansaries, which contained provisions, places to house and refresh both traders and animals, and scouts and directions to the local area. This system provided stability and safety for goods as well as travelers. From Persia spices, steel, jewels, pearls, and textiles moved east to China. From China, Tibet, and Mongolia flowed furs, falcons, silks, porcelain, and medicines to Persia. Mongol trade routes became the main arteries in international trade.

Second, the Mongols promoted trade by finding international markets for local textiles. Fabrics such as satin (from the Mongol port of Zaytun), damask silk (from Damascus, where most of the Ilkhanid trade passed from Persia to Europe), and muslin (from Mosul in northern Iraq) originated from Mongol efforts to promote textile trade. The Mongols

encouraged other forms of commerce, a small example of which was the trade in playing cards, which proved so popular among soldiers and merchants that cards were eventually printed from carved blocks normally reserved for printing scriptures.

Third, the Mongols sought to improve agricultural output to maintain a steady supply of food for local populations. Perhaps better than anyone they understood the nomads' need for grain and crafts, just as settled peoples needed the livestock produced by nomads. They encouraged the expansion of rice and tea cultivation from its origins in China to Persia and the Middle East. They improved tools and spread the use of the triangular plow. They imported seeds from China, brought in new varieties of rice and millet, and improved yields of citrus trees and root crops (carrots and turnips). They also transplanted new varieties of peas, grapes, lentils, nuts, and leafy vegetables.

In addition, the Mongols developed new varieties of cotton, wool, and other materials for making rope, dyes, oils, ink, and paper. They created a special bureau for overseeing the technology and promotion of the cotton industry and promoted improvements in weaving and manufacturing. This was a significant undertaking, because cotton had become a major fiber crop and required an array of cultivation techniques (pruning, staking, harvesting); crop-processing techniques (cutting, threshing, grinding); and commodities-transporting techniques (bundling, preserving). Cotton cultivation and its associated textile manufacture remain a major industry in the Middle East.

A similar interest was given to the peasantry, who were organized into 50,000 household units that were largely permitted to run their own affairs, overseeing local farms, land and water management, animal husbandry, food reserves, and local governments. The Mongols encouraged literacy as well and built schools for both peasants and their children. This effort constituted one of the first-known attempts at universal education.

The Mongols introduced paper to the Middle East—and eventually to Europe—where only parchment had been used, thus allowing greater facility in printing and disseminating information. Technological improvements to the blast furnace also originated from the Mongols and permitted metalwork to be done at higher temperatures, thus improving the quality of the final product. The mechanized meat spit also had its origin with the Mongols and reduced the labor-intensive burden of cooking meats.

One of the most interesting innovations, albeit one that did not outlive the Mongol regime, was the introduction of paper money. The money was made from mulberry bark, cut into rectangles of various sizes, marked with various cash

values, and stamped with a special seal. The system was in place at the time of Marco Polo, in the late 13th century. The Mongols based their paper currency on silver and copper commodities, whose value in paper was controlled by an administrative body. Trade using the currency was enforced by order of the khans on the penalty of death. Problems arose, however, when perceptions of weakness in the Mongol rulers undermined confidence in the currency. Inflation usually followed. At one point inflation exceeded 1,000 percent, making the paper essentially worthless. The system was relatively short lived but was the first experiment with paper money in the premodern period.

Contemporary historians hold that the legendary destruction of cities in Iran and Iraq had a broader strategic purpose, arguing that the Mongols attempted to redirect commerce along routes that could accommodate large movements of military units, thereby safeguarding those routes. Beyond the razing and depopulation of cities, the Mongols also destroyed irrigation systems, thus preventing future agriculture and permitting the land to revert to grazing pastures. Such pastures were arguably needed for feeding horses and providing a path to retreat into inner Asia when necessary. Whatever the ultimate assessment of the Mongol invasion of the Muslim world, it may be said that the scope of their building and contributions to conquered lands was at least as significant as their initial destruction.

ECONOMIC CONDITIONS AT THE END OF THE MEDIEVAL ERA (CA. 1400–CA. 1500)

On the eve of the modern era in the 15th century Anatolia was largely in Muslim hands. By 1453 Constantinople had fallen and with it the millennium-long Byzantine Empire. Muslim expansion continued into Bulgaria and the Balkans, arousing great consternation on the part of European powers. Fresh winds were blowing, however, and the European world was awakening to a new age of progress that relied on technology, maritime trade, the gradual emergence of civil authority over religious dictates, and innovative forms of association predicated on common interests as opposed to kinship and tribal loyalties. Thus a novel set of dynamics created the preconditions from which economic progress ensued.

The Muslim Ottoman Empire retained its nomadic heritage, tribal affiliation, and agricultural base. It derived most of its revenues from land and agricultural taxes and thus did not invest in maritime power or exploration. Continued dominance over the civil societies prevented new ideas and technology from the non-Muslim West to be introduced and assimilated into Muslim lands. As a result, the Muslim world gradually fell behind in technological and economic development.

See also ADORNMENT; AGRICULTURE; ARCHITECTURE; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; FAMILY; FESTIVALS; FOOD AND DIET; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; INVENTIONS; LANGUAGE; LAWS AND LEGAL CODES; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MILLS AND MILL-

ING; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; NUMBERS AND COUNTING; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SACRED SITES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

The Americas

Report by Juan Polo de Ondegardo, excerpt (ca. 1550)

OF THE LINEAGE OF THE YNCAS AND HOW THEY EXTENDED THEIR CONQUESTS

A knowledge of the *huacas* and places of worship is very important for the work of conversion. I have a knowledge of them in more than a hundred villages; and when the Lord Bishop of Charcas doubted whether the custom was so universal, at a time when we were in a joint commission by order of his Majesty, I showed him the truth of it in Cuzco. And although the discovery of these things has taken time, yet it has been necessary as regards the question of tribute and contributions. For a very large portion of the harvests was set apart for this service, and stored in places prepared for the purpose. Part was expended on the sacrifices of the villages, and a larger share was taken to Cuzco from all parts. The portions thus set apart were from a third to a fourth, varying in different districts. In many villages all belonged to the Sun, such as in Arapa and others. In these the greater part was devoted to sacrifices, in others (belonging to the Ynca) not so much.

Another share of the produce was reserved for the Ynca. This was stored in the granaries or sent to Cuzco, according to the necessities of the Government. For it was not always disposed of in the same way. The Ynca supplied with food all his garrisons, his servants, his relations, and the chiefs who attended upon him, out of this share of the tribute, which was brought to Cuzco from all parts of the country. In time of war

the provisions from some parts were sent to others, in addition to the ordinary consumption, and there was such order in these arrangements that no mistake ever occurred. Sometimes the stores were sent from the magazines in the mountains to the coast, at others from the coast to the interior, according to the exigencies of each case, and this was done with never-failing speed and exactness. When there was no demand the stores remained in the magazines, and occasionally there was an accumulation sufficient for ten years.

There can be no doubt that this share of the Ynca was well managed. I visited many of the store-houses in different parts, and they were, without comparison, larger and better than those set apart for the service of religion.

The lands set apart for the tribute of the Ynca and of religion were sown and reaped in the same order; but it must be understood that when the people worked upon them, they ate and drank at the cost of the Ynca and of the Sun. This work was not performed by gangs, nor were the men told off for it, but all the inhabitants went forth except the aged and infirm, dressed in their best clothes, and singing songs appropriate for the occasion. In these two kinds of tribute there were two things that seem worthy of note. One is that the aged, infirm, and widows did not join in it. The other is that although the crops and other produce of these lands were devoted to the tribute, the land itself belonged to

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the people themselves. Hence a thing will be apparent which has not hitherto been properly understood. When any one wants land, it is considered sufficient if it can be shown that it belonged to the Ynca or to the Sun. But in this the Indians are treated with great injustice. For in those days they paid the tribute, and the land was theirs; but now, if it is found convenient to tax them in some other way, it is clear that they will pay double tribute—in one way by being deprived of their land, and in another by having to pay the tax in the form that may be now fixed. If any one, as is often done, sets up a claim by saying the Ynca had power to appropriate the land, the injustice and wrong is all the greater; because if such was the right, his Majesty succeeds to it; and, as regards *encomiendas* for a life or lives, it is clear that it is not the intention to grant them, nor is it just as regards the estate of the Ynca. Such tribute or tax was levied by the Ynca as King and Lord, and not as a private person. Hence arose a notable mistake. It was declared that all the farms of coca belonged to the Ynca, which was true, and therefore they appertain to his Majesty. He could grant them in *encomienda*, and resume them at the end of the term, if he so pleased, as is the case with the *alcabalas* of Valladolid. The Fiscal exerted himself to prove that the farms belonged to the Ynca, and that the *encomienda* only extended to the Indians, and this

was through not comprehending the nature of the tribute that was given to the Ynca. In effect, the Ynca took the produce of all the coca farms throughout the Andes for his own use, except a few small patches granted to chiefs and *camayus*. All the rest was taken to Cuzco, but there was not then so much as there is now, nor one fiftieth part; for in this too the reports were deceptive, as I have more particularly shown in my report on the coca.

The Ynca did the same with all the males in the flocks, which were appropriated for the service of himself and of religion, being left, however, in the same district where they were bred, and merely counted. No female was included in the tribute. The pastures and hunting-grounds were demarcated, that the flocks might not be passed from one province to another; but that each might have its assigned limits. This rule has also given rise to pretensions on the part of some, to the flocks, on the ground that they belonged to the Sun or the Ynca; and, before order was established, a great quantity was seized on this pretext. It is very certain that if his Majesty took the tribute of the flocks, he would not wish that it should be given out of what the Indians held as their own, and enjoyed as such; but only from that which belonged to him, from having been given by them to the Ynca and to religion.

From: Clements R. Markham, *Narratives of the Rites and Laws of the Yncas* (London: Hakluyt Society, 1873).

Europe

~ Documents Concerning Guilds (12th–13th centuries) ~

THE LAW OF THE FULLERS AND WEAVERS OF WINCHESTER (ENGLAND, 1209)

Be it known that no weaver or fuller may dry or dye cloth nor go outside the city to sell it. They may sell their cloth to no foreigner, but only to merchants of the city. And if it happens that, in order to enrich himself, one of the weavers or fullers wishes to go outside the city to sell his merchandise, he may be very sure that the honest men of the city will take all

his cloth and bring it back to the city, and that he will forfeit it in the presence of the aldermen and honest men of the city. And if any weaver or fuller sell his cloth to a foreigner, the foreigner shall lose his cloth, and the other shall remain at the mercy of the city for as much as he has. Neither the weaver nor the fuller may buy anything except for his trade but by making an agreement with the mayor. No free man can be accused by a weaver or a fuller, nor can a weaver or a fuller bear testimony against a free man. If any of

them become rich, and wish to give up his trade, he may forswear it and turn his tools out of the house, and then do as much for the city as he is able in his freedom.

**GRANT OF A GUILD TO THE CARPENTERS,
COMMUNE OF RICHIRZEGCHEIDE
(GERMANY, 1180)**

Be it known . . . that in those times in which Theoderic in Mulingazzin and Henry Flaco were mayors of the citizens, they, with the advice and common consent of the officials of Richirzegcheide, agreed for the honor of St. John the Evangelist, for the sake of usefulness, to concede a fraternity to the carpenters who were petitioning them. And this was approved in the City Hall in the presence of the officials of Richirzegcheide. They shall have this fraternity by this law; that every carpenter, that is dreslere, wishing to join the said fraternity will give twelve solidi for the fraternity. And it was decreed that every apprentice, who is commonly called leirtint, should pay four solidi on his entry. But others who are not of the craft of these brethren, and who wish to have the said fraternity, will give twenty-four denarii for the same fraternity. Also they ought to enjoy this law, that, whatever man or woman of the fraternity should depart this life, there will be given for his obsequies at death four pounds of wax; and, for his vigil, six men, who will watch diligently, are appointed; and, to his burial the men and women who are of the fraternity shall all be compelled to come. He who neglects to watch when he is ordered will give two denarii for satisfaction. Whoever is unwilling to be present at the funeral of a brother or sister, as has been said, will pay just as much.

Also it has been decreed that whatever guest or citizen sells the timber or other merchandise of the brethren to another, and does not pay for it on the next day at the latest, if the seller makes a complaint about it, whatever brother remains a debtor in such a way shall give ten denarii to the brethren for satisfaction. Also it has been decreed that if any of the said brethren who are said to be carpenters shall give their work to a guest or citizen, or shall promise him work, and then delay more than two weeks, if it be a citizen or guest who is impeded in this way, and if he complain about it, then the brother who hindered him by delay

shall pay ten denarii for satisfaction to the brethren. Witnesses, etc.

**CHARTER OF PRIVILEGES TO THE BUTCHERS OF
PARIS (FRANCE, 1182)**

In the name of the Holy and Indivisible Trinity. Amen. Philip, by the grace of God, King of the Franks. Be it known to all present and future generations that the butchers of Paris came to our presence asking that we would grant and permit them to hold in peace their ancient customs, just as our father and grandfather, Louis of good memory, and other predecessors of ours—the Kings of France—had granted them. On the advice of those who attended us we heard their petition, but, since those customs granted by our father were not in a written charter, we have ordered them to be put into writing, and to be confirmed with our seal. These are the customs:

1. The butchers of Paris can buy living and dead cattle, and whatever pertains to their trade, freely without custom and without giving any pedagium within the area of Paris, whencesoever they come, or whithersoever they are taken, if by chance it should happen that they are being taken anywhere. Fish of the sea, and fish from fresh water, they may likewise buy and sell.
2. No one can be a Paris butcher, nor shall other butchers have their rights, namely, food and drink, unless they wish to concede them of their own will.
3. On the Octave of Christmas every butcher will give us annually twelve denarii; on the Octaves of Easter and of St. Denis, thirteen denarii to him who holds it in fief from us.
4. Every butcher shall owe an obole for stallage to our reeve for every Sunday on which he cuts pork or beef, and every butcher owes every year to us, at the vintage, one hautban of wine.

And in order that all these things may remain secure for ever, we have strengthened this charter by the addition of our seal and signature. Done at Paris in the year of the Incarnation of the Lord, 1182, in the fourth year of our reign. Witnesses, etc.

From: Roy C. Cave and Herbert H. Coulson, *A Source Book for Medieval Economic History* (Milwaukee: Bruce Publishing Co., 1936).

FURTHER READING

- Anthony P. Andrews, *Maya Salt Production and Trade* (Tucson: University of Arizona Press, 1983).
- Kenneth R. Hall, *Maritime Trade and State Development in Early Southeast Asia* (Honolulu: University of Hawaii Press, 1985).
- Kenneth R. Hall, ed. *Structure and Society in Early South India* (New Delhi, India: Oxford University Press, 2005).
- Kenneth Hirth, ed. *Trade and Exchange in Early Mesoamerica* (Albuquerque: University of New Mexico Press).
- "Inca Government and Economy," In *Early Civilizations in the Americas Reference Library*, vol. 1, ed. Sonia Benson and Deborah Baker (Detroit, Mich.: Thomson Gale, 2005).
- Ira M. Lapidus, "The Arab Muslim Imperium (632–945)," In his *History of Islamic Societies*, 2nd ed. (Cambridge, U.K.: Cambridge University Press, 2002).
- David Ludden, *An Agrarian History of South Asia* (Cambridge, U.K.: Cambridge University Press, 1999).
- Virginia Morell, "Empires across the Andes," *National Geographic* (June 2002): 106–129.
- Nathan Seppa, "Metropolitan Life on the Mississippi," *Washington Post* March 12, 1997. Available online. URL: <http://www.washingtonpost.com/wp-srv/national/daily/march/12/cahokia.htm>. Downloaded on August 24, 2007.
- Warren Treadgold, "The Shrinking of Society, 612–780." In his *History of the Byzantine State and Society* (Stanford, Calif.: Stanford University Press, 1997).

► education

INTRODUCTION

In the ancient world formal education was restricted to the wealthy or some others who showed great ability at a young age. Schools existed in the Roman Empire, in China, and elsewhere, but generally they were run by individuals as private ventures. As a result they flourished with the skills and reputation of an individual teacher. Many operated from temples or from areas close to temples, with wealthier people able to afford private tutors for their children—the tutors in some of these societies often being educated slaves.

During the medieval period there was a gradual movement toward the establishment of schools—institutions that employed teachers, providing a greater sense of continuity. A number of famous European schools date from the Middle Ages, and frequently sons attended the same schools as their fathers had. Schools arose with the emergence of the urban middle class and the growth of cities around the world. The majority of these early schools, as in the ancient world, also tended to be established as offshoots of places of worship—the monasteries of Christian Europe, the mosques of the Islamic world, and the temples of Asia and Mexico. Monks, nuns, and other clerics and the like served as teachers. These schools predominantly were for the education of boys. Pupils were taught the rudiments of reading and writing, with many

spending a year or a couple of years at these institutions. In medieval China during the Sung Dynasty (960–1279) schools were established in Hangchow for sons of senior officials, and similar institutions existed in other Chinese cities. The introduction of the hangul script in Korea revolutionized formal education in that country.

With only the wealthy able to afford a formal education, most children's education continued to be undertaken at home. As a result, parents—most often the mother—taught children many aspects of everyday life. Girls learned the preparation of food, cooking, sewing, and other homemaking skills. They also learned about hygiene and the provision of basic medical care. Most sons tended to follow their father's occupation, helping their fathers and thereby gaining skills. This was especially true in the agricultural sectors of the economy. In the urban societies of Europe many boys intending to find work as artisans or craftsmen were sent to work for other people as apprentices, where they learned the trade before returning to help their fathers. This system of apprenticeship tended to be formalized in Europe, as also in the Islamic world and in China, Japan, and Korea.

In sub-Saharan Africa, Pacific island communities, and Australia, it appears that the education of children was often placed in the hands of village elders. Older men and women, respectively, would teach boys and girls life skills such as hunting and the lore of their cultures. This was a formalized process and often led to an initiation ceremony when the adolescents were deemed to have become adults. In many Aboriginal societies as well as some African ones circumcision was used to mark this transition. Communities of the Americas likewise passed along specialized knowledge and skills through oral traditions and apprenticeship forms of training. In Mesoamerica learning sometimes took place in workshops and schools that taught the trades.

Another of the major changes in the system of education in medieval times was the establishment of universities. Although academies existed in the ancient world in the Greek and Roman spheres of influence and also in India, the modern university, where there were substantial numbers of paid staff, started with the founding of the University of Constantinople in 849. Gradually other universities were established—in Fez (modern-day Morocco) in 859; Cairo, Egypt, in 970; Parma, Italy, in 1064; Bologna, Italy, in 1088; Paris, France, in 1150; and Oxford, England, in 1167. A total of 55 universities trace their origins to institutions established before 1500, all either in Europe or in the Islamic World (with the exception of Sungkyunkwan University in Seoul, Korea). Even though they were not formal universities, similar institutions existed in India, China, and Japan.

AFRICA

BY CHARLES B. HUTCHISON

The term *education* is indeed one of the most slippery in the English language. It is important to make a distinction between what may be considered Western or modern education and older educational traditions. In ancient as well as current traditional Africa there has been a delicate balance between education, teaching, and learning. It is useful to understand that learning occurs when a stimulus and a response leads to a permanent change in behavior. For this reason, learning is natural and inherent in human nature from birth to death. Africans throughout history have recognized this fact. For this reason, traditional Africans have had a lively awareness of the educational process and have always valued both formal and informal education since ancient times.

In talking about education in medieval Africa, it is crucial to understand that Africa was not carved out into tiny powerless countries like the present-day nations on a map of the continent. Africa included the main continent and parts of the current Middle East—which was considered northern Africa. This history of the geographical term helps to explain why there are dark-skinned, woolly-haired persons of African descent living in places like Yemen and nearby regions in the early 2000s. Africans lived in these parts of the Middle East before the invasion of the Arabs in the seventh century and later European colonization. When the Arabs and later the Greeks and Europeans arrived on the African continent, they marveled at the advanced African educational systems and civilizations, which were already several thousand years old. Africans lived in such large kingdoms as Ethiopia, Egypt, Songhai, Mali, Ghana, and Zimbabwe. Thousands of years before the medieval period Africans had already traveled across the globe, and their educational influence extended literally throughout the world. They significantly influenced later civilizations, such as the Aztec, the Inca, and the Greek, and ruled parts of southern Europe like Spain, building and leaving behind significant, African-based artifacts in all these places. For these reasons, many historians would argue that the discussion of medieval education or civilizations across the globe is incomplete without mentioning the influence of medieval Africans.

Education had three primary functions in medieval Africa. First, it was a means of learning how to live in the society. The traditions and customs of the society of any society can be complex. The function of the immediate community was therefore to educate their youth regarding acceptable societal norms and conventions. Second, education was a mechanism for refining and transmitting working knowledge and historical information. The proverbial gatherings

and discussions under the baobab tree was just one means of passing on this information. Families participated in this endeavor by teaching their kinsmen and kinswomen family trades and traditions. Another means of handing on the traditions took place in royal courts, where the members of the king's councils would discuss policies for later communication to the subjects.

The third notable function of education in medieval Africa was its use not only for the sake of survival but also for entertainment and in intellectual pursuits. For example, what may be termed ancient African martial arts or war dances—which later became the popular Brazilian martial art *Capoeira*—wrestling, and several other physical art forms were taught in traditional schools for public entertainment during festivals. Formal learning for pure intellectual satisfaction also was advanced throughout Africa. Medicine and astronomy were widely taught subjects, and the knowledge of such secret arts and sciences as metallurgy was disseminated among certain groups and passed down through family lineages. Although more people study the African rulers of Egypt who invented hieroglyphs, it is noteworthy that literacy was common in such other parts of medieval Africa as the regions of present-day Mali and Ethiopia. (Note that in earlier times the term *Ethiopia* referred to all of Africa outside Egypt.)

Historians indicate that the oldest-known form of formal education may have begun in ancient Ethiopia and later was transferred to Egypt. Ethiopians were the rulers of Egypt over the course of several Pharaonic dynasties. This fact is not surprising, since Ethiopian educational practices are probably the longest unbroken tradition of education in the world. Medieval Ethiopia had its own form of ancient writing and manuscript preservation. As is still true in many parts of Africa, there were specific groups of people who went through formal learning processes to become priests or to hold other important offices.

Formal education in medieval Africa also was illustrated brilliantly during the reign of Mansa Kankan Musa (1312–37). At this time the famous University of Sankoré in Timbuktu was at its height, and people from all over the region, including Arabs from the Middle East, came to Africa to learn from the African professors at learning centers called *madrassas*. Historians note that the University of Sankoré had formal professors grouped according to rigorous academic hierarchies. These professors were at the top of the academic world of their times, and it was very difficult for foreign teachers to gain admission to their ranks, owing to the extreme strictness of the admission qualifications. Education was deemed too important to neglect even in the most trying and challenging times. For this reason, these learning centers and

their ancient manuscripts have been protected by the African people through the years. The University of Sankoré and a few other learning centers in the region are still in operation to varying degrees.

In medieval Africa formal education began at birth. This traditional schooling continued in combination with informal education until death. Even after death the dead still have many things to learn and duties to perform—for both the dead and the living. For this reason, Africans, both ancient and contemporary, have traditional ceremonies that are performed for the dead as a part of their ritualized educational process. For example, many West Africans have extremely elaborate funeral and mourning programs that take several days. The dead are buried after “conversations” with the living, whereby they are “spoken to.” Before burial they are given money, dresses, jewelry, and other valuable objects to help them pay their way across the waters. Once they arrive at the new land, they are expected to learn new and higher things to teach the living. This custom explains in part why the memory of the dead was and still is honored in traditional Africa. These traditions are so old and widespread across the continent that one can see strong similarities between the burial rites and artifacts of the pharaohs of ancient Egypt, as illustrated by their hieroglyphic texts, and those of many other African kings and nobility.

As with any cultural knowledge, the seriousness with which education takes place in Africa is understood only when one has lived in the culture. It is possible to shed light on how traditions and customs were and still are actively used by Africans to educate their youth. The Akans of Ghana migrated from regions of Sudan (ancient Nubia). With the advent of Islamic incursions, they moved southward and spread across parts of western Africa, bringing their cultural practices with them. Although they are scattered in several modern-day African states, they still maintain many of their ancient and medieval practices.

One of these practices is the *dzin to*, or “naming ceremony.” Among the Akans of western Africa, like the Fantis of Ghana, when a baby is born, the infant is not exposed to the public and is not given a name until the eighth day of life. On the eighth day the family has a naming ceremony, in which a family elder takes two containers, with water in one and alcohol in the other, and pronounces the following words: “Nana Kosa (or another name), *Ese nsu a nsu a, nsa a nsa a*,” meaning, “Nana Kosa, if you say this is water, it is water. On the other hand, if you say it is alcohol, then it is so.”

This ceremony has two purposes. First, it is meant to teach the infant. The Akans believe that the child has a fully developed soul and is capable of learning early in life. Second, this formal ceremony is performed in the midst of all family

members and invited guests from the community. Here the elder, as a powerful custodian of community knowledge, is pronouncing wisdom for the education of all the hearers. He is acting as a traditional teacher in a formal manner. Adults are reminded of community virtues through such ceremonies, and the young are taught how to act virtuously.

In medieval Africa the school curriculum was defined in part within the family unit. This was so because the families (and oftentimes the tribes to which they belonged) had their trade specialties. For example, some were professional musicians who learned the “language of the drum” and thus could play the “talking drums.” Others were metalworkers like blacksmiths and goldsmiths. In a functional African society there were many such family-based professionals. In terms of education these trades had their own secrets, and such secrets were held within the families. It was through a guarded apprenticeship process that such trade secrets were passed down—but only within families. Oftentimes, there were traditions or rituals that prohibited the sharing of these trade secrets.

One of the most widespread forms of informal basic education in medieval Africa involved the telling of stories. Many of these stories were crafted in such a way to teach moral values. These stories are now popularized around the world, like the stories concerning Ananse the Spider and Brer Rabbit (western Africa) and Fudukazi the Tortoise (southern Africa). These tales, passed down from medieval times, are still instructive today and have become a part of the educational tradition in many countries around the world. Across the continent, however, these stories all had similar themes, with the fundamental objective of teaching the next generation about moral standards. Stories were therefore a powerful means of moral and ethical education in medieval Africa.

Another important technique of education in medieval Africa was the use of proverbs and symbols. Proverbs are short, wise sayings that are intentionally phrased to stimulate moral thinking, for example, “Your left hand washes the right, as the right washes the left.” This proverb indicates that people need to learn to cooperate with each other in order for all to prosper. Many African proverbs were also motivational and promoted good decision making for the betterment of the larger society. Some African groups also had and still use specific visual symbols that stand for concepts or important ideas. The Akans of Ghana have the Adinkra symbols, similar to (but not necessarily the same in meaning as) those of the ancient Africans of Pharaonic Egypt. Adinkra symbols are drawings or carvings that help people remember important information. The *Gye Nyame* symbol, for instance, stands for the fact that only God can determine one’s fate in life. Therefore, people should not allow anyone to negatively influence their potential in life.

Medieval Africans, like their ancestors in the Zimbabwean civilizations of southern Africa, the Egyptians and Ethiopians of northeastern Africa, and the many empires like those of Songhai, Ghana, and Mali, have always cherished good education. The high value placed on education is evident both in their traditions and in ancient historical records and artifacts.

THE AMERICAS

BY ANGELA HERREN

Archaeological and historical records provide little information on formal education systems in the Americas before the 16th century. However, evidence suggests that communities passed along specialized knowledge through oral traditions, ritual practices, and systems of training and apprenticeship. Lacking a formal alphabetic writing system, early American cultures recorded complex knowledge for future generations in various forms. In all these cultures the adults trained children to perform everyday tasks. Cooking, cleaning, weaving, child rearing, hunting, fishing, agricultural production, construction, art making, and other basic community labors often were divided according to gender. In more stratified societies the opportunity to learn specialized knowledge was sometimes limited by ability, social standing, and political considerations.

Native North Americans recorded meaning in frescoes, symbolic architecture, monuments, petroglyphs, and iconographic motifs on ceramic, stone, shell, and metal objects. Information about astronomy, the spiritual world, life, and death complemented knowledge obtained through ritual practices and oral traditions.

The art of the Mississippian phase of the Woodlands cultures (ca. 750–ca. 1500), mostly recovered from burial sites, indicates that community members learned and performed tasks like killing game, gardening, cooking, and engaging in ceremonial activities that celebrated the dead. Select individuals learned specialized social roles. Carved circular plates worn at the chest depict ritual decapitation and may illustrate aspects of the warrior's life. High-status burial sites contained the remains of priests or chiefs adorned with headdresses and ritual clothing. The predominance of representations of powerful animals and birds like the falcon, rattlesnake, and deer suggests that Woodlands people imparted to their children an intimate knowledge of and spiritual association with local fauna.

The Hohokam and Mogollon (ca. 500–ca. 1400), two cultures that flourished in the southwestern part of the present-day United States, also developed a sophisticated knowledge of local flora and fauna. Adults taught their children

important sustenance activities such as hunting, fishing, and gathering and important ritual activities like playing musical instruments and dancing. In the same geographic region the Anasazi developed large centralized communities (ca. 900–ca. 1300) at sites such as those found in Mesa Verde in Colorado and Pottery Mound in New Mexico. Extensive multifamily dwellings built from adobe brick contained living and storage spaces, platforms, and circular subterranean rooms called kivas. Women probably worked on the open platforms, teaching their daughters cooking, ceramic painting, and other skills. Like later Pueblo peoples, Anasazi men may have initiated their sons into manhood by teaching them important ritual knowledge in the ceremonial spaces of kivas decorated with frescoes showing human, animal, and supernatural figures engaged in activities related to fertility and mortuary rites. According to Pueblo descendants of the Anasazi, the small hole in the floor of the kiva signified the *sipapu*, the place where man first emerged from the earth.



Soapstone bowl of a kind associated with girls' initiation rites, Strait of Georgia culture, British Columbia, ca. 1–900 (© The Trustees of the British Museum)

Inhabitants of Mesoamerica educated their youth and community in the home, in workshop environments, and in specialized schools. The pictographic writing system that Mesoamericans developed in the first millennium B.C.E. proved to be one of the most influential complements to the educational system. Before the arrival of the Spaniards in the 16th century indigenous inhabitants used images to record information on sculpture, architecture, portable arts, and painted manuscripts.

Material culture remains from Classic Period locations like Teotihuacán (ca. 1–ca. 700), Monte Albán (ca. 400–900), and the Mayan region (ca. 250–900) provide insights into medieval learning processes. At some sites archaeological remains show *barrios*, or neighborhoods, where practitioners of a certain trade gathered, perhaps sharing knowledge, materials, tools, and equipment like pottery kilns. Some excavated objects betray the work of apprentices or less-skilled artists training in a particular technique. For example, many Mayan ceramic vases display “pseudoglyphs” that mimic the form of Mayan pictographic writing without conveying meaning; they may demonstrate the work of an “illiterate” painter-scribe imitating an experienced artist.

Sixteenth-century accounts of the Aztec peoples, a group that rose to power in central Mexico in the 14th century, indicate an advanced and formalized system of education. From a very early age children learned to perform gender-specific tasks at home. Girls learned to cook, clean, and weave textiles. Boys began to learn about warfare and might begin training in the trades of their fathers. Sometime before the age of 15, boys and girls attended the school to which they had been dedicated at birth. Children of lords and nobles primarily attended the *calmecac*, a school associated with a temple. Commoners typically attended the *telpochcalli*, a school with military emphasis, although especially gifted commoners were allowed to attend the *calmecac*. Both schools taught children song and dance. *Calmecac* students studied more extensively from painted manuscripts and eventually could become priests or wise men if they continued their education.

Painted manuscripts were an integral part of the intellectual environment in the pre-Hispanic Mesoamerican world. In a small, portable format that simplified their storage and transport, the manuscripts recorded calendars, religious and ritual data, economic information, genealogies, maps, songs, poems, and history. The writing system’s pictorial nature and uniformity in representation enabled painter-scribes to convey information in a consistent and legible manner that was accessible to groups speaking various languages.

Interpreting the educational systems of the Caribbean region is particularly challenging because Spanish colonization resulted in the annihilation of most indigenous populations

by 1510. Nevertheless, material remains and 16th-century Spanish documents suggest that advanced cultures like the Taíno of the Greater Antilles shared ritual and social beliefs with their communities through the construction and use of civic structures like ball courts and plazas, religious wood and stone carving, and ceramic production. The Taínos produced many objects related to deity worship, such as three-cornered stones; *zemis* (deities rendered in human and animal form); and collars of stone, bone, and wood that represented the costume worn in ceremonial ball games. They shared their history, religion, and cultural beliefs through dance, music, and oral tradition.

From about 700 until the Spanish invasion in the 16th century, indigenous inhabitants of the regions of present-day Costa Rica, Panama, and Columbia developed sophisticated social, political, and religious systems and produced stone statuary, lapidary work, ceramics, and gold work that reflected their values and beliefs. The gold necklaces and pendants of this region, for example, are products of skilled individuals who learned to mine ore; artisans who learned techniques like mold making, burnishing, and repoussé; and priests who taught the spiritual qualities of the animals and birds reproduced in metal. The gold work also reflects the role of elites, who controlled the power and wealth in the society and wore such items, and of long-distance traders, who moved the goods from one place to another. Although archaeological evidence does not suggest the presence of schools or formalized education, Central American societies clearly relied on priests to impart spiritual knowledge and accomplished individuals to teach the skills of their trades to younger protégés.

In South America the material and archaeological remains of early Andean cultures reveal the importance of cosmology as a guiding force in the acquisition of knowledge. For instance, the city center at Tiwanaku (ca. 100–ca. 1000) symbolically references Andean origins on an island in Lake Titicaca, and Machu Picchu is a 16th-century Incan royal retreat where monuments and structures embrace and highlight relationships to the sacred landscape. On a smaller scale portable works often depict shamans, spirit figures, and abstract conceptions of the universe in a variety of media. Throughout Andean history various cultures used textiles to record and share historical, religious, and social information. Women learned their culture’s many weaving and embroidery techniques from their mothers or in weaving workshops.

By the 16th century the Inca provided limited formal education to select members of the population. Boys from elite families attended a four-year school in the capital city of Cuzco to learn oratory, warfare, the Inca religion and history, and *quipu* use from wise men. The Incan *quipu*, an ingeniously simple and highly portable device made from knotted

strings, allowed the user to perform complex accounting and possibly to record historical and phonetic information as well. While most girls learned weaving and other skills from their mothers, “chosen women” attended a special school in the provinces of the Inca Empire. Between the ages of 10 and 14 the chosen women studied the arts of spinning, weaving, cooking, brewing corn beer, and other domestic activities. Renowned for their great beauty, they were selected from conquered provinces of the Inca Empire and from the children of nobles in Cuzco. While some of the most beautiful women were destined for sacrificial offering, most became temple priestesses, teachers, or secondary wives to the Inca king.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

When the Han Dynasty ended in 220 C.E., China went through hundreds of years of civil wars. Schools and education often suffered from neglect or outright destruction, although some governments tried to keep the tradition of state-run schools alive. The founding of the Tang Dynasty (618–907) brought a resurgence of state-funded education. The need for graduated students able to serve in the government probably made itself apparent early in the emperor Gaozu’s reign (618–26). In 618 he founded three colleges in Ch’angan (modern-day Xi’an), and in 624 he ordered that schools be founded in every prefecture in China. In 629 the emperor Taizong (r. 626–49) founded medical schools in the capitals of the prefectures. These public schools were often underfunded, and late in the 600s many fell into disuse. In 738 the emperor Xuanzong (r. 712–56) commanded that China’s prefectures build schools in all of their villages, creating 19,000 schools. He also insisted that the prefectures hire qualified teachers for each school.

With the passing of the Tang Dynasty and debilitating wars China’s schools again fell on hard times, but in 1044 the Song Dynasty (960–1279) created schools in each prefecture. These were supplemented by 124 private schools, and many small communities established their own schools and hired their own teachers. The Yuan Dynasty (1279–1368), of northern China, created a school system that probably was administered by former Song government officials. Although the Ming Dynasty (1368–1644) encouraged education at the village level, only 1,200 such schools had been established by the year 1400. Private schools, which were often paid for by the parents of students, helped produce the educational officials needed by the government.

During the medieval era two sorts of schools existed in China: secular and religious. Secular schools frequently were government run and focused on preparing boys for the examinations given by the national government, usually only once

a year. The examinations tested not only how well students had memorized the Confucian classics but also how well they understood them by having those taking the examinations write essays applying Confucian theory to current events. Passing the examinations usually guaranteed a student a government job and a chance to advance up the social ladder. A student could take the examinations an unlimited number of times.

Religious schools were run by Buddhists or Daoists and were usually funded by monasteries. These schools sometimes required their students to commit to becoming monks or priests. Students were expected to memorize important religious texts and prayers and to write essays expressing their views about what they learned. Some Buddhist and Daoist schools were significant centers of learning, attracting students from far away who would live in rooms near the schools.

A boy could enter a school at almost any age. His treatment in school depended less on his social rank than on his age, with older students given more privileges than younger ones. The learning of Chinese pictographs began as early as possible, as an educated person was expected to know about 50,000 of them. Arithmetic also was considered essential for any educated person, and by about age 13 one was expected to apply arithmetic to realistic problems, often involving aspects of accounting. A boy who misbehaved could be expelled. Offenses could be punished by whippings. Students sat in school courtyards and listened to their teachers, and teachers were expected to have their whips visibly nearby. Girls rarely attended schools. For most girls, their best hope for a good education was to have been born into a rich family that would pay a tutor to instruct them.

In Korea the official written language was Chinese, and boys were taught the way Chinese boys were taught, with many villages having small schools. Attending school was considered less than respectable for girls, and during most of the medieval era they were not allowed to be educated. By the 1400s education in Korea had fallen on hard times. Few could read or write because written Chinese often could not accurately reflect actual Korean speech. Only the wealthy could afford to spend the years required to learn to use Chinese pictographs to convey Korean words and ideas.

Sejong Jangheon Yeongmun Yemu Inseong Myeonghyo the Great, the king of Korea from 1418 to 1450, bore much influence on the nation’s educational system. Sejong was an extraordinary scholar who excelled in phonetics, music, poetry, the sciences, and swordsmanship. He was also a devout Buddhist during an era when Buddhists were regarded with great suspicion by the bureaucrats of the Korean government. Although Sejong was king, the traditions of the day demanded

that he gain the consent of his aristocratic advisers with respect to major decisions, and they often resisted his reforms.

In 1420 Sejong created the Hall of Worthies, an institution of scholars who were to pursue research for national interests. At his command, they wrote 20 major books on history, agriculture, medicine, and government. He allowed promising young scholars to take reading vacations, or paid periods of study. Perhaps Sejong's greatest ambition was to bring literacy to even the lowest ranking of his subjects. In 1443 he told the Hall of Worthies to create a new written language designed to reflect and express the everyday speech of Koreans. Sejong himself directed the research and participated in the creation of the letters of the new alphabet. In 1446 he made the new written language, hangul, the written language of Korea and ordered that it be taught to everyone, women and men alike. The script was simple enough that it could be learned in several days.

The government bureaucrats who had devoted decades of their lives to learning to write with Chinese pictographs resisted the institution of hangul, even trying to have the script banned after Sejong's death, but its use spread among the common people. Hangul proved a boon to women, who had previously been denied schooling, with even aristocratic women becoming literate. Many books were published in the new script, making learning available to all Koreans, and many of Sejong's later scholarly projects were intended to make hangul more useful to his subjects. For instance, he commissioned an agricultural handbook that Korean farmers could use in the course of their daily work.

In terms of functionality, Korean schools were often paid for by the parents of students. Teachers were treated as exalted figures, and students had to be respectful to their teachers—even to bad or cruel teachers—at all times. Like Chinese students, Korean ones had to memorize Confucian texts and learn arithmetic and science. Their education was directed toward annual examinations that, if passed, would qualify them for government jobs; as in China, this was perceived as a great opportunity for a boy to improve his life. Decorum was very important in Korean schools, and violations of decorum resulted in punishment. The number of punishable violations was vast. For instance, if a student walking on a road saw his teacher coming toward him, he was to stand on the left side of the road and bow to his teacher as his teacher passed; any variation in this, such as hiding from sight, was punishable. In general, the Koreans used physical punishment only as a last resort. Instead, misbehaving students were publicly humiliated in various ways. For the worst offenses, students were expelled, and people in their villages would scorn them. Having their names and offenses posted for other students to see was a more common punishment.

In about 600 Japan's emperor sent students to China to study in Chinese colleges. Often staying in China more than 20 years, these students returned to Japan and became advisers to the emperor. Japanese schools at first were modeled on those of China, with secular and Buddhist schools emphasizing memorization, mathematics, and the ability of students to write about what they learned. The first teachers were usually from Korea and China, with the first state-run college in 647 being directed by a Korean, but in time Japan began producing its own teachers. Among the earliest Japanese teachers were aristocrats fallen on hard times, samurai without lords, scholars who had not received government jobs, and people who chose teaching as their profession.

The colleges of Japan were reserved almost exclusively for aristocrats, although commoners were sometimes admitted. Entry into college almost automatically guaranteed a job in government later on; only the most dull-witted of aristocratic children did not pass school and their examinations. Japanese towns and villages built their own schools and hired their own teachers, and parents participated in school activities such as celebrations and the supplying of study materials. Students were usually taught indoors. In class, students could be divided into groups working on different projects. Classes were often coeducational, with girls learning what boys learned; a notable exception to this would be a military school in which military arts were taught, since such schools were private academies reserved for the sons of samurai, the warrior aristocracy.

In schools, boys and girls learned to read and write. At first, Chinese pictographs were learned, but the Japanese found that Chinese writing was often ill suited to their language and began using pictographs as sounds rather than as ideas. Students practiced writing with brush and ink on paper, covering both sides in ink and continuing to use the paper for as long as the wet ink could be discerned from the dried ink. Girls and boys alike had to learn mathematics because as adults they would need to be able to keep accounts of their family's goods, income, and expenditures.

Girls were rarely able to attend school in medieval India. A girl's best hope for an education was to have someone in her family teach her or to have wealthy parents who would hire a tutor for her. Otherwise, school was intended for boys. At age four or five a boy had to learn the alphabet. He had to attend a town or village school, where he would spend about three years learning reading and arithmetic. The student then had to attend a religious school, usually Hindu, Buddhist, or Jainist. In Hindu schools the student would have a special agreement with a teacher called a guru. The rites for this formal commitment called upon the student to promise to obey and honor his teacher and the teacher to promise to care for the

student. The student then moved to the school of the teacher, who could have many students of different ages. Schooling could be over by age 19 or continue for two or three decades, with the student attending one of several universities. A university was composed of several colleges, with a few hundred students in each college.

Students were expected to learn a broad range of subjects, including the essentials of language: grammar, phonetics, etymology (the linguistic history of a word), prosody (versification, or the cadence of a language), and literature. They were expected to learn mathematics, including algebra, and also learned astronomy and chemistry. Essential for students at religious schools was the learning of morality according to their faith. This was especially complex for Hindus, because each caste, or hereditary social class, had its own moral code that students were expected to follow.

The Indian alphabet of Sanskrit spread throughout Southeast Asia, excluding northern Vietnam, where students were expected to learn Chinese writing. Only the rich in Vietnam could afford to commit the time needed to learn enough Chinese pictographs to be literate in written Chinese. In the 1000s northern Vietnam introduced Confucian examinations, but the offering of these became irregular. In the 1400s the examinations were revived and became a part of Vietnam's educational system, which was modeled on that of the Chinese. Literacy was uncommon in most of medieval Southeast Asia except for on the islands of Indonesia, where the ability to write poetry was essential for both men and women in matters of courtship. Most education was religious, with Buddhist and Hindu schools present. Students were expected to become religious scholars.

A significant challenge in the historic study of educational practices in Oceania is that when people who could read and write came to the islands and to Australia, they almost immediately began teaching people in ways that were different from local customs. Thus, the very people who produced the first written records of how indigenous peoples taught their young people were themselves altering local educational methods, making their records somewhat dubious; modern scholars have had difficulty determining what practices were responses to the influence of newcomers.

By virtue of its size, Australia long retained some locales where the educational practices of outsiders did not intrude. A medieval Australian child was expected to learn the rules of kinship and was taught how to properly speak to different relatives. Formal education began with initiation rites. In some cultures, a boy who behaved properly toward others, could make a straight spear, and could hunt small game was given his initiation rites before boys who were rude or lazy. In other cases, the onset of pubic hair signaled the time

for initiation. For girls, menstruation was most often the signal for initiation rites to begin. During initiation both boys and girls were expected to learn songs and myths. Education could continue for many years, with youths passing through series of stages of learning the mysteries of their history and religion before becoming elders in their groups.

EUROPE

BY AMY HACKNEY BLACKWELL

The vast majority of medieval Europeans had no formal education. Even among the wealthy, education was rare. Few people could read, and fewer could write. One reason for this was practical: Books were expensive and time-consuming to make, and good light was not readily available.

For most laypeople education consisted of learning skills by observation and practice. Women taught their daughters how to manage households and care for children, and girls learned these skills by helping their mothers. They would learn how to cook, clean, spin, weave, and make clothing. The daughters of the wealthy might learn more skills, both practical and decorative. They would learn to manage a household and treat illnesses, which were often the responsibility of noblewomen. They might also learn embroidery, music, and other arts designed to make them attractive and pleasant companions. Both boys and girls learned culture through experience. Little children listened to folktales told by their parents and grandparents, and older children might learn songs and poems by listening to minstrels perform. Local priests or monks might provide some sort of religious instruction.

Boys might help their fathers in the fields or with hunting. Tradesmen taught their trades to their sons, who were then expected to continue in those occupations. For example, a master mason would raise his son to be a mason as well, taking him to work and giving him jobs appropriate to his age and abilities. During the later medieval period some boys learned their trade through apprenticeships. A boy would live with the family of a tradesman somewhere between the ages of seven and 14. He would spend several years as an apprentice, working as a servant to his master while gradually learning the trade. His family might pay a fee to the master in return for the training. After a specified period of time, usually seven years, the apprentice would be declared a journeyman, a competent craftsman with all the necessary skills to practice his craft. Many boys stopped their education at this stage and spent their lives working as journeymen, but some continued to improve their skills until they could produce what was called a masterpiece, an example of their work that showed complete mastery of the craft. A journeyman

who made a masterpiece was considered a master and could thereafter open his own workshop and take on his own apprentices. Some girls learned trades through apprenticeship, particularly textile trades such as embroidery or female-dominated trades such as midwifery.

A son of a wealthy or noble family might spend his youth learning to be a knight. When he was about seven years old he would be sent to live with another noble family, who would train him in military arts and courtesy. Sending boys to other families was part of a long tradition of fostering, which served a dual purpose: It allowed boys to form alliances with their foster families, and it kept the boys' families from attacking the foster families. A boy often went to live with a family richer than his own or even at the king's court. When a young boy first arrived at his foster home, he became a page. He worked as a personal servant to the lords and ladies of the house and began his training for the knighthood. He learned noble skills such as riding horses, hunting with bow or falcons, proper behavior at court, and the use of a sword. When the boy turned 14, he might become a squire, serving as the personal assistant and shield bearer to a knight. The knight was expected to teach his squire the skills he would need in battle. After the young man had worked for seven years or so as a squire, his lord might finally make him a knight.

Formal education in reading, writing, and other academic subjects was available only through the church throughout most of medieval Europe. In many areas only priests and monks were literate. Boys who went into the priesthood or joined a monastic order often learned to read and write, though not all did, and illiterate clerics were not at all uncommon. Boys destined for the priesthood learned the fundamentals of Christian theology and how to conduct religious services. A boy who joined a monastery would become a novice, or trainee monk. He would learn the monastic lifestyle, including the words and songs to the several religious services he had to attend every day. He would learn the tasks expected of monks, which could include farm work, cooking, sheep husbandry, cheese making, or any other operation his monastery ran. Most novices received some instruction in Latin reading and writing. If a novice displayed a talent for writing, he would be taught how to copy books. If he was artistic, he might learn how to paint the pages of books with designs called illuminations. He might also learn how to make parchment or vellum from sheepskin or calfskin, how to manufacture ink and pigments, and how to bind books. The only way to create new books was to copy them by hand, so medieval monasteries performed an invaluable service in preserving and transmitting information. Ireland's monasteries of the early medieval period



A hornbook, teaching and instructional aid for children, Britain, 15th century (© Museum of London)

were especially renowned for producing literate monks who did excellent copying work.

Actual schools for lay students were rare in western Europe during the early medieval period. The few schools that existed were small cathedral schools run by priests and designed primarily to train boys for the priesthood. During the 12th and 13th centuries, however, schools became more common, especially in cities with large populations of merchants and professionals. Schools gradually moved away from cathedrals, became more open to lay students, and taught subjects beyond theology and canon law.

Medieval students studied a specific set of subjects. The seven so-called liberal arts were defined in late antiquity and persisted throughout the medieval period. They were divided into two parts, the trivium and the quadrivium. The trivium included grammar, rhetoric, and logic, or dialectic. Mastery of the trivium was considered necessary for progression to the quadrivium, which included arithmetic, geometry, astronomy, and music.

Grammar schools were designed to teach the trivium to boys. Wealthy families could send their sons to school for a fee. The grammar in question was Latin for most of the medieval period. Latin functioned as a sort of universal language within Europe, and merchants dealing internationally found it a useful common language. During the 15th century scholars began studying the grammar of vernaculars such as French and Spanish, but for the most part schools kept teaching exclusively in Latin.

Many wealthy families hired personal tutors for their children instead of sending them to school. Some of these tutors taught both sons and daughters, customizing lessons by sex and age. Some educational theorists recommended that families attempt to create an exclusively Latin environment to enhance their children's education. This required parents, tutors, and household servants to address the children solely in Latin, so in practice this ambition was not often realized.

The Byzantine Empire, or Western Roman Empire, maintained a system of formal education throughout the early medieval period. When the Western Roman Empire fell into decline, teachers migrated to Constantinople, which became the new center of learning. The Eastern Roman emperor Theodosius II (r. 408–50) founded a school similar to a university in Constantinople in 425. It was decreed an actual university in 849 and offered degrees in medicine, law, philosophy, and forestry in addition to the liberal arts. Education in the Byzantine world fell on hard times in the 13th century after Constantinople was captured by the crusaders in 1204, and the university disbanded in the 1300s.

Universities first appeared in western Europe during the 11th and 12th centuries. These early universities arose out of schools that had existed for many years or even centuries. What made them universities were their size (they were larger than cathedral schools) and their administration in a manner similar to that of craft guilds. This self-regulation allowed universities to teach a wider variety of subjects than schools that were restricted by particular cathedrals. Universities also were distinctive in that they granted degrees to their graduates. Both Paris and Bologna claim to be the sites of the first university. It is hard to pinpoint exactly when the educational institutions in each of these cities became universities in the modern sense, but both were well established by the early 1200s. They were quickly followed by a profusion of new universities all over Europe, including those of Oxford and Cambridge in England.

The first universities still emphasized the education of religious professionals. They taught canon law, theology, logic, and mathematics, all of which were useful to church administrators. They also began to teach more secular subjects, including medicine, astronomy, rhetoric, music, and

the other liberal arts. Different universities specialized in different fields; for example, the university in Paris specialized in Christian theology, and the university in Bologna was known for its teaching of law. By the end of the medieval period scholars had rediscovered the ancient Greek and Roman classics, and students were beginning to study the new philosophy of humanism. Students typically began university studies around the age of 14 or 15 and continued for about six years.

What education existed in medieval Europe was confined almost exclusively to men and boys. Grammar schools taught boys. Women were not admitted into medieval universities. University students were generally considered clerics, similar to priests, and women could not hold this status. For the most part, the only women who learned to read or write were the daughters of noble families who could afford private tutors. Girls who learned to read often studied different subjects than did their brothers. Certain subjects were considered inappropriate for women, so even the most educated women learned only a portion of the material available to men.

THE ISLAMIC WORLD

BY SEBASTIAN GÜNTHER

Islamic education builds on two major principles: the idea of a lifelong pursuit of learning and the close correlation of knowledge and action for the welfare of the Muslim community. Although it primarily aims at the nurturing of religious belief in the individual, Islamic education incorporates numerous secular disciplines, both literary and scientific. Thus it aspires to develop individuals who are well grounded in the virtues of Islam and have obtained the solid general education needed to become valuable and fully integrated members of society. This inclusiveness of Islamic learning relates to primary and higher education. It is evident in the Koran, the holy scripture of Islam, and in the Hadith, the literature of Islamic prophetic traditions. It is also expressed in numerous proverbs, aphorisms, and wisdom sayings and in much of the poetry and prose of Middle Eastern literature. Scholarly discussion of educational theories and practices are offered in various genres of medieval Arabic writings, particularly in those devoted to educational philosophy and ethics, pedagogy, and didactics.

In pre-Islamic Arabia lyric poetry represented the summit of the artistic and intellectual attainment of the Arabs. Poetry was “the register of their learning and the final word of their wisdom,” according to the philologist Ibn Sallam al-Jumahi (d. ca. 845 in Baghdad). At the beginning of the seventh century Muhammad, a native of the city of Mecca, communicated the Word of God in the form of the Koran.

Shortly after the prophet Muhammad died in 632, the individual parts of the Koranic revelation were compiled from both oral and written sources, arranged in one text, and published by an authorized committee of learned Muslims. Thus the Koran became Islam's first book as well as its first holy book.

The Islamic religious tradition expressly prioritizes learning and education. Chapter 96 of the Koran, verses 1 through 5, traditionally considered to be the very first revelation to the prophet Muhammad, start with the divine command to "read" or "recite" words of the revelation. These lines emphasize that God taught humankind through the scriptures and that God is humankind's undisputed supreme teacher. The Koran also indicates that Muhammad was first ordered to listen to the revelation, recite the divine text himself, learn of its meanings by way of explanation, and eventually convey and teach God's message to others. This divinely inaugurated method of instruction—listening, learning and understanding, and teaching—had a significant impact on education and the transmission of knowledge in the medieval Muslim world. An imperative to seek knowledge and learning is also met in sayings attributed to the prophet Muhammad, such as "To acquire knowledge is an obligation on every Muslim, male or female" and "Seek knowledge, even if it is in China."

By the 10th century the Muslim world extended from Spain to the borders of China. Multitudes of people adopted Islam as their religion. This situation stimulated Islamic learning on both the basic and higher levels, causing Arabic-Islamic civilization to become a "knowledge society." In the ninth to the 13th centuries Baghdad, the capital of the Abbasid Caliphate, was the vibrant commercial, cultural, and intellectual metropolis of the Muslim world. It witnessed remarkable learning activities in the humanities and great advancement in the natural sciences. Baghdad's famous translation academy, the Bait al-Hikma, or House of Wisdom, was officially sponsored by Caliph al-Mamun (r. 813–33) to prepare professional Arabic translations of philosophical and scientific works, particularly those in Greek. Most of these translations were carried out by Christian Arabic (Syriac-speaking) scholars. They advanced considerably Muslim scholars' creative adaptations of not only the Hellenistic heritage but also Byzantine, Iranian, and Indian traditions.

Philosophy was the most important branch of the Hellenistic tradition incorporated into the dynamically developing Islamic body of knowledge. The importance that medieval Muslim thinkers granted to philosophy helped to establish reason, logic, and the laws of nature firmly in Islamic thought. Examples of prominent Muslim sages are al-Kindi (d. 873), a brilliant scientist and metaphysician; al-Farabi (d. 950), logician, metaphysician, musical theorist, and the most impor-

tant Islamic political philosopher; and Ibn Sina (known to the Western world as Avicenna; d. 1037), a philosopher and physician who contributed insightful original ideas to the Aristotelian and Neoplatonic traditions. In Islamic Spain, Abu Bakr ibn Tufayl (d. 1185) is noted for his allegorical and philosophical narrative of a solitary individual on an island who independently arrives at philosophical and religious truths. Ibn-Rushd (known in the Western world as Averroës; d. 1198), the most Aristotelian of the Islamic philosophers, is renowned for developing a theory of the intellect based on Aristotle's theory of the soul. His rationalistic philosophy had a far-reaching impact on both Islamic and medieval European scholarship. Despite different ethnic and cultural backgrounds, all these scholars wrote their major works in Arabic, the lingua franca of the medieval Muslim world.

Reason and logic were also significant to Islamic theology. In the eighth and ninth centuries Muslim scholars disputed, for example, whether God was to be understood through revelation (literally) or through reason (metaphorically). The orthodox theologian al-Ashari (d. 935) bridged these conflicting positions. Although he set limits to philosophical speculation in religious matters, he did not end it. Al-Ghazali (d. 1111), perhaps the most important theologian of Islam and a noted jurist and mystic, accepted Greek logic as a neutral instrument of learning and recommended it for Muslim theologians.

Creativity is evident in narrative and descriptive disciplines, such as history and geography, in the codification of law, and in philology and grammar. Examples are the works of al-Tabari (d. 923), a particularly influential historian and Koran commentator, and Abu l-Faraj al-Isfahani (d. ca. 971), a celebrated man of letters, historian, and musicologist.

In the natural sciences medieval Muslim scholars displayed industriousness and originality, as evident in the works of Jabir ibn Hayyan (d. 803), known as the father of chemistry; al-Khawarizmi (d. 840), considered the founder of algebra; and Ibn al-Haytham (d. 1040), who significantly advanced experimental and theoretical research in optics. Abu l-Qasim al-Zahrawi (d. 1013) explained surgical procedures and gave detailed illustrations of surgical instruments. His great encyclopedia of medicine—composed to facilitate student learning—was used in Latin translation at European hospitals and universities for centuries.

In early Islam learning and education were rather informal. Instruction took place in teaching sessions and study circles held at mosques or privately at the homes of scholars. The professor lectured while sitting on the floor or a small pedestal. The students were also seated on the floor, with the most senior students sitting closest to the professor. Oral instruction was the predominant feature of Muslim learning,

and personal contact between the teacher and the students was viewed to be the best way to guarantee the authenticity of transmitted knowledge. This idea of authoritative transmission remains crucial to Islamic learning, especially in the religious disciplines. Nonetheless, from the seventh century on, lectures and seminars were regularly based on written collections of data and notes used by scholars and students as memory aids. In the ninth century the book emerged in Muslim society and was soon recognized as a powerful medium of education.

As Islamic civilization matured, medieval Islamic education began to rely on various institutions. The elementary or Koran school admitted children as young as six or seven years of age. The topics to be taught included the precise articulation and memorization of the Koran, knowledge of reading and writing, the duties of worship, and good manners. Other recommended topics were the Arabic language and grammar, handwriting, arithmetic, poetry (provided the verses were morally decent), proverbs, speeches, and the historical reports and legends of the ancient Arabs. Elementary schooling took place in a simple building. The teacher was responsible for renting the school or classroom and the equipment needed for teaching. The teacher's salary was paid directly by the pupils' parents. Reviews of the children's knowledge of the Koran and their advancement in learning took place on Wednesday evenings or Thursdays. There was no school on Fridays or religious holidays. Basic instruction concluded with a final oral exam after the pupil had memorized the Koran.

At more-advanced levels of schooling pupils and adolescent students were instructed in Arabic and Islamic history, Arabic language and literature, arithmetic and geometry, music, astronomy, medicine, and logical argumentation. Children of the lower social classes received vocational instruction in practical professions. Girls were not excluded from elementary or higher learning, although preference was given to their moral education at home, provided by their families.

For higher Islamic learning two institutions are particularly important: the mosque and the college of law (madrasa). Although it was primarily a place of worship, the mosque has been a center of learning from the earliest time of Islam and has served educational purposes throughout the centuries. In the ninth century, however, the college of law became the principal institution of higher Islamic learning. The key importance of the college is related to the priority that law generally occupies in Muslim life. For devout Muslims it is imperative to learn and obey God's will and to ascertain what to do and what to avoid doing. Thus Muslims seek guidance from those who are well versed in the sacred scriptures and who can derive laws from them. In the medieval period the

training of specialists in the knowledge of God's law became a prime objective of Islamic education.

The earliest colleges emerged from the practice of teaching at mosques. With the growing need in Islamic society for law experts, colleges were established in separate buildings attached to larger mosques. In Iran, Syria, and Egypt colleges were sometimes built next to holy shrines or near the graves or mausoleums of famous scholars. Many law colleges combined living and teaching accommodations. Each college was financed by a pious endowment supporting both faculty and students and was directed by an imam-professor.

The college of law flourished in the 11th to 14th centuries and hence became a palpable feature of Islamic culture and civilization. Curriculum focused on religious law and Islamic jurisprudence, the Koran and Koranic exegesis, and the Islamic prophetic traditions. It also included Arabic language, grammar and literature, and logic—disciplines considered essential for accurate expression and sound reasoning. Astronomy was studied because it related to the calendar and issues relevant to practices of the Islamic faith. However, the constraints in the subjects taught at the college, along with the rising influence of religious scholars, who by then were professionalized under state patronage, affected the cohesiveness of Islamic thought. This strengthened conservative elements in Islamic education and led, among certain scholars, to an opposition to secular learning.

Some of the more famous medieval institutions of higher education are the Azhar in Cairo, Egypt, founded in 970 under the Shiite dynasty of the Fatimids (r. 909–1171) and eventually the principal religious university of the Islamic world; the Nizamiyya in Baghdad, Iraq, established in 1057 by the vizier Nizam al-Mulk (d. 1092) and considered the most famous law college of the medieval Muslim world; and the mosque-universities of Zaytuna in Tunis, Tunisia, flourishing in the 13th century; the Qarawiyyin in Fez, Morocco, one of the most renowned medieval centers of learning, attracting scholars from Christian Europe; and Alhambra in Grenada, Spain.

From the eighth to the 16th centuries there was a continuous tradition of Arabic-Islamic scholarship dealing with pedagogical and didactic issues. Medieval Muslim scholars writing on education included theologians, philosophers, jurists, litterateurs, Hadith scholars, and scientists. Although many of them taught, none was a specialist in education. Nonetheless, their ideas and philosophies on education contributed much to Islam's classical pedagogical tradition. Prominent examples are the jurist Ibn Sahnun (817–70), who apparently was the first Muslim scholar to write a legal handbook for elementary school teachers; the man of letters and theologian al-Jahiz (ca. 776–868), who dealt with issues in ed-

education from a literary and philosophical viewpoint; and the aforementioned scholars al-Farabi, Ibn Sina, and al-Ghazali. For example, al-Farabi suggested an integrated curriculum for the higher learning of the sciences, both foreign (grounded in Greek philosophy and science) and religious (based on the Koran and its interpretation) sciences; Ibn Sina contributed to child education through his theoretical considerations on the intellect and his medical findings; and al-Ghazali, noted for his theological-mystical approach to learning, was one of the great architects of classical Islam's educational philosophy and ethics. Other Muslim scholars with specific interests in education include al-Zarnuji (d. first half of the 13th century), al-Tusi (d. 1274), Ibn Jamaa (d. 1333), Ibn Khaldun (d. 1406), and al-Almawi (d. 1573).

While early Muslim thinkers underscored logos and the spirit of inquiry along with the care for perfection and human excellence, later medieval scholars tended to emphasize

the integrity and purity of the transmission of knowledge that had already been definitively established. Generally, however, medieval Muslim scholars strongly promoted the idea that books are stimulating and indispensable tools for learning. Their writings and ideas provide a wealth of insight into the dynamic world of classical Islamic learning.

See also ART; CALENDARS AND CLOCKS; CHILDREN; CRAFTS; DRAMA AND THEATER; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; DEATH AND BURIAL PRACTICES; FAMILY; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; ILLUMINATION; LANGUAGE; LAWS AND LEGAL CODES; LITERATURE; MILITARY; MUSIC AND MUSICAL INSTRUMENTS; NUMBERS AND COUNTING; OCCUPATIONS; RELIGION AND COSMOLOGY; SCIENCE; SOCIAL ORGANIZATION; TEXTILES AND NEEDLEWORK; WRITING.

Asia and the Pacific

~ "Hsio Ki; or, Record on the Subject of Education," excerpt from Li Ki (ca. second century) ~

1. When a ruler is concerned that his measures should be in accordance with law, and seeks for the (assistance of the) good and upright, this is sufficient to secure him a considerable reputation, but not to move the multitudes.

When he cultivates the society of the worthy, and tries to embody the views of those who are remote (from the court), this is sufficient to move the multitudes, but not to transform the people.

If he wish to transform the people and to perfect their manners and customs, must he not start from the lessons of the school?

2. The jade uncut will not form a vessel for use; and if men do not learn, they do not know the way (in which they should go). On this account the ancient kings, when establishing states and governing the people, made instruction and schools a primary object;—as it is said in the Charge to Yüeh, "The thoughts from first to last should be fixed on learning."

3. However fine the viands be, if one do not eat, he does not know their taste; however perfect the course may be, if one do not learn it, he does not know its goodness. Therefore when he learns, one knows his own

deficiencies; when he teaches, he knows the difficulties of learning. After he knows his deficiencies, one is able to turn round and examine himself; after he knows the difficulties, he is able to stimulate himself to effort. Hence it is said, "Teaching and learning help each other"; as it is said in the Charge to Yüeh, "Teaching is the half of learning."

4. According to the system of ancient teaching, for the families of (a hamlet) there was the village school; for a neighbourhood there was the hsiang; for the larger districts there was the hsü; and in the capitals there was the college.

5. Every year some entered the college, and every second year there was a comparative examination. In the first year it was seen whether they could read the texts intelligently, and what was the meaning of each; in the third year, whether they were reverently attentive to their work, and what companionship was most pleasant to them; in the fifth year, how they extended their studies and sought the company of their teachers; in the seventh year, how they could discuss the subjects of their studies and select their friends. They were now said to have made some small attainments. In the ninth year, when they knew the different classes of subjects

and had gained a general intelligence, were firmly established and would not fall back, they were said to have made grand attainments. After this the training was sufficient to transform the people, and to change (anything bad in) manners and customs. Those who lived near at hand submitted with delight, and those who were far off thought (of the teaching) with longing desire. Such was the method of the Great learning; as is said in the Record, "The little ant continually exercises the art (of amassing)."

6. At the commencement of the teaching in the Great college, (the masters) in their skin caps presented the offerings of vegetables (to the ancient sages), to show their pupils the principle of reverence for them; and made them sing (at the same time) the (first) three pieces of the Minor Odes of the Kingdom, as their first lesson in the duties of officers. When they entered the college, the drum was beaten and the satchels were produced, that they might begin their work reverently. The cane and the thorns were there to secure in them a proper awe. It was not till the time for the summer sacrifice was divined for, that the testing examination was held;—to give composure to their minds. They were continually under inspection, but not spoken to,—to keep their minds undisturbed. They listened, but they did not ask questions; and they could not transgress the order of study (imposed on them). These seven things were the chief regulations in the teaching. As it is expressed in the Record, "In all learning, for him who would in be an officer the first thing is (the knowledge of) business; for scholars the first thing is the directing of the mind." . . .

8. If a student do not learn (at college) to play in tune, he cannot quietly enjoy his lutes; if he do not learn extensively the figures of poetry, he cannot quietly enjoy the odes; if he do not learn the varieties of dress, he cannot quietly take part in the different ceremonies; if he do not acquire the various accomplishments, he cannot take delight in learning.

9. Therefore a student of talents and virtue pursues his studies, withdrawn in college from all besides, and devoted to their cultivation, or occupied with them when retired from it, and enjoying himself. Having attained to this, he rests quietly in his studies and seeks the company of his teachers; he finds pleasure in his friends, and has all confidence in their course. Although he should be separated from his teachers and helpers, he will not act contrary to the course;—as it is said in the Charge to Yüeh, "Maintain a reverent humility, and strive to be constantly earnest. In such a case the cultivation will surely come." . . .

11. The rules aimed at in the Great college were the prevention of evil before it was manifested; the timeliness of instruction just when it was required; the suitability of the lessons in adaptation to circumstances; and the good influence of example to parties observing one another. It was from these four things that the teaching was so effectual and flourishing.

From: *The Li Ki (The Book of Rites)*, part 2, trans. James Legge, in *Sacred Books of the East*, vol. 28 (Oxford, U.K.: Oxford University Press, 1885).

Europe

≈ Petrus Paulus Vergerius: "The New Education" (ca. 1400) ≈

We call those studies liberal which are worthy of a free man; those studies by which we attain and practice virtue and wisdom; that education which calls forth, trains and develops those highest gifts of body and of mind which ennoble men, and which are rightly judged to rank next in dignity to virtue only. For to a vulgar temper gain and pleasure are the one aim of

existence, to a lofty nature, moral worth and fame. It is, then, of the highest importance that even from infancy this aim, this effort, should constantly be kept alive in growing minds. For I may affirm with fullest conviction that we shall not have attained wisdom in our later years unless in our earliest we have sincerely entered on its search. Nor may we for a

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moment admit, with the unthinking crowd, that those who give early promise fail in subsequent fulfillment. This may, partly from physical causes, happen in exceptional cases. But there is no doubt that nature has endowed some children with so keen, so ready an intelligence, that without serious effort they attain to a notable power of reasoning and conversing upon grave and lofty subjects, and by aid of right guidance and sound learning reach in manhood the highest distinction. On the other hand, children of modest powers demand even more attention, that their natural defects may be supplied by art. But all alike must in those early years,

Dum faciles animi iuvenum, dum mobilis aetas

whilst the mind is supple, be inured to the toil and effort of learning. Not that education, in the broad sense, is exclusively the concern of youth. Did not Cato think it honorable to learn Greek in later life? Did not Socrates, greatest of philosophers, compel his aged fingers to the lute? . . .

We come now to the consideration of the various subjects which may rightly be included under the name of "Liberal Studies." Amongst these I accord the first place to History, on grounds both of its attractiveness and of its utility, qualities which appeal equally to the scholar and to the statesman. Next in importance ranks Moral Philosophy, which indeed is, in a peculiar sense, a "Liberal Art," in that its purpose is to teach men the secret of true freedom. History, then, gives us the concrete examples of the precepts inculcated by philosophy. The one shows what men should do, the other what men have said and done in the past, and what practical lessons we may draw therefrom for the present day. I would indicate as the third main branch of study, Eloquence, which indeed holds a place of distinction amongst the refined Arts. By philosophy we learn the essential truth of things, which by eloquence we so exhibit in orderly adornment as to bring conviction to differing minds. And history provides the light of experienced cumulative wisdom fit to supplement the force of reason and the persuasion of eloquence. For we allow that soundness of judgment, wisdom of speech,

integrity of conduct are the marks of a truly liberal temper. . . .

The Art of Letters . . . is a study adapted to all times and to all circumstances, to the investigation of fresh knowledge or to the re-casting and application of old. Hence the importance of grammar and of the rules of composition must be recognized at the outset, as the foundation on which the whole study of Literature must rest: and closely associated with these rudiments, the art of Disputation or Logical argument. The function of this is to enable us to discern fallacy from truth in discussion. Logic, indeed, as setting forth the true method of learning, is the guide to the acquisition of knowledge in whatever subject. Rhetoric comes next, and is strictly speaking the formal study by which we attain the art of eloquence; which, as we have just stated, takes the third place amongst the studies specially important in public life. It is now, indeed, fallen from its old renown and is well nigh a lost art. In the Law-Court, in the Council, in the popular Assembly, in exposition, in persuasion, in debate, eloquence finds no place now-a-days: speed, brevity, homeliness are the only qualities desired. Oratory, in which our forefathers gained so great glory for themselves and for their language, is despised: but our youth, if they would earn the repute of true education, must emulate their ancestors in this accomplishment.

After Eloquence we place Poetry and the Poetic Art, which though not without their value in daily life and as an aid to oratory, have nevertheless their main concern for the leisure side of existence.

As to Music, the Greeks refused the title of "Educated" to anyone who could not sing or play. Socrates sets an example to the Athenian youth, by himself learning to play in his old age; urging the pursuit of music not as a sensuous indulgence, but as an aid to the inner harmony of the soul. In so far as it is taught as a healthy recreation for the moral and spiritual nature, music is a truly liberal art, and, both as regards its theory and its practice, should find a place in education.

Arithmetic, which treats of the properties of numbers, Geometry, which treats of the properties of dimensions, lines, surfaces, and solid bodies, are weighty studies because they possess a peculiar element of certainty. The science of the Stars, their motions, magnitudes

and distances, lifts us into the clear calm of the upper air. There we may contemplate the fixed stars, or the conjunctions of the planets, and predict the eclipses of the sun and the moon. The knowledge of Nature—animate and inanimate—the laws and the properties of things in heaven and in earth, their causes, mutations and effects, especially the explanation of their wonders (as they are popularly supposed) by the unraveling of their causes—this is a most delightful, and at the same time most profitable, study for youth. With these may be joined investigations concerning the weights of bodies, and those relative to the subject which mathematicians call “Perspective.” . . .

Respecting the general place of liberal studies, we remember that Aristotle would not have them absorb the entire interests of life: for he kept steadily in view the nature of man as a citizen, an active member of the State. For the man who has surrendered himself absolutely to the attractions of Letters or of speculative thought follows, perhaps, a self-regarding end and is useless as a citizen or as prince.

From: Petrus Paulus Vergerius, *De ingenues moribus et liberalibus studiis*, trans. W. H. Woodward et al. (Cambridge, U.K.: Cambridge University Press, 1897).

FURTHER READING

- Ronald B. Begley and Joseph W. Koterski, eds., *Medieval Education* (New York: Fordham University Press, 2005).
- Ronald M. Berndt and Catherine H. Berndt, “The Life Cycle: Growing Up.” In *The World of the First Australians: Aboriginal Traditional Life Past and Present*, 5th ed. (Canberra, Australia: Aboriginal Studies Press, 1996).
- Suresh Chandra Ghosh, *Civilisation, Education, and School in Ancient and Medieval India, 1500 B.C.–1757 A.D.* (New York: P. Lang, 2002).
- Sebastian Günther, “Advice for Teachers: The 9th-Century Muslim Scholars Ibn Sahnun and al-Jahiz on Pedagogy and Didactics.” In *Ideas, Images and Methods of Portrayal: Insights into Classical Arabic Literature and Islam*, ed. Sebastian Günther (Leiden, Netherlands: Brill, 2005).
- Sebastian Günther, “Be Masters in That You Teach and Continue to Learn: Medieval Muslim Thinkers on Educational Theory,” *Comparative Education Review* 50 (2006): 367–388.
- Sebastian Günther, “Teaching.” In *Encyclopaedia of the Qur’an*, vol. 4, ed. J. D. McAuliffe (Leiden, Netherlands: Brill, 2005).
- Brian Hook and Denis Twitchett, “Education,” in their *The Cambridge Encyclopedia of China*, 2nd ed. (New York: Cambridge University Press, 1991).
- Alfonso Maierù, *University Training in Medieval Europe* (New York: E. J. Brill, 1994).
- George Makdisi, *The Rise of Colleges: Institutions of Learning in Islam and the West* (Edinburgh: Edinburgh University Press, 1981).
- Joyce Marcus, *Mesoamerican Writing Systems: Propaganda, Myth, and History in Four Ancient Civilizations* (Princeton, N.J.: Princeton University Press, 1992).
- P. E. Walker, “Knowledge and Learning.” In *Encyclopaedia of the Qur’an*, vol. 3, ed. Jane Dammen McAuliffe (Leiden, Netherlands: Brill, 2003).
- Zahra Al Zeera, *Wholeness and Holiness in Education: An Islamic Perspective* (Herndon, Va.: International Institute of Islamic Thought, 2001).

► empires and dynasties

INTRODUCTION

The primary form of government all over the world in the Middle Ages was the monarchy, the rule of a single man (rarely and never ideally a woman) over a state or empire. The model for this institution was the family, ruled over by the single head, the father. The medieval father and king both had authority over their respective spheres, the family or kingdom, while their households or subjects had obligations to the head. The king or father also had the duty to protect those who were dependent on him and not to exploit them. The concept of the family is thoroughly interwoven in all human cultures and served as a model to make the inequality of power relationships inherent in a monarchical system comprehensible and acceptable to the subjects of a kingdom or empire. Families made up a clan and clans a nation, so it seemed natural that the father and clan chief should be ruled over by a king. The king’s own family took on its own larger life as a dynasty; its squabbles played out as civil wars. The monarchical title and authority were passed down from generation to generation like family property.

Power in medieval states tended to be decentralized. Local leaders were not eliminated by the king even when new territories were conquered; instead, they were brought into the family. Once Korea was conquered by China, for instance, the two states referred to each other as younger and elder brothers. Often there were true family alliances between local leaders and the ruling dynasty, contracted through marriage. Medieval technology could not sustain direct control over a territory as large as China or Europe, and power necessarily

devolved on local rulers or governors who were largely beyond the reach of the central monarchy. Such officials received their right to rule from the king or emperor and therefore had an obligation to support him with taxes and soldiers. This system of government is known as feudalism. But often distant or great nobles and governors had little contact with the center and effectively acted and ruled independently or openly rebelled. Such independence would be taken in hand by the monarchy whenever resources and circumstances allowed; very often a large territory would be unified or reunified by military conquest only to fragment again into *de facto* independent countries. This happened almost at once when the huge Mongol Empire conquered by Genghis Khan was divided among his sons and grandsons. The history of medieval China is one of new dynasties unifying the country, only to have it splinter apart again. The modern western European nations essentially correspond to the individual provinces of the Roman Empire because these were small enough to be governed with a reasonable amount of direct control from the center.

The other major trend in governance during the Middle Ages was democracy. This, too, found its roots in the family, in the equality of brothers. A few states, such as some of the Swiss cantons and Italian cities, were long-lasting self-governing democracies, but the democratic power in government was most often directly tied up with the monarchy. In their origins, a surprising number of medieval monarchies were elected, either by the national army as equals selecting a leader or by a group of leading nobles choosing a king based on the interests of their own regions. The Germanic tribes that overwhelmed the Roman Empire often chose their kings in this manner, and the institution became enshrined in the system of election of the Holy Roman Emperors by the leading nobles and bishops. The caliphs, the supreme political and religious leaders of Islam, were originally elected by the army. The monarchies of many other states all over the world were also elected, for instance, those of the Aztecs of Mexico and the kingdom of the Congo in central Africa. Still, this process inevitably gave way to a dynasty when the reigning king's son or other close relative was elected as a natural successor, so that over time the succession became a matter of inheritance and the election was reduced to a show of support or was done away with entirely.

Another trend common in medieval monarchies was the supplanting of the legitimate ruling family or office by a court official. Typically, the old dynasty would continue as a symbolic figurehead. In the kingdom of the Franks, for example, the Merovingian Dynasty, which had originally built the Frankish Empire, was supplanted by their "mayors of the palace." The Merovingians continued as putative rulers for several generations while power was exercised by their officials,

who eventually took the royal title for themselves. The Japanese emperors, on the other hand, continue as titular heads of state to this day, but real political power in Japan passed almost immediately after the foundation of the imperial state to court officials such as the shogun. The caliphs, or successors to Muhammad, were similarly kept as religious leaders after the fragmentation of the Islamic state in the 10th century but lost political authority to the various successor dynasties in the different parts of the empire and were themselves appointed by the Buyid Dynasty that controlled Baghdad.

China and states that molded themselves on China, such as Korea and Japan, benefited from the Confucian tradition to institute a civil service bureaucracy based on education and examination rather than birth or privilege. This established a class of governors and bureaucrats trained to exercise political authority but lacking their base of power to rebel against the central authority. Other areas of the world did not enjoy such professional bureaucracies until after the medieval period, although the governmental use of university-trained lawyers in western Europe in the High Middle Ages began a trend in this direction.

Another factor that conditioned state formation in the Middle Ages was the conflict inherent in the way of life of nomadic tribes and of settled states based on agriculture. From the Roman Empire to India to the Islamic world to China, large states collapsed again and again either in the face of invasion from the steppe nomads of inner Asia or from the inordinate expense involved in defending against them, which could range from paying for a huge standing army to the maintenance of the Great Wall of China. Countless states were destroyed or replaced by nomadic invaders. The central valley of Mexico, the center of civilization in North America, seems to have been conquered several times by nomadic peoples from the surrounding regions.

AFRICA

BY TOM STREISSGUTH

In the view of many historians, successful agriculture led to the rise of centralized kingdoms in medieval Africa. The harvesting of surplus food allowed people to gather in cities, where specialized professions such as ironworking and goldsmithing developed. As societies stratified into laborers and artisans, a class of nobles, those who gained control of land and goods, gathered power and established their authority in large cities and neighboring regions. Eventually, in a given region a single powerful family might emerge to establish a hereditary dynasty. A complex state could then rise to power, as controlled by ministers, provincial governors, and an administration for collecting taxes and tolls. Medieval African

empires protected and expanded their borders with standing armies and in some cases survived to dominate large regions for centuries.

Key factors in the process of empire development were mining and trade. Although gold was not considered especially valuable in sub-Saharan Africa, it was in high demand as a trade item, one that distant realms in North Africa and the Middle East took great pains to acquire. All medieval African kingdoms rose in proximity to valuable mineral resources, including copper, iron ore, and gold, as well as to fertile land, needed for both crops and herds. Furthermore, all controlled long-range trade routes and featured a class of middlemen and merchants who traded along major rivers, through seaports, or across the Sahara Desert.

Geography and climate were also important factors in the development of empires. The port of Adulis, on the hot and arid western coast of the Red Sea, was a key link in trade between the Nile River valley, other Red Sea ports, the eastern coast of Africa, and the Indian Ocean. Adulis also lay near a mountainous region about 100 miles to the west that enjoyed a mild climate with good rainfall. These Ethiopian highlands were free of the diseases that were endemic to lower elevations, including malaria and sleeping sickness; they also were protected by a series of ridges that formed a strong natural barrier to invasion. In this region the empire of Axum rose at the dawn of the medieval period.

AXUM

The city of Axum at its height was the capital of a realm stretching from the Sahara Desert to the Arabian Peninsula. The Axumites struck the first coins in sub-Saharan Africa and developed a system of phonetic writing known as Geez. Their empire originated in the settlement of the Red Sea coast by traders and farmers in the time of the late Egyptian dynasties. According to tradition, this was the land of the Queen of Sheba, whose visit to King Solomon is described in the Old Testament book of Kings. The queen brought a great treasure of gold and precious gems to the king, who reciprocated with gifts of his own and with a son, King David, founder of the Solomonic dynasty of Ethiopia as Menelik I; David had brought to his homeland the Ark of the Covenant, a relic said to contain the stone tables on which were inscribed the Ten Commandments.

Axum prospered by controlling busy routes between southern Arabia, eastern Africa, and India. At its height the Axumite kingdom included the upper Nile Valley to the north and Yemen, on the southern coast of the Arabian Peninsula. The fall of Kush, an empire in what is now Sudan, allowed the Axumite leaders to establish new tributary states and also brought the realm into contact with Christianity, which was

spreading into Africa from its home in the Roman-controlled Levant. Axum converted to Christianity during the reign of its king Ezana, who was baptized into the new faith by a Syrian bishop. By 500 churches in Axum were holding mass in the native language of Geez, and the Axumite Christians claimed descent from the ancient tribes of the Hebrews and their legendary warrior king David.

The rulers of Axum were buried in stone tombs marked by tall stelae. Many of these obelisks survive in the modern city, where a few still stand upright while many more are overturned and lying in pieces on the ground. The obelisks were decorated with elaborate bas-reliefs; the tallest was more than 100 feet in height.

The port of Adulis boasted one of the busiest harbors in the ancient world, where ships called from the Persian Gulf, the east coast of Africa, India, and as far as the East Indies. Adulis was home to Egyptians, Greeks, Arabs, Indians, and Africans and featured a cross section of ancient faiths, including Judaism, Christianity, and Buddhism. With the rise of Islam in the seventh century, however, and the conquest of vast territories by Muslim armies, Adulis's sphere of influence began to shrink. Arabs seized control of many desert and seaborne trading routes; they refrained from directly attacking Axum, however, as Muslims honored the city as a refuge for the early disciples of Muhammad, the founder of Islam.

Environmental degradation played an important role in the decline of Axum. Trees were stripped for their bark to fire charcoal furnaces, used to produce iron as well as brick, glass, and pottery kilns. Timber also was used for firewood and for home construction. With the landscape denuded of trees, soil eroded in the heavy rainfall, resulting in a loss of fertility and a decline in food production. At the same time, conflict in the Mediterranean after the fall of Rome lessened trade through Adulis, and the Persian Empire was taking control of trade in the Arabian Peninsula. In the eighth century Adulis was overrun by Arab armies. Axum declined further; the state stopped minting coins as central authority fragmented and disappeared. Drought beginning in the middle of the eighth century worsened the situation.

By the ninth century Axum had declined into a small, poor, and insignificant village. In modern times the city and its many carved obelisks survive as a symbol of ancient Ethiopian glory. Axum also remains a religious center, place of pilgrimage, and, according to legend, the resting place of the Ark of the Covenant, replicas of which are enshrined as holy relics in Ethiopia's modern Christian churches.

GHANA AND TAKRUR

Around the third century the use of camels eased the hardships of travel across the Sahara Desert. These ungainly beasts



Bronze head of the king of Ife, with a beaded crown and plume, Yoruba culture, Nigeria, ca. 12th–14th centuries (© The Trustees of the British Museum)

could bear heavy burdens and survive on small amounts of food and water. Camel caravans, some numbering in the hundreds of animals, moved slowly across the gravelly plains of the desert, making the entire journey between the coast and the towns of the Sahel, just past the southern limits of the desert, in a few weeks.

The caravans provided a spur to trade in gold, salt, and other goods between sub-Saharan Africa and the Mediterranean coast. They also helped the Berber nomads of the desert establish their supremacy over the lucrative cross-desert trade. An important mint in the city of Carthage, a Roman port on the Mediterranean, relied on gold from alluvial deposits in the forested highlands of western Africa. The demand for gold by the Roman mints and later among the Arabs of North Africa brought about the rise of centralized

states in western Africa, which remained the leading source of gold for the Mediterranean region and Europe throughout the medieval period.

The Ghana Empire arose in the fifth century. Its early history is obscure, with some historians holding the view that the Berbers founded the kingdom by establishing their supremacy over the local Mandingo people. Eventually, the two groups mingled—or the Berbers were forcefully expelled—and a capital was founded at Koumbi Saleh, in what is now Mauritania. Ghana dominated the Niger Delta, a fertile region of grassland, marsh, and springs, while its kings extended their authority over distant tributary states. Koumbi Saleh supplied abundant amounts of gold, and its artisans also produced copper and iron goods for ornaments, tools, and weapons.

By the 11th century the Ghana Empire's northern reaches were subjected to raiding and plundering by the Islamic Almoravid Dynasty (1056–1147), of the region now comprising Morocco, Tunisia, Algeria, and Libya. Ghana's trade with North Africa was disrupted, and the empire's decline was hastened by overgrazing and overpopulation. Drought conditions worsened in the 11th century, putting further pressure on the food supply. In the meantime the Berber and Tuareg nomads of the Sahara sided with the Almoravids, and the kingdom of Takrur, of the Senegal River valley, also joined the alliance against Ghana. In 1052 an Almoravid army attacked Koumbi Saleh, and after this siege Ghana went into decline. War continued until 1076, when the Almoravid general Abu Bakr captured and destroyed the city.

At the collapse of Ghana in 1076 the kingdom of Takrur was thriving from trade in gold, salt, grain, and slaves. This realm controlled caravan routes between western Africa and the cities of the north. Takrur adopted Islam in the 11th century under the king War Jabi, the first leader in western Africa to accept the new faith. Takrur was never a strong military power, however, and its rivals were powerful and dangerous. The Sosso realm, which had once paid tribute to Ghana, emerged as Takrur's strongest rival. By 1200 Sosso armies were raiding and pillaging the tribes of the Manden region, just south of the borders with Ghana. The Mandingo peoples there counterattacked in 1235 under the leadership of Sundiata Keita, who united the 12 Manden tribes and established the Mali Empire. Sundiata led his troops to a final victory at the battle of Kirina, which brought Sosso authority to an abrupt end. In 1280 Takrur was finally destroyed by the Mali emperor Sabakoura.

THE MALI EMPIRE

The realm founded by Sundiata Keita would endure for four centuries. The Mali Empire controlled a wide swath of west-

ern Africa from its political center in the Niger Delta. Its emperors imposed law and customs on far-flung regions that the kings of Ghana were unable to control, and their acceptance of the Islamic faith allied them more closely with the North African states. The Mali emperor Mansa Musa was renowned for his lavish palaces and great wealth. Mansa Musa imposed a constitution and convened an assembly known as the Gbara, at which representatives of the Mandingo clans debated important decisions.

The emperors of Mali were chosen from the clan of the Keita. The capital of the realm was located in Niani, in what is now northern Guinea. The realm expanded rapidly in the late 13th century under the emperors Ouali and Sakoura, the latter a former slave. Mali took control of new territory to the west as well as the realm of Takrur and the cities of Timbuktu and Gao, which was important to the Songhai people. Productive copper and gold mines were seized, allowing Mali to extend its authority and influence south into the Hausa region. Under Sakoura, Mali carried out a thriving trade with North Africa in gold, salt, slaves, ivory, and kola nuts.

From Niani the emperors levied taxes on mines and collected regular tribute from the subject tribes. New territories were governed by viceroys appointed by the emperor; upon proving their loyalty, these territories were allowed to govern themselves with elected leaders. The Mali emperors accepted Islam but allowed the subject tribes to follow the religions of their choice. Through the Mali Empire the Islamic faith spread into the forest kingdoms of sub-Saharan western Africa.

The empire was defended by a large and well-trained standing army, with both infantry and cavalry. Each of the tribes paying tribute to the emperor also had to provide troops. With these forces Mali reached its greatest extent in the middle of the 14th century, when it was organized into 14 large provinces. The realm covered most of western Africa, from the coast of the Atlantic Ocean to the central Sahara Desert.

Emperor Mansa Musa annexed Timbuktu, making the city a center of Islamic study and establishing the university known as Sankoré. This emperor's most famous achievement, however, was the pilgrimage to Mecca that he undertook in 1324. Mansa Musa brought along a vast treasury of gold, which he distributed as alms and as gifts to the princes he met along the way. The gold was so plentiful, stories tell, that it caused a crisis of inflation in Egypt and the Middle East. The free-spending emperor and his huge entourage attracted notice throughout the Islamic world and as far as Europe, where princes and navigators took especial note of this previously unknown source of gold in distant Africa.

In the middle of the 15th century Portuguese explorers began making their way down the western coast of Africa. These navigators were seeking a new water route to the East

Indies and were following the reports of an abundance of gold in the western African interior. Portuguese ships anchored off the mouths of prominent rivers, including the Gambia, and sent slave-raiding expeditions into the forests along the coasts. The Mali emperors opened up diplomatic and trade negotiations with the Portuguese.

SONGHAI

No states managed to rival the longevity of the Mali Empire in the medieval era, but a few regions did break away from its hold. By the middle of the 15th century disputes over succession to the throne were weakening central authority in Mali and making the empire vulnerable to military conquest. The Songhai, who dominated a region to the north and east of Niani, broke away from Mali in the late 14th century. Under their leader Sunni Ali Ber (r. 1464–92) the Songhai armies conquered Timbuktu in 1468. Songhai seized valuable salt mines in the western Sahara in the 1490s. This began a century of slow decline for the Mali Empire, as its provinces and resources gradually fell to rival states. In 1545 the Songhai forces attacked and occupied Niani, the Mali capital, forcing the emperor Mansa Mahmud III to retreat. Although Mansa Mahmud eventually regained his capital city, the Songhai Empire surpassed Mali to become the most powerful state in western Africa.

Sunni Ali Ber's successor, Askia Muhammad Touré (r. 1493–1528), founded the Askia Dynasty and expanded the frontiers of the Songhai Empire, pushing south into Hausa territory. Askia Muhammad created a large centralized bureaucracy, instituted a system of standard weights and measures, replaced traditional religion with Islam, and appointed Islamic judges to implement Islamic law. The majority of people held to their traditional religions, however, and Islam was only known in the cities and among the upper classes. Songhai was a short-lived realm that grew too large to be effectively controlled from its capital. In 1591 it was overthrown by the Moroccan sultan Ahmad I al-Mansur Saadi, whose forces conquered Gao, Timbuktu, and Djenné. After these defeats, Songhai disintegrated into several small states.

The Kanem Empire and the successor empire of Bornu rose in the central Sahel around 1200, as the Kanuri people began to conquer surrounding areas as led by Mai Dunama Dibbalemi, who converted to Islam and declared jihad against local chiefs. Kanem controlled trade between Hausaland, the Sahel region, and North Africa. In the early 1400s the center of the empire moved to Bornu, southwest of Lake Chad. This realm grew in the late 15th century and the 16th century as Songhai weakened.

To the east the Kitara Empire flourished in the region near Lake Victoria. Ruled by the Bachwezi Dynasty, Kitara

was destroyed in the 16th century by invasions from the north. Strong centralized kingdoms were developing in the lake region of East Africa at the close of the medieval period. These included the realm of the *mwami*, or Rwandan kings, which prospered just east of Lake Kivu in a heavily populated area with lush pasture and a temperate climate. Rwanda lay between the kingdoms of Burundi to the south and Buganda to the north.

In the west the growing trade between the coastal regions and the interior, along with the migrations of people of the savanna as the desert advanced to the south, spurred the rise of forest kingdoms along the coast and just inland. These included the Wolof Kingdom in the west. The Wolof, who fielded a powerful army in what is now Senegal, controlled a strategic crossroads between the coast and the interior, and they moved salt, gold, and slaves between the coast and North Africa. In the early 15th century the Mole-Dagbani and Mossi kingdoms flourished along the Volta River.

THE KINGDOM OF KONGO

At the time of the savanna and forest kingdoms a migration of Bantu-speaking peoples was occurring throughout the southern half of Africa. From their homeland in the area surrounding the great bend of the Niger River, Bantu speakers arrived at the lower reaches of the Congo River by the early medieval period. They built a capital city at Kwilu, near the coast in what is now the Democratic Republic of Congo. Two small kingdoms, Mpemba Kasi and Mbata, allied their ruling dynasties around 1375, establishing a system for electing a joint king. In the next generation, the king Nimi Lukeni founded a new capital at M'banza Kongo.

The kingdom of Kongo featured a strongly centralized monarchy, with the kings ruling the far-flung provinces through appointed governors. Thousands of small villages in the forest and coastal regions, from Cameroon to Angola, were under the control of M'banza Kongo. They paid taxes with crops or with currency, in the form of the small *nzimbu* shells found around the site of Luanda, in the southern reaches of the kingdom. M'banza Kongo itself grew into a large city, as supported by the tribute of the provinces and by taxes on the iron and copper ware, raffia cloth, pottery, and other goods that moved between the interior and the Atlantic coast.

The Kongo kings established a large permanent army of archers and infantry, who fought with spears, swords, and shields. The army had bases in the capital and in the most important towns. This force enabled the king and provincial governors to quickly put down rebellions, which were common in areas distant from the capital. The Kongo kings expanded the realm into one of the largest in Africa by the time Portuguese navigators arrived in the 1480s.

The Portuguese navigator Diogo Cão encountered the Kongo realm during his voyage of 1482–83. Cão took several Kongo leaders captive and brought them north to the court of the king of Portugal. He returned with his captives in 1485, when he converted the Kongo king Nzinga Nkuwu to Christianity. Missionaries followed to baptize the king and members of the Kongo aristocracy, starting with the ruler of the coastal province of Soyo. At the same time a literate Kongo citizen returning from Portugal opened the first school. Nzinga Nkuwu took the name of João I in honor of Portugal's king at the time, João II.

The death of João I in 1506 sparked a civil war between his son, Nzinga Mbemba, or Afonso, and Afonso's half-brother Mpanzu Kitima. Afonso overcame his rival—thanks to the intervention of the Virgin Mary and the Christian Saint James, in his view—and ruled for 37 years, the longest reign in Kongo's history. The kingdom thrived through trade and expanded through the conquest of neighboring regions, which brought in many prisoners of war, who were valued as slaves. Kongo became an important source of slaves for Portuguese sugar plantations on the island of São Tomé. A devout Christian, Afonso banned the animist religion native to the region and made Christianity Kongo's official religion. His son Henrique was ordained as a bishop.

Afonso sought to model his monarchy on that of Portugal, establishing schools in Kongo that would educate the elite to live and rule in the European manner. He grew concerned with the effects of the slave trade on the realm and made an attempt to abolish the trade altogether. The Portuguese were not inclined to relinquish the advantages of this lucrative business, however, and continued to both buy and capture slaves for export. Kongo, in turn, came to depend on the trade for the financing of the school-construction program and of the importation of luxury goods for the enjoyment of the king and nobles.

MAPUNGUBWE, THE MWENE MUTAPA, AND GREAT ZIMBABWE

In southern Africa the Bantu migration brought a transformation of economic life and social organization. Dependent on cattle, usually for either milk or meat, the Bantu peoples were moving in search of pasture and elevated land that would allow their animals to escape trypanosomiasis, or "sleeping sickness," a disease brought by the lowland-dwelling tsetse fly. The Bantu peoples brought iron smelting as well as cattle raising with them to the region south of the Zambezi River, a region well suited to cattle, with good forage and a temperate climate. The Mapungubwe cities of the Limpopo River valley arose in the 10th century. Terraced fields were built on the hillsides to increase the ground area available for cultivation.

An aristocracy claimed land at the summits of these hills and built walled enclosures for defense.

The rise of large kingdoms in southern Africa was closely tied to practices of cattle raising. The raising of cattle for beef, rather than for the milk production that dominated East Africa, was a less labor-intensive form of husbandry. Beef cattle could sustain large and expanding populations, while milk production was better suited to arid climates and marginal land.

The Zambezi and Limpopo valleys traded with the outside world through the port of Sofala, a Swahili-speaking city-state on the Indian Ocean coast. Beginning in the 13th century productive and abundant gold mines in this area were providing a medium of exchange for items of value brought to Sofala by Arab traders.

In the 13th century the Mapungubwe realms were eclipsed by the Shona states, which also were based on cattle raising. Among the Shona, *zimbabwe* was the name for a royal precinct or stone-walled enclosure, more than 300 of which have been found in the region and the largest of which is known as Great Zimbabwe. Here the kingdom of the Mwene Mutapa—the title borne by its kings—arose to become the strongest realm in medieval southern Africa. This kingdom traded in gold and other resources through Sofala. Glass and ceramics were imported, while iron, copper, cattle, and cowrie shells were shipped abroad or exchanged at the coast. The great trade wealth accumulated in their treasuries allowed the Zimbabweans to centralize their government. Their seat of power at Great Zimbabwe remains the largest archaeological site in Africa outside the Nile Valley.

Great Zimbabwe, which has been dated to the 12th century, contained a hill complex and several smaller, dependent sites known as valley complexes. The hill complex was a sacred district where rituals were carried out, iron forges were worked, and the royal treasury was kept. The Imba Huru, or Great Enclosure, a royal precinct surrounded by a much larger city, was protected by a massive wall 15 feet thick, 800 feet in length, and about 32 feet tall at its greatest height. The builders collected granite blocks from the surrounding hill-tops and fitted the rough stones together without mortar.

The Mwene Mutapa controlled much of what is now Zimbabwe and parts of Mozambique, with the realm reaching its height in the middle of the 15th century. Overgrazing eventually brought about a decline in the kingdom's food supply; meanwhile, the water supply became degraded and contaminated, while surrounding forests were denuded of trees, which were cleared for firewood. The capital of the realm was moved from Great Zimbabwe to Mount Fura, on the Zambezi River. Rival Shona states warred for control of dwindling pasture and gold resources, and the arrival of Europeans in the 16th

century began a debilitating trade in slaves. By the middle of the 17th century the kingdom of the Mwene Mutapa had disintegrated under the assaults of the Portuguese, who had conquered Sofala and other Indian Ocean ports, with additional pressure having come from the migration of the Zulu people from the north.

THE AMERICAS

BY J. J. GEORGE

The concept of an empire as a major political unit comprising one large territory or several territories or peoples ruled by a single sovereign is usually associated with states or city-states. Although exactly what constitutes a state is a matter of continued debate, at its most basic level it is, like an empire, the political organization of a populace sometimes numbering into the hundreds of thousands or even millions. For example, the Inca civilization, centered in Peru, controlled about 6 to 8 million people. Some of the practical criteria evident in statehood are territorial control, unified governmental efficiency, divisions of labor, a monopoly on the use of military force, established social classes, often the presence of monumental architecture (especially at the capital or core), and satellite communities of various sizes and complexity surrounding the capital. An empire, then, is the result of a state expanding beyond its core area to encompass peoples with various ethnic or state identities and controlling its widening territory through diplomacy, force, or reciprocity.

Ideally, dynastic rule and kingship would follow a strict rule of primogeniture, which mandates that the exclusive right of inheritance belongs to the eldest son. But succession was rarely so clean and easy in the medieval period. Politics, power, and intrigue, not to mention misfortune or simply not bearing a son, helped shape the role of succession. A range of eligible persons was usually considered in instances of dynastic succession, almost invariably from close relatives already in positions of authority. It was, nonetheless, of great importance, especially among royalty and the elite, to be able to trace a person's ancestry along both paternal and maternal lines, because many societies were strictly divided by class. Obviously, tracing a line of nobles was more advantageous than tracing a lineage with commoner's roots.

The best information available on empires and dynasties in the Americas comes from central Mexico, especially for the Aztec Empire; the Maya territory; and South America, particularly the Inca. In relation to the sociopolitical climate of North America during the medieval period, scholars do not use the term *empire*. While many North American societies were old and complex, even the largest and most diverse often are described politically as chiefdoms and demographi-

cally as towns or villages. Even in societies whose successions of chiefs or dynasties reverberate with empirelike issues of power, data are absent or incomplete. Further, the definition of *empire* simply does not correlate with the types of societal organizations present in medieval North America.

CENTRAL MEXICO

Conventional scholarship divides Mesoamerican cultural development into periods that are generally consistent with the cultural chronologies of the Maya Empire and other areas of Mexico. Although research is continually refining and amending the dating, the periods from 500 to 1500 C.E. are as follows: Early Classic (ca. 150–ca. 600), Late Classic (ca. 600–ca. 800), Terminal Classic (ca. 800–ca. 925), Early Postclassic (ca. 925–ca. 1200), and Late Postclassic (ca. 1200–ca. 1530), the latter dominated by the rise of the Aztec and the arrival of the Spanish. The Spaniard Hernán Cortés and his men landed on the Gulf Coast in 1519 and by 1521 had entered the great Aztec capital of Tenochtitlán. Soon thereafter the Aztec Empire fell, and the period of Spanish colonial rule ensued.

A full picture of the situation of empire in central Mexico must begin with the final 250 years of Teotihuacán, from roughly 500 to 750, during which the city and the vast culture associated with it experienced its climax, denouement, and eventual destruction by fire. At its greatest extent Teotihuacán reached a population of approximately 125,000 and an area of control of roughly 10,000 square miles. Considering the limits of human energy unaided by beasts of burden at the time (12 to 15 miles a day, with minimal gear), this represents a significant piece of property. Teotihuacán's urban core as well as the extent of its control and influence went unmatched until the rise of the Aztec Empire and its capital, Tenochtitlán, in the 15th and 16th centuries.

Teotihuacán apparently did not want to or was not able to unify all the territories within its reach under a single cohesive structure; rather it concentrated on controlling key settlements, routes, and resource areas in "blocks" of territory. Nevertheless, its presence was felt throughout Mesoamerica. Outside central Mexico evidence of its presence has been found at Monte Albán in Oaxaca, Veracruz, Chiapas, Belize, and Guatemala, particularly in the form of architectural signatures, carved stone reliefs, and pottery. So pervasive was Teotihuacán's influence between 400 and 700 C.E. that scholars have proposed assigning that period its own classification—the Middle Classic.

Why Teotihuacán fell is a matter of ongoing debate. One theory is based on the idea that the nature of Teotihuacán constituted a religious confederation, deriving its power and influence from moral force. The erosion of the religious fer-

vor that led to cohesion consequently left it vulnerable and weak to invasion. Another theory suggests that, in essence, Teotihuacán was a victim of its own success; developing and spreading its own urban social formula prompted the emergence of rivals who pressured and ultimately challenged Teotihuacán authority. Moreover, if it had been suffering from internal conflicts as has been suggested, any additional pressure from external sources would have caused it to abandon its imperial outposts and focus on matters at home. Conclusive explanations remain elusive at this time.

The collapse of Teotihuacán created a vacuum in which numerous polities maneuvered for greater power through shifting alliances and outright war. People from the northern colonies migrated south, many settling in Tula, which had been a town while Teotihuacán dominated but subsequently grew rapidly. By about 950 Tula became the capital of the Toltec Empire. Around 1000 its center expanded to cover about 5 square miles with an estimated population between 32,000 and 37,000. From there its influence extended to include the Mexico Basin, the regions north and west of the basin, and the Valley of Puebla. Major centers aside from Tula included Tollanzinco, Tenanco, and later Chapultepec, where Huemac, the last Toltec king, moved the capital in 1156. Toltec influence was also recognized in the Yucatan at Chichén Itzá. The period from 987 to 1187 corresponds with Maya-Toltec development, and this phase of construction at Chichén Itzá is its most magnificent.

Toltec dynastic history is derived from two sources. The first is the *Historia Tolteca-Chichimeca*, an account of the history and origins of Texcoco, a city-state in the Mexico basin later subsumed by the Aztec Empire, written by an educated Texcocan after the Spanish conquest. The second, called the *Anales de Cuauhtitlan*, is a generalized history of a city-state by persons who claimed their ancestors had come from Tula. Neither source inspires great confidence. The order of Toltec rulers according to the *Anales* is Mixcoamatatzin, Huetzin, Totepeuh, Ihuitamal, Topiltzin, Matlaxochitl, Nauhyotzin I, Matlaccoatzin, Tlilcoatzin, and Huemac.

The Toltec hold something of a privileged place in the history of central Mexico because subsequent regional dynasties made it a point to attach their historical lineage to that of the Toltec as a way to usurp tradition for self-legitimizing purposes. Not the least of the empires to do this was that of the Aztec (or more specifically the Aztec-Mexica, with Mexica being the tribal affiliation within the Aztec group), whose origin myth has them coming out of Tollan—another name for Tula and the Toltec Empire—and wandering for years before settling a swampy, snake-infested backwater island in Lake Texcoco in the Mexico basin, from which rose their capital city Tenochtitlán.

The founder of the Aztec imperial line was Acamapichtli, elected king (*tlatoani*) in 1376. On his death his son, Huitzilhuitl (r. 1395–1417), was elected, followed by Acamapichtli's grandson Chimalpopoca (r. 1417–27) and then his other son Itzcóatl (r. 1427–40). The Mexico basin was essentially composed of a system of competing city-states, and under Itzcóatl, Tenochtitlán allied itself with Texcoco and Tlacopán, two other regional city-states, to form what is commonly called the Triple Alliance. Beginning in 1428 the three allied powers first succeeded in conquering powerful city-states, notably Chalco. During the reign of Motecuhzoma I (r. 1440–68) the Triple Alliance expanded far beyond the basin. Succeeding Aztec *tlatoani* include Axayácatl, Tízoc, Ahuítzotl, and Motecuhzoma II, who was the last ruler before the Spanish conquest.

In the course of developing the empire the Aztec made substantial achievements: They built major waterworks and causeways, expanded *chinampa* (raised field) agriculture, promoted ceremonial and public architecture within urban centers, and raised standards of living. The strength of the Aztec military grew as well. Warfare became idealized and unremitting, long-range military campaigns grew commonplace, and ever-increasing tributes from conquered regions were expected.

As the empire extended its control over more distant and diverse city-states and regions, control became more tenuous. Enemy states such as the Tarascans to the west and the Tlaxcalans to the east remained independent, and quelling rebellions and reconquering upstart city-states necessitated great expenditures of money and materiel. Imperial strategies for establishing and maintaining control can be divided into four areas—economic, political, frontier, and elite—each geared toward expansionist objectives.

The economic strategy was to control resources, emphasizing production and exchange with the goal of expanding trade and diversifying goods. Conquered city-states were grouped into tributary provinces; tribute was a scheduled, repetitive, and relatively predictable form of delivering products to the imperial centers. Tribute items included large quantities of food staples such as maize, beans, cacao, honey, salt, and chilies; textiles and clothing items such as garments, raw cotton, and cochineal dye; jewelry and luxuries such as colorful feathers, lip plugs, amber, turquoise masks, and gold bars; and miscellaneous products like copal incense, paper, and pottery bowls. The Codex Mendoza, one of the few painted manuscripts to survive the conquest, contains a list of all tribute items brought to Tenochtitlán from the periphery. While tribute was meant specifically for the benefit of the imperial center, the demands of production nonetheless stimulated commercial activity and interaction in outlying areas, with

the fortuitous effect of encouraging cohesion based on intertwining interests and needs.

The political strategy emphasized controlling political competitors by diffusing the power of local rulers (*tlatoque*) and making sure formerly autonomous states were dependent on their new imperial center. After conquering a city-state, the Aztec most often left existing political structures intact, so long as the conquered people agreed to pay tribute and accept the Aztec god Huitzilopochtli. Sometimes, however, the Aztec directly interfered with local political offices by eliminating some, downgrading others, and creating new administrative positions and installing persons who were family of the Mexica ruler. In a few particularly unstable areas, the Aztec installed powerful governors, military garrisons, or forts.

The frontier strategy focused on goals of security and containment along hostile imperial borders. Especially hostile borders to the east and west inhabited by the Tlaxcalans and the Tarascans, respectively, necessitated establishing fortresses, dispatching garrisons of warriors, and sending colonists to strengthen frontier regions. In the case of the Tarascans, to whom the Aztec suffered a disastrous defeat in 1478 or 1479, the Aztec established several client states along the border to act as a kind of strategic province or buffer zone. Situated along dynamic borders, the obligations of the client states included maintaining trade routes and stabilizing the border.

The elite strategy emphasized economic, social, and political links among elites throughout the imperial domain. These links were established through the reciprocal exchange of luxury goods, marriage alliances, and the shared use of common symbols and restricted cultural codes, such as writing and palace architecture. Perhaps the most interesting consequence of this level of interaction stemmed from the need for successful communication. To facilitate communication, Nahuatl, the native language of the Mexica, was imposed on the provincial regions as a kind of lingua franca; specific forms of manuscript painting spread; and new forms of stylistic interaction involving painted ceramics, mural painting, and manuscripts helped bind the elite into a kind of interacting social class. The Aztec succeeded in their imperial campaigns until the arrival in Tenochtitlán of the Spanish, led by Hernán Cortés, in 1521.

THE MAYA

Unlike the Aztec and Inca civilizations, the Maya never constituted a unified or coherent empire but rather were divided into more than 60 kingdoms, each ruled by a “divine lord” and constantly struggling to maintain their autonomy or conquer their neighbor. The Classic Period marks the height of Mayan influence, largely in the central area, though they were never

isolated from developments in central Mexico, which at this time was dominated by Teotihuacán. The central area comprised the Tabasco, Campeche, and Quintana Roo states of Mexico; the Petén of northern Guatemala; Belize; and western Honduras. By 800 dynasties began to fail, and population levels dropped dramatically. In the Postclassic Period, Mayan population centers were largely concentrated in the northern and southern areas—the Yucatán Peninsula in the north and Chiapas, Mexico, and the highlands of Guatemala in the south. The last Mayan settlements remained beyond Spanish control, in part because they were buried deep in the jungles of northern Guatemala.

The intellectual achievements of the Maya include their writing and timekeeping systems. Although the origins of both systems are obscure, the Maya perfected both. Social and political developments emphasizing dynastic descent and ultimately divine kingship created the need for permanent records to proclaim genealogy, ritual, and great deeds. Legitimizing the rule of individuals by fixing their lives within a sacred time order was the primary purpose of these dynastic records. They were inscribed on monolithic stelae, stone wall panels, altars, thrones, and door lintels. The Maya left an astonishing permanent record in durable material such as stone, but most writing was done on perishable material, especially bark paper, which was used to make Mayan books called codices (of which only four examples remain from the Postclassic Period). The surviving texts are dedicated entirely to the concerns of the elite class. It is because of these records that much is known about Classic and Postclassic Mayan dynasties.

The Mayan political landscape in the Classic Period is an extraordinary system of shifting alliances and warfare, with complex hierarchical and family linkages. Mayan city-states depended less on borders for definition than on the dynastic seat at their ceremonial and commercial focus or core—the literal center. Domination or conquest rarely meant territorial acquisition, partly because of the massive expenditure of labor this required. Instead, conquest depended on bringing a rival “divine lord” under control. Where possible, the conquering center would work through the existing royal structure; recent scholarship indicates that when resistance proved permissive, a dominant “overking” might be installed, to whom the local king was beholden.

Tikal, Palenque, Piedras Negras, Calakmul, Naranjo, Caracol, Dos Pilas, Quiriguá, Yaxchilan, and Copán were all important classic Mayan centers. The political landscape comprised a confusing and elaborate system of shifting alliances, family linkages, and warfare that, in many ways, was similar to classical Greece or Renaissance Italy, with a sophisticated and widely shared culture flourishing amid perpetual

conflict and division. For example, Tikal, centered in the Petén region of northern Guatemala, is among the largest and most complex Mayan sites, and its dynastic history is known to span at least 33 rulers over 800 years. Inscriptions trace the origin of Tikal’s classic dynasty to a lord called Yax Ehb’ Xook (“First Step Shark”), whose ruling dates are not known specifically but estimated to begin around 90. The first contemporary date appears in 292 on stela 29, which also provides the first visual example of a Tikal ruler (*ajaw*), a richly dressed figure outfitted in regalia denoting rulership, an image that went essentially unchanged for the next 600 years. He is referred to as Animal Headdress.

From the fourth century rulers, listed here with their ascension dates if known, include Curl Snout (379), Stormy Sky (411), Kan Boar (458), Jaguar Paw Skull (486), Lady of Tikal (511), Bird Claw, Wak chan K’awiil (537), Animal Skull (593), 23rd and 24th Rulers (ca. 640), Shield Skull (657), Ruler A (682), Ruler B (734), 28th Ruler (766), Ruler C (768), Nuun Ujol K’inich (ca. 800), Dark Sun (810), Jewel K’awiil (849), and



Gold pendant with a miniature portrait of a Mayan ruler, Mexico, ca. 600–1521 (© The Trustees of the British Museum)

Jasaw Chan K'awiil II (869). By the ninth century Tikal, along with most other centers of the Classic Period, had been all but abandoned, and by the 10th and 11th centuries the jungle had reclaimed the once-great cities as its own.

SOUTH AMERICA

Conventional scholarship subdivides Andean settlement into broad historical trends called horizons and intermediate periods. Horizons feature widespread similarities in the art and culture of various areas that may be associated with the power of a cult, state, or empire. Regional diversity, by contrast, is more characteristic of intermediate periods. Together the two types of periods help to define settlement patterns and the manner in which various settlements interacted or related to one another. Using these subdivisions the period from 500 to 1500 comprises the end of the Early Intermediate Period (100 B.C.E.–550 C.E.), the Middle Horizon (550–1000), the Late Intermediate Period (1000–1430), and the Late Horizon (1434–1532). The Spaniard Francisco Pizarro arrived in Peru in 1532, and the great Inca civilization, then at its climax, soon fell.

In the south-central highlands of Peru and Bolivia, beginning around 600, the Tiwanaku state began an aggressive expansion out of the southern Titicaca Basin, so called for its relation to the lake of the same name—Lake Titicaca—the epicenter of the largest agricultural center in the highlands. The site of Tiwanaku itself is a vast, planned urban capital that sprawled over the landscape of the altiplano, or high plain. At its height from 800 to 900 Tiwanaku boasted an impressive architectural core of pyramids, temples, palaces, streets, and state buildings. Surrounding the core of the capital was an urban settlement of artisans, laborers, and farmers who lived in adobe structures up and down the valley. Current estimates suggest that the total urban settlement covered an area of roughly 2 square miles, with a population in the valley ranging from 30,000 to 60,000. Large areas of intensified agricultural production are associated with Tiwanaku populations around the basin. At its height, including the surrounding area, the Tiwanaku state possibly reached a population of 100,000 people.

Tiwanaku artifacts and colonies are found throughout the area surrounding the Titicaca basin and beyond. Colonies are suspected in Moquegua, the Cochabamba and Larecaja regions of Bolivia, and the Arequipa area of Peru. It seems that Tiwanaku was not able to maintain an Inca-style empire by incorporating large, contiguous areas but that it selectively controlled economically and militarily strategic areas. Tiwanaku declined in the 11th century.

Roughly contemporary with, and possibly sharing origin with, Tiwanaku was the highland Wari culture, an expansive

state that stretched from the Cuzco area in southern Peru to Cajamarca in the north. For a long time the nature of the relationship between Tiwanaku and Wari was debated. *Enigmatic* might best describe it, because it seems to have been antagonistic when needed and cooperative when demanded. Each had religious and military aspects as well as being economic hubs. Overall, however, Wari took a more militaristic stance. The capital site, also called Huari, is at the center of up to 6 square miles that have been attributed to the Wari urban complex, which includes nearly 500 acres of stone architecture and 740 acres of domestic residences.

Provincial Wari settlements tended to be rigid and intrusive, akin to military compounds, and seem intended to dominate and organize the region within which they sat. For example, the settlement of Pikillacta, located near Cuzco, was built on a grid, had 700 individual structures, occupied 1 square mile of land, was surrounded by a multistory wall, and had a single entrance leading along a long, easily policed corridor.

Before the rise of the Inca, the Chimú Empire (or Chimu) flourished from about 1000 to 1470. Its capital was the site of Chan Chan in the Moche valley on the northern coast of Peru. Chan Chan's urban core covered roughly 2 square miles, with surrounding ruins covering nearly 8 square miles, and was entirely occupied by 11 immense, high-walled adobe *ciudadelas*—a combination of royal palaces, administrative and storage spaces, and mausoleums. At the height of its power Chimú controlled the northernmost 600 miles of the Peruvian coast, a desert region cut through intermittently by a series of fertile river valleys.

Little is known for certain about Chimú government, its rules of succession, and social structure, but it is suspected that Chimú was ruled by divine or semidivine kings who personified the state. Traditional history maintains that the founder of the royal dynasties of Chimú was a personage named Tacaynamo, whose son Guacricaur undertook the conquest of the lower Moche valley. In turn, his son, Nancencpinco, is said to have conquered a number of neighboring valleys, as did the seven successive rulers until Minchancaman, the Chimú sovereign whom the Inca faced in the 15th century.

Chimú apparently shared certain traits with their eventual conquerors. Like Chimú, the Inca expanded through military conquest, were economically organized by a system of labor tax supervised by the state administrative system, and embarked on large programs of land reclamation for agricultural use. By 1438 the Inca imperial campaign had begun.

The land of the Inca, known by its inhabitants as Tahuantinsuyu, or “Land of the Four Quarters,” was one of the world's great imperial states. At its maximum extent it stretched over 3,000 miles from northern Ecuador to just south of Santiago,

Chile. Administered from Cuzco, Peru, more than 350,000 square miles of land were unified, something no previous Andean state or empire had even approximated. The Inca built grand stone architecture, over 25,000 miles of roads traversing mountains and deserts, and thousands of provincial installations and stockpiled every imaginable supply as well as works of art in precious metal, stone, and cloth. Yet by 1532, the year the Spanish arrived, the empire was already showing signs of division and decimation; evidence suggests that smallpox arrived ahead of the Spanish. As magnificent as the rise had been, the conclusion of the empire was even more dramatic; in less than 100 years it had gone from what was probably a fairly sleepy town at Cuzco to imperial power to a Spanish colony.

The known history of the Inca is somewhat more complete than that of previous Andean empires through a combination of archaeological research and accounts written by the Spanish and, a little later, mestizo sources. Although the Spanish accounts are colored by their biases and must necessarily be read with discernment, they are nonetheless an invaluable resource. As the Spanish learned, the Inca civilization developed in the span of only four generations. According to the conventional list of kings, the empire was launched when the ninth king, Pachakuti, usurped the throne from his father and began to conquer the people around Cuzco. The entire list is Manqo Qhapaq, Zinchi Roq'a, Lloq'e Yupanki, Mayta Qhapaq, Qhapaq Yupanki, Inka Roq'a, Yawar Waqqa, Wiraqocha Inka, Pachakuti Inca Yupanki, Thupa Inka Yupanki, Wayna Qhapaq, Waskhar Inka, and Atawallpa.

Following the collapse of the Wari in the 11th century, a power vacuum developed in the Cuzco valley, and regional political competition ensued among entrenched settlements and newly developing villages. At the same time, Cuzco was rapidly developing and may have grown to as much as 125 acres, 10 times larger than any other village in the valley. Cuzco rose quickly from an obscure village to a royal capital and an urban hub, the center of a centralized state. The Inca solidified local authority through various combinations of force, diplomacy, reciprocity, alliances, and marriage, effectively reducing ethnic diversity, political competition, and administrative redundancy to create an Inca heartland capable of soon-to-be-realized dramatic expansion. Pachakuti then initiated the Inca imperial period, drawing in large part on the ability to mobilize large amounts of resources and people from the core area, including an army prepared to engage in extended campaigns.

The Inca proved to be master administrators, so much so that it could be said that logistics, strategy, and organization, rather than training, tactics, or technology, were primary reasons for the Inca's success. The Inca subdivided their en-

tire world into manageable and interlocking units—from the four quarters of Tahuantinsuyu to taxpayers to their famous sculpted stone walls. Governmentally the ruler oversaw governors of the quarters who in turn controlled regional and local administrators, who supervised a population divided into multiples of 10 taxpayers. The census data from this system were as accurate as any gathered from modern systems. This level of detail, alongside a feared military apparatus, forced nomadic labor, kidnapped local rulers, a highly well-organized bureaucracy, and an efficient supply system spread across the empire's unparalleled road network, among other factors, allowed the Inca to rapidly expand and quickly control an enormous amount of land and people.

ASIA AND THE PACIFIC

BY KENNETH HALL

During the medieval era Asia was the most advanced region of the world. While the West entered a period of decline after the fall of Rome at the end of the fifth century, India, China, Korea, Japan, Sri Lanka, and Southeast Asia were reaching the heights of their respective civilizations.

CHINA

With the fall of the Han Dynasty in 220 northern China endured 400 years of periodic raids by seminomadic tribesmen from the steppe grasslands of central Asia as well as warfare among the powerful regional warlords. Dynastic stability returned first under the Sui Dynasty (589–619), a line of ruthless warriors whose military victories allowed them to consolidate their authority over northern and central China. The most noteworthy achievement of the Sui was the construction of the Grand Canal, which linked the productive eastern Yangtze basin to Beijing in the north and allowed surplus wet-rice production from southern China to reach needy consumers in northern China. The Sui emperors ultimately overextended their reach both in their commitment of human and financial resources to the restoration of dynastic government as well as in their heavy military spending as they attempted to secure China's western frontier. Popular revolts, political assassinations, and internal disloyalty provided the opportunity for the Sui regional governor Li Yüan (r. 618–26) to seize authority and restore order under the new Tang Dynasty (618–907).

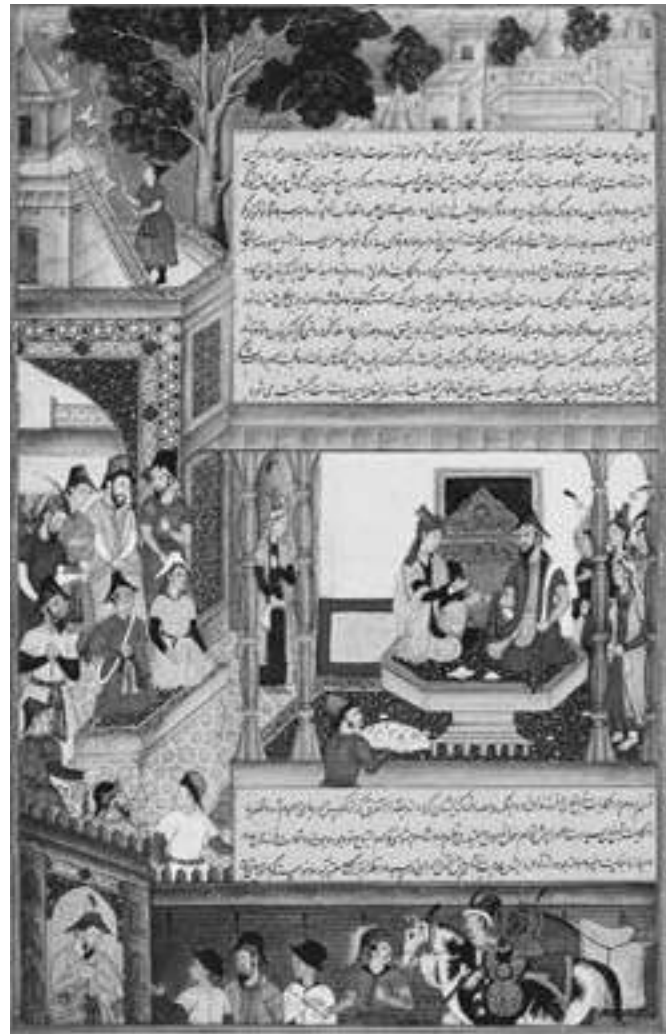
The Tang Dynasty is frequently referred to as China's cosmopolitan age because of its openness to new ideas and cultural options. People of various ethnicities flowed into the capital city of Ch'ang-an (present-day Xi'an) by way of the reopened Silk Road, a major overland connection to the West. The Tang state institutionalized an educated Confu-

cian bureaucracy selected through a competitive civil service examination system to secure qualified candidates for public office. Like the Sui, the Tang Dynasty ultimately collapsed as the result of the financial drain of funding the troops required for the ongoing defense of China's northwestern borders. After a dissident military governor named An Lushan led a temporarily successful rebellion against the Tang that lasted from 755 to 763, the Tang emperors' authority was overly dependent on the support of regional governors. Tang authority collapsed in 907 when the regional governors established their own autonomy in what is known as the period of "Five Dynasties and Ten Kingdoms." Ultimately one of these competing powers, the Song, reintroduced dynastic authority in 960.

The Song Dynasty (960–1279) applied the broadly based neo-Confucian concept of human creativity, believing that it stimulated human intelligence to all sorts of constructive activities, including the development of such new technologies as printing with moveable type, weaponry powered by gunpowder, and improvements in navigation. The Song era is especially known for its artistic achievements and as an age in which the traditional classes and genders mixed more openly. Merchants and gentry shared in literary conversations at popular teahouses. In addition, urban residential districts became open to cross-class residence based on wealth rather than on birthright. Indeed, retrospective Chinese accounts of the Song era criticized the Song rulers for being overly relaxed, supposedly making China more vulnerable to foreign invasion.

The Mongol conquest of China in 1279 shocked the Chinese, since China had never previously been subject to rule by non-Chinese. The Mongols were warriors from the northern Asian steppes whose forces conquered and temporarily controlled the entire Asian continent from China to Turkey and from northern India to Southeast Asia by the late 13th century. The Mongol lord Kublai Khan (r. 1279–94), the first emperor of the Yuan Dynasty (1279–1368) waged a prolonged war against the Song from 1253 onward and finally completed his conquest in 1279.

Although the powerful Mongol Yuan emperors ruled China for a little less than a century, they adopted the country's governmental system, employed its Confucian bureaucrats, and accepted its cultural practices. The Chinese concluded from this acceptance by their conquerors that their civilization must be superior to any other. The Yuan emperors were aggressively expansionistic. Following his conquest of China, Kublai Khan sent his troops south to fight in the region of present-day Myanmar and Vietnam and sent Mongol fleets to attack Vietnam and Java. All these attempts to further extend the power of the Yuan Dynasty were costly failures, however,



Kublai Khan (1215–94) and his empress enthroned, ink on paper, Mughal Dynasty, India, 1596 (Freer Gallery of Art, Smithsonian Institution, Purchase, F1954-31)

especially Kublai Khan's repeated attempts to invade Japan in 1274 and 1281. Kublai Khan's successors found themselves weakened by his debts. They were also isolated politically as the Mongol realm fragmented into independent regional components in the 14th century. Their own deficiencies ultimately paired with general Chinese dislike for alien rule to make the Yuan emperors vulnerable to overthrow by resurgent Chinese forces led by Ming generals.

The Ming Dynasty (1368–1644) was intent on reestablishing the pre-Yuan Confucian bureaucratic system. The emperors of this dynasty attempted to restore the Tang Dynasty system of rule instead of the more relaxed policies of the Song, which they held accountable for the fall of China to the Mongols. The Ming emperors, however, followed in the footsteps of the Yuan in their early foreign initiatives. Between 1405

and 1433 Ming rulers sent General Zheng He and his fleet of more than 300 warships on seven expeditions into the Indian Ocean to represent China's interests beyond its borders. After Zheng He's death these voyages ceased. In part, the country turned away from exploration because conservative Confucian political factions convinced the Ming emperors that internationalism was both expensive and unnecessary. The Confucian bureaucrats also argued that the voyages were detrimental to China's military priority, which was defending its northern borders from barbarian invasions. Thereafter Ming military investments focused on rebuilding the Great Wall and preparing for the inevitable invasion from the central Asian steppes.

KOREA

By 668 the Silla kingdom, one of three rival states in early medieval Korea, had defeated the Koguryo realm to its north, annexed its former Paekche ally to its south, and consolidated its authority over most of the Korean peninsula. During the so-called Unified Silla era (668–918), the Silla rulers administered their realm with the assistance of Korean Buddhist monks. They also established a Confucian academy to train scholar-bureaucrats for a new civil administration and experimented with a formal examination system to fill the civil service with qualified candidates. The resulting political system depended on so-called flower knights (*hwarang*), a cultural and paramilitary youth organization that trained and educated the sons of the Silla elite. The *hwarang* instilled in their pupils the bone rank system, a societal hierarchy of warrior-aristocrats based on birth. By the 780s powerful landholding regional clans began to challenge the Silla Dynasty's central authority. Regional autonomy and limited court authority characterized the last decades of the dynasty, known as the Later Three Kingdoms era, which lasted until 935.

In about 918 a former merchant named Wang Kon rose to power, supported by regional Silla landholding clans. Wang founded the new Koryo Dynasty (918–1392) from which the name of Korea is derived), based in the city of Kaesŏng. The Koryo rulers abolished the Silla ranking system and replaced it with their own set of status distinctions. A literate class of bureaucrats who had passed the state's Confucian civil service examinations led Koryo society, in partnership with Buddhist clergy who had qualified for service through a separate examination. A privileged hereditary ruling class that included royalty, civil bureaucrats, military bureaucrats, and the Buddhist priesthood controlled the administration of the Koryo state.

The Koryo civilian bureaucracy held authority until 1170, when the state's generals, supported by a network of military officer-bureaucrats, began a 20-year civil war in response to

the increased concentration of power in the court. Other state bureaucrats who opposed the absolutism of the court joined their ranks, and from 1197 to 1258 the Choe family clan of military dictators held power. The Mongols ended this period of military-bureaucratic partnership by invading Korea in 1231 against limited opposition. They restored the Koryo royal family in 1259 and placed the Korean kings under the watchful eye of a Mongol overlord.

General Yi Seong-gye defeated the remnants of Mongol authority in 1364, following the slow collapse of the Mongol Yuan Dynasty in China during the 1350s. After 28 years of civil war, he deposed the Koryo rulers in 1392, founding the Joseon Dynasty (1392–1910), based in present-day Seoul, the capital of modern South Korea. Yi Seong-gye, who took the title of King Taejo (r. 1392–98) reassured the new Ming Dynasty rulers of China by accepting Korea's formal status as a Chinese tributary state, which subsequent Joseon and Chinese rulers described as a relationship between a "younger brother and elder brother." King Taejo and his successors implemented a new style of government run according to the principles of Confucianism and purposely reduced Buddhism to the status of a secondary religion. He seized lands belonging to Buddhist monasteries, closed temples, and placed the supervision of restricted Buddhist activities under the watchful eye of a newly empowered landowning aristocracy known as *yangban*.

Taejo and subsequent Joseon rulers favored Confucian ancestor worship and its rituals over Buddhist traditions and implemented a Confucian social code that discouraged practices that had reinforced the autonomy of the traditional family clans, such as taking multiple wives, granting permission for widows to remarry, and marrying within the family clan network. In return, the gentry were granted the hereditary right to both civil and military appointments. Confucian examinations and official appointments were open only to *yangban* candidates—in contrast to the Chinese examination system and bureaucracy that was in theory open to all males. The first centuries of Joseon rule were highly innovative and productive, but over the centuries the system lapsed into aristocratic factionalism and administrative ineffectiveness.

JAPAN

By about 400 the Yamato clan, centered in the region surrounding present-day Nara in the Kinai region of the Yamato plain of south-central Honshu, was able to forge a network among the aristocratic clans, or *uji*, of their region by a combination of conquest, absorption, and the incorporation of the *uji* leaders as government ministers. The imperial clan began to organize the other *uji* into ranks that were subordinate to the ruling Yamato family, which claimed ultimate authority

due to its divine descent from the sun goddess Amaterasu. The Soga *uji* eventually took over the day-to-day affairs of the early Japanese state. Following a war over the imperial succession in 587, the Yamato emperors—initially an empress—became symbolic heads of state and spent most of their time performing state Shinto rituals, while the *uji* were assigned specific tasks in the new imperial administration (including revenue management, religious rituals, and waging warfare) by the Soga Prince Shōtoku, who served as the court regent to the Yamato empress.

Prince Shōtoku (r. 593–621) promoted the spread of Buddhism in Japan as a superior new form of magic as well as because of its importance in forming ties to contemporary China. Prince Shōtoku thought that Buddhism played a key role in the renewal of the Chinese social order that promoted centralization of political power. With Shōtoku's encouragement, clan leaders in Japan competed with one another to erect lavish local shrines dedicated to the main Buddhist sects, each an extension of Buddhist sects based in China. The central temples of these Buddhist sects in Japan were located in the imperial city of Nara. The Nara temples served as centers from which the competing sects spread their influence among the clans.

The Buddhist priests and *uji* elite accepted their proper place in the new Yamato political and religious order. After Prince Shōtoku died, the heads of several powerful *uji*, led by Fujiwara Kamatari, the head of the Nakatomi clan, planned and eventually staged a successful revolt in 645 coincident with the succession of a new emperor to the throne. Subsequently Kamatari assumed a partnership with the new emperor, Tenchi, and as the head of the retitled Fujiwara family he implemented the new Taika ("great change") Reforms that were intended to eliminate what remained of Japan's old decentralized government. Kamatari also established a new capital at Naniwa (now incorporated within the modern-day city of Osaka, south of Nara), which was modeled on the urban grid pattern of the contemporary Chinese Tang capital at Ch'angan. The Taihō Code (702), which was implemented in 710 by Kamatari's Fujiwara successors, further codified the new Japanese political order, formalizing the Yamato state structure that had emerged gradually over the previous century.

Nara became the new imperial capital in 710 following the death of Emperor Tenchi, ending the historical tradition that the Yamato court move each time an emperor died in order to avoid the ritual pollution associated with the deceased. Nara was the site of the realm's greatest Buddhist temples, such as the stunning Tōdai-ji (Eastern Great Temple) and its great statue of the Buddha, known as the Daibutsu. The monks of six Nara-based sects competed for the patronage of the emperor and his elite but too often took this competi-

tion into the streets of Nara, where subsequent records report that they regularly fought with one another as justification for the government's fear over the growing importance of Buddhism.

An open affair between a Buddhist priest and the empress Shōtoku in the 750s reinforced public fears that Buddhism had become a threat to the civil order. When the priest and the empress tried to dislodge the Fujiwara family's control of the court, the imperial military intervened to physically occupy the Nara temples and to place the Nara priests under a form of house arrest. With the death of the empress the new emperor Kammu (r. 781–806) and his Fujiwara advisers decided in 784 to move the Japanese capital to Heian (modern-day Kyoto) at the northern end of the Yamato plain. The move was completed in 794, leaving behind the tarnished reputation of the Nara court and the previously powerful Nara-based Buddhist sects.

To eliminate the negative influence of the Buddhist sects and female members of the imperial family, during the Heian imperial era (794–1185) only the Tendai and Shingon sects of Buddhism were officially recognized, and women were no longer allowed to hold the imperial throne as rulers in their own right. The imperial authority of the Heian rulers reached its height in the 10th century, when the Fujiwara clan had exclusive management of the affairs of the court on the emperor's behalf. Under the Fujiwara family, which continued to dominate imperial government until 1160, the court became more and more insulated from the affairs of the countryside, and eventually the rural areas were no longer subject in fact to the direct authority of the court.

After 1185 a series of military strongmen called shoguns wielded ultimate political authority in Japan. The shogun received his authority from the emperor after winning battles against armed opponents. In theory, the emperor delegated the responsibility of running the Japanese imperial state to the shogun. Under the decentralized system of the Kamakura shogunate (1185–1333), which was based in the city of Kamakura southeast of modern Tokyo, the regional samurai lords were vassals of the Kamakura shoguns. The Kamakura court was administered by hereditary educated samurai. Its authority depended on its negotiated alliances with local samurai rather than reassignments of loyal Kamakura samurai to military fiefs. The emperors in Kyoto and the Kamakura shoguns competed for the support of local administrators, who controlled semiautonomous farming estates called *shōen* that had developed in the later imperial era.

The Kamakura shoguns were successful in repelling two Mongol invasions of Japan, in 1274 and 1281, respectively. The shoguns had considerable help from the *kamikaze* ("divine winds"), severe typhoons that destroyed the invading

Mongol fleets. The expense of maintaining a strong defensive force against potential Mongol invasions, however, eventually undermined the Kamakura shogunate. After defeating the Kamakura clan in 1338, the Kyoto-based Ashikaga, or Muromachi, shoguns ruled Japan from 1336 to 1467. There was a further decentralization of authority, but the Ashikaga era is especially noteworthy for cultural developments that represented a fusion of the imperial court traditions with samurai culture. The Ashikaga era ended with a century of civil wars from 1467 to 1568 among rival samurai armies loyal to regional warlords who were consolidating their power.

INDIA

Gupta imperial rule over northern India ended around 550 as a result of the century-long drain on public resources to defend India's northwestern frontier against repeated attempts at invasion by eastern Hun seminomads. There was a brief renewal of centralized authority under Harsa (r. 606–47), a military leader of the early seventh century. Harsa claimed that he had restored the Gupta realm. Harsa's was a military rather than a civilian administration, however. After his death India once again lapsed into a group of regional states dominated by martial kings or chiefs.

At the turn of the second millennium northern India faced a new onslaught from the northwest by Muslim invaders, most of whom were Turks from central Asia. The new invaders, like numbers of seminomads before them, entered India via the northwestern passageways. Between 1010 and 1525 India was ruled by a series of Muslim dynasties. After 1206 the Muslim fortified city of Delhi and its suburbs became the new capital, and the rulers were known collectively as the Delhi sultans.

The initial Muslim invasion was led by Mahmud of Ghazni (r. 997–1030), a warrior based near the present-day city of Kabul in Afghanistan. Mahmud, who was the first Muslim ruler to take the title of sultan, raided India 17 times between 1001 and 1025. His heirs continued to have a presence in the city of Lahore from 1010 to 1156 and in the Punjab region until 1186. Between 1175 and 1205 the Ghurids of northern Persia extended their authority into northwestern India. Finally, in 1206 the Ghurid warrior Qutb-ud-Din Aybak (r. 1206–10) took Delhi. Aybak's successors, collectively known as the Slave Dynasty, also known as the Mamluk Dynasty, reigned from 1206 to 1290. The Khilji Turks ruled the Delhi Sultanate from 1290 to 1320, followed by the Tughlaq Turks (1320–1413), the Sayyid Turks (1414–51), and the Lodhi Afghan rulers (1451–1526). In 1526 Zahir-ud-Dom Muhammad (known as Babur), an Afghan heir of the Mongols (r. 1526–30), defeated the Lodhi armies and initiated the Mughal Dynasty (1556–1707).

The Delhi era of Muslim rule in India is characterized by some scholars as a succession of Turkish dynasties that ruled from their walled fortresses over their largely Hindu subject populations in northern India, from whom they exacted taxes in return for offering them protection. Despite this seeming separation between ruler and ruled, Muslims and Hindus began a productive intercultural dialogue typical of the earlier eras of cultural integration, except that the Muslim rulers allowed Hindus greater opportunity to retain their cultural traditions as long as they submitted to Islamic sovereignty.

Alongside these developments in northern India, southern India was ruled by a series of Hindu dynasties from roughly 600, in part the result of the resettlement of refugees from the north. The Pallava, Chola, and Pandyan kingdoms were based in the multiple river system valleys and fertile plains of India's southeastern Coromandel Coast. The Chera monarchs ruled over the southwestern Malabar Coast. Among these dynasties, the Cholas consolidated their control over their rivals in the 10th and 11th centuries. They sent successful military missions to annex the neighboring region of present-day Sri Lanka as well as raiding parties against Bengal to the north and the Srivijaya Empire, which at that time controlled the straits of Melaka. These straits were a vital maritime passageway between China and India.

In the 14th century the Vijayanagara Hindu monarchy (ca. 1323–1565), which constructed a lavish court and ritual complex on the southern Deccan plateau of Karnataka, annexed the entire southern region. The Vijayanagara rulers incorporated the existing regional warrior elite (*nayaka*) or assigned members of the royal military as delegated provincial governors. Similarly to the contemporary Delhi Sultanate system, the Vijayanagara commanders governed from regional military garrisons, in contrast to the previous age, when royal troops were clustered exclusively around the royal court. The *nayaka* partnered with local elite and strategic temples to control the surrounding rural communities.

SRI LANKA

Anuradhapura was the early center of the Sri Lanka agricultural and Theravada Buddhist community. It remained the capital city of the island from ancient times until 1000, when invading Tamil Chola armies from southern India plundered the city and established a new capital at Polonnaruwa to the southeast. Sri Lanka forces retained Polonnaruwa as their capital when they retook the island in 1070. The state that was based in the new capital reached its height in the reign of Parakramabahu I (r. 1153–86), as Sri Lanka prospered as a center of the trade network surrounding the Indian Ocean and as the international center of Theravada Buddhist scholarship. But by 1200 this realm had fragmented, in part because the Tam-

ils of southern India regained a political foothold in northern Sri Lanka. There they founded the Jaffna kingdom and began a series of raids against their Sinhalese neighbors from their regional power bases in Kandy in the hills of central Sri Lanka and Kotte in the south near present-day Colombo.

CAMBODIA

The Angkor state, centered in present-day Cambodia, was founded by King Jayavarman II (r. ca. 802–50), who celebrated the unity of the Khmer people as the result of the favor of the Hindu god Shiva. Angkor remained the realm's capital under Yasovarman I (r. 889–910). Suryavarman I (r. 1010–50) extended Angkor's territory in all directions and consolidated its political authority; Suryavarman II (r. 1113–50) defended Angkor against its neighbors in the kingdom of Champa in central Vietnam and also sponsored the construction of the Angkor Wat temple complex, dedicated to the Hindu god Vishnu.

In 1177 the Champa king's forces raided Angkor, desecrated its temples, and carried off the state's wealth and significant numbers of its population. Jayavarman VII (r. 1181–1215?) restored order and built a new capital city adjacent to Angkor Wat at Angkor Thom, which he centered on the Bayon Mahayana Buddhist shrine. Following the death of Jayavarman VII the Angkor state steadily declined. The armies of the Thai kingdom of Ayutthaya, based in former Angkor territories in the north and west, sacked the Angkor capital in 1431 and brought an end to the Khmer Empire (802–1432). They carried Angkor's royal regalia back to the Thai capital on the lower Chao Phraya River, where it remains to this day as the symbolic source of Thai political authority.

BAGAN MYANMAR (BURMA)

Bagan, Myanmar's first inclusive state (ca. 800–1280), was centered in the middle of the Irrawaddy River basin. Buddhism always provided the economic and conceptual bases for Myanmar sovereignty. Bagan's cultural diversity and Buddhism had their roots in the early Mon Mahayana Buddhist tradition, which flourished in modern-day lower Myanmar and Thailand. In 1057 Anawrahta (r. 1044–77) annexed the southern part of Myanmar and its Mon culture, which allowed him to promote Theravada Buddhism as the source of cultural unity in the core agricultural zones that surrounded his court. Theravada Buddhist monasteries and temples in the court complex and elsewhere received strategic allocations of land rights and labor for resettlement. The Buddhist institutions in turn asserted their leadership in the development of new irrigation networks and wet-rice agriculture. Eventually the competition for power between the kings of Bagan, the wealthy Buddhist religious organizations, and each side's network of supporters brought down the Bagan state.

SUCCESSION IN ANGKOR

Although there are many records of the kings of the medieval Cambodian kingdom of Angkor, some writers have suggested that royal succession was not through the male ancestral line but through the men who married into a female matrilineal line of descent. This certainly explains various succession crises in Angkor, but it cannot explain the absence of references to females in many of the surviving genealogies.

One of the usurpers in Angkor was King Suryavarman I, a Buddhist, who managed to take over several of the small kingdoms that had developed in eastern Cambodia in the late 10th century. He seems to have been a powerful military figure, and his reign is officially stated to have begun in 1002, but it was not until nine years later that his supporters swore an oath to him, according to the surviving inscription in the royal palace of Angkor. The manner of his claim to the throne was twofold. He himself traced descent from Prithivindradevi, the mother of King Indravarman (r. 877–90), and his wife was a descendant of Harshavarman I (r. 900–ca. 922). This made him, at best, the fifth cousin of his immediate predecessor.

A close study of his circle of patronage shows that Suryavarman I was clearly from an elite family, with some royal heritage, who managed to involve himself in a number of political coalitions to establish powerful friends at the court at Angkor and use his power to cajole others to support him in what essentially was a coup d'état, made possible by the collapse of social order in the capital, and his promise to restore law and order. He certainly achieved the latter during his reign, which lasted until 1050.

A Mongol invasion in 1287 destroyed the remnants of the Bagan kingdom, and a new Burmese dynasty emerged by the end of the 15th century at Toungoo in the southwest. The new dynasty was vigorously expansionist and regularly went to war against the neighboring Thais, in part in order to dominate the high volume of international trade in the upper Bay of Bengal.

JAVA

Sanjaya (r. 732–60), a patron of the Hindu god Shiva, was the first significant ruler of Java. He built his court and the first of Java's sprawling temple complexes on the sacred Di-

eng Plateau in north-central Java. Sanjaya was succeeded by a series of Sailendra monarchs into the mid-ninth century, all of whom followed his lead and built several major Mahayana Buddhist temples in central Java near modern-day Yogyakarta, including the early ninth-century temple complex at Borobudur.

In the late ninth century Hindu kings based in central Java defeated the Buddhist Sailendras and proclaimed their sovereignty over what they called the Mataram state (ca. 760–1000). These kings constructed their own equally impressive central temple complex dedicated to Lord Shiva at Prambanan, north of Yogyakarta near Mount Merapi, an active volcano.

After a devastating eruption of Mount Merapi in the 10th century temporarily made the plains of central Java uninhabitable, the center of Javanese civilization shifted to eastern Java. Temples assumed less importance as statements of royal authority. Instead, the kings of Java through the reign of Airlangga (r. 1019–45) encouraged the spread of wet-rice agriculture in eastern Java and exploited the region's strategic position close to the international maritime trade route to eastern Indonesia's Spice Islands. Following Airlangga's death, the Java monarchy split into competing factions, with kings identified by their association with two rival courts, one at Kediri on the southwestern edge of the Brantas River plain and the other at Singhasari to the southeast on the Malang Plateau.

The Majapahit Empire (1293–1525), based near present-day Surabaya, was the high point in the development of the Hindu-Buddhist civilizations on the islands of Southeast Asia. It controlled all the islands that are now part of Indonesia, which they called Nusantara. Local societies appropriated Majapahit's refined culture. The most notable of these societies was neighboring Bali, which still practices the Hindu religious traditions it inherited from the Majapahit Empire. During the 15th century the Majapahit Empire faced aggressive competition from the newly Islamic ports on Java's northern coast. In 1528 the empire finally fell to a military coalition led by the Demak Sultanate.

MELAKA

The Melaka (Malacca) maritime state was founded by the Sumatra-based Malay prince Parameswara (d. 1414), who claimed to be the heir to the earlier network of ports along the straits that the Chinese and Indians called Srivijaya. Parameswara moved his court there from what is now Singapore in about 1390. Within 50 years Malacca had become the wealthiest commercial port in Asia. It served as both the connecting hub in the trade between India and China and as the international source of Indonesian spices.

The initial success of Melaka was the result of special diplomatic ties with the Ming Dynasty of China. Merchants wishing to trade in Chinese ports were given special treatment if they first made stopovers in Malacca. In return, the state was obligated to keep the straits free of piracy, thereby assuring the regular flow of Western luxuries, Indian textiles, and Southeast Asian spices into China. When the Ming court ended their aggressive diplomatic relationships with the region in the 1430s and subsequently began to restrict China's overseas contacts, the ruler of Malacca, Sultan Muhammad Shah (r. 1424–44) converted to Islam in order to encourage the Muslim merchants who dominated trade in the Indian Ocean to use his port and to legitimize Malacca's control over other ports in the straits region.

VIETNAM

Northern Vietnam remained under Chinese sovereignty until the fall of the Tang Dynasty, when Vietnamese armies prevented the restoration of Chinese rule under the new Song Dynasty. The leadership of the newly independent Vietnam Lý state (1009–1225) partnered with Mahayana Buddhist monks trained in China to establish and administer the new government institutions. Minor officials were chosen by examination for the first time in 1075, and a civil service training institute and an imperial academy, which provided a mixed Buddhist and Confucian education, were set up in 1076. In 1089 a fixed hierarchy of Buddhist and secular state officials was established with nine degrees of civil and military scholar officials.

By the 13th century, however, the Buddhist religious institutions had become a threat to Vietnamese secular leadership. The Trần Dynasty (1225–1400) as well as the subsequent Lê Dynasty (1428–1527) began to recruit newly trained Confucian scholars from among the Vietnamese landed aristocracy to replace the Buddhist monks as state bureaucrats. Vietnam's emperors implemented their own version of the Chinese Confucian examination system. Unlike the Chinese examinations, however, which were open to all qualified male applicants, the Vietnamese system admitted only the sons of the Vietnamese landed elite.

From the 13th to the 15th centuries, the Vietnamese rulers repelled repeated Chinese attempts to annex their territory and fended off periodic raids by their Champa Hindu neighbors in central Vietnam. The multiple wars between the Vietnamese and the Champa eventually resulted in the fall of the Champa Kingdom to victorious Vietnamese forces in 1471. In 1527, however, the Lê state fragmented into regional courts ruled by rival factions of the royal family. After that, Vietnam had no effective central authority until the 19th century.

EUROPE

BY BRADLEY A. SKEEN

The Romans abandoned the island of Britain in 410, and the entire Western Roman Empire collapsed in 476 under the impact of invasions by Germanic groups. However, the Roman provincial system remained more or less intact because the invaders could control the old Roman aristocracies and power structures more easily than they could establish new states. In most cases the Germanic peoples had been brought into the empire to serve as mercenaries against groups considered even more barbaric, and once they were in military control they saw no further need to submit to Roman authority. The last Roman emperor in the west, Romulus Augustulus, was a youth who reigned only from 475 to 476, dying after some years of captivity under the Ostrogothic kings of Italy.

GERMANIC KINGDOMS

After 410 the Romans abandoned Britain as indefensible against the threat it faced from raids along the North Sea coast by Picts from Scotland and by Germanic peoples (Saxons, Angles, and Jutes) from across the sea. In 449 the Roman-Celtic king of Britain, Vortigen, entrusted the security of Great Britain to German mercenaries led by their chieftains Hengest and Horsa. But these leaders repudiated their allegiance to Vortigen and divided Britain into several German-ruled kingdoms. The Anglo-Saxon conquest of Britain seems to have been limited to the eastern part of the island for a century or so by a Romano-Celtic victory at Mount Badon in the late fifth century. Historical sources for this period are lacking, and popular traditions attribute this victory to King Arthur, who was probably a legendary figure.

In 476 the German prince Odacer, already in command of Roman military forces in Italy (mostly his own Ostragoths), declared himself emperor, the usual step for rebelling military commanders. However, he then declined that title in favor of that of king of Italy, thereby avoiding war with the emperor in Constantinople, who at that time was hard pressed by other enemies. Theodoric the Great (454–526) succeeded him and greatly strengthened the kingdom, but his state (including Dalmatia, modern-day Slovenia, and Croatia) did not last long under pressure from the Byzantines who reconquered much of Italy. After 560 invasions by the Lombards and other Germans destroyed the Ostragothic kingdom.

In 415 the Visigoths had been admitted to the Western Roman Empire as mercenaries and granted land to settle in southwestern France. After the general collapse of 476 they became an independent nation under King Euric, ruling most of southern France and almost all of Spain. However, the Visigoths under King Alaric II were defeated by the Franks in

507 and lost their territories north of the Pyrenees. The capital moved from Toulouse to Toledo. The last Visigothic king was Roderick, who was killed in 711 while fighting to prevent the eventually successful Islamic conquest of Spain.

The Germanic Burgundians, under their king, Günter, had established a kingdom inside the tottering Roman Empire in 411, making its capital the city of Worms on the Upper Rhine. Later, however, the Romans engaged the Huns as mercenaries to destroy the kingdom. Little is known about that conflict, but it eventually became an important element of Germanic legend and inspired the German national myth of the *Nibelungendlied*. In 443 Günter's son Guntheric was granted a second territory for the Burgundians, located inside the Roman Empire around the city of Lyon in southeastern France and including modern-day Switzerland. This state lasted until it was conquered by the Franks in 554.

Like other Germanic peoples, the Franks had come into the empire as mercenaries divided into several groups. The Frankish groups were a confederacy in which each tribe or group of tribes had their own kings. One of these kings was the semilegendary Merovech (Latinized as Meroveus) who is counted as the founder of the Merovingian Dynasty (447–751). By 486 his descendent Clovis (r. 481–511) had become king of the entire Frankish nation, which by then controlled northern France, Belgium and the Netherlands, and northwestern Germany. In 507 he conquered southern France from the Visigoths. His sons conquered Burgundy (554).

BYZANTINE EMPIRE

The Eastern Roman Empire is called the Byzantine Empire by modern historians, after Byzantium, the original name of its capital, Constantinople. After the loss of the western half of the empire to Germanic invaders, the Byzantine emperor Justinian (r. 527–65) attempted to reconquer the west and succeeded in occupying the southern half of Italy, the extreme south of Spain, and much of North Africa (an area that had been conquered by the Germanic Vandals). But these conquests were short lived. The area of the Byzantine Empire continually diminished throughout the medieval period under pressure from Slavic invaders to the north and Muslim invaders to the south and east. Eventually it consisted of only the heavily fortified capital, Constantinople.

During the seventh century the Heraclian Dynasty was barely able to negotiate the continued existence of the Byzantine state in the face of invasion by Arabs newly converted to Islam. All the empire's possessions in Asia outside the western half of modern-day Turkey were permanently lost. During the Isaurian Dynasty in the next century the empire was threatened by internal religious strife: the so-called iconoclast controversy concerning whether paintings of saints

(icons) should be allowed to decorate churches. In the ninth and 10th centuries the Macedonian emperors restored prosperity to the empire and retook most of the Balkans, southern Italy, and Armenia. The 11th century brought new pressures, however, from Islamic Arabs and Turks and the loss of most Asiatic territories. The Comnenian emperors (1057–1185) attempted to retrieve their position in Asia by calling for help from the western Christian nations, which came in the form of the Crusades. These campaigns, however, did not have any decisive military effect, and during the Angeloi Dynasty, in 1204, the crusaders actually sacked Constantinople. After that the Byzantine Empire was ruled by the Palaiologan Dynasty and was slowly absorbed by the Turks (at first the Seljuks and then the Ottomans) until Constantinople itself was captured in 1453.

CAROLINGIAN EMPIRE

In western Europe the kingdom of the Franks became the dominant power. Control of the kingdom passed in the eighth century from the Merovingian kings to courtly officials, members of the Carolingian Empire, who ruled under the title of mayor of the palace. The first such figure was Charles Martel (686–741), who defeated an Islamic invasion of France at the Battle of Tours in 732, limiting the Muslim conquest to Spain. His grandson Pepin the Short took the royal title in 751, and Pepin's son Charlemagne (Charles the Great) succeeded him in 768.

Charlemagne greatly expanded the size of the Frankish kingdom, occupying northern Italy and conquering much of Germany, including Saxony, Bavaria, and Carinthia (modern-day Austria). His expedition to Spain, however, was unsuccessful. On Christmas Day of 800 the pope crowned him emperor in recognition of the reunification of much of the Western Roman Empire into the new Carolingian state. In return Charlemagne ceded control of central Italy to the pope as the Papal States, a territory that continued as an independent principality until Italian unification in 1870 and today endures symbolically as the small territory of Vatican City.

The whole empire remained intact under Charlemagne and his son Louis the Pious (d. 840), but disputed succession resulted in a civil war that divided the empire in 843. Through the Treaty of Verdun, Charlemagne's grandsons divided the empire into three kingdoms. Charles the Bald received territory roughly equivalent to present-day France, and Louis received modern-day Germany and Austria. Lothair received the imperial title and the kingdom of Italy, to which was added territories equivalent to the Low Countries, the French provinces of Burgundy and Alsace-Lorraine, and Switzerland. The status of these lands was continuously disputed

FROM LOTHARINGIA TO BURGUNDY

In 843 the empire of Charlemagne was split among his three grandsons: the western kingdom of Charles became the nucleus of France, and the eastern empire of Ludwig became the nucleus of Germany. Between the two lay the kingdom of their brother, Lothair, comprising what is today the Netherlands, Belgium, the Rhine valley, Switzerland, southeastern France (Provence and the Dauphiné), and northern Italy. This patched-together state was not destined to be, however; by 870 it had been annexed by Germany, except for some small portions taken over by France. While it lasted, it was called Lotharingia (after its ruler), which survives in the name of the modern-day French province of Lorraine. The dispute over control of this territory lasted throughout the Middle Ages and afterward, down to the world wars of the 20th century.

During the later Middle Ages the dukes of Burgundy attempted to form an independent state in this middle region. John II of France (r. 1350–64) made Burgundy a separate duchy under his younger son Philippe (1342–1404), and this dynasty soon gained control, through marriage, of most of the regions that are today the Netherlands and Belgium, as well as extensive territories along the upper Rhine bordering Switzerland. The textile-manufacturing industry in Flanders (present-day Belgium), and the international trade based in the Netherlands, soon made the duchy one of the richest states in Europe. Throughout the Hundred Years' War, Burgundy surpassed the French kingdom in wealth and power. The last independent duke, Charles the Bold (1433–77), attempted to consolidate his rule by occupying key cities in Switzerland, but he was defeated by the Swiss in a series of battles and was finally killed at the siege of Nancy. Despite his superior resources, Charles could not overcome the Swiss with his force of mounted knights because their peasant army had more quickly adapted to the changing conditions of warfare at the end of the Middle Ages. Within months Charles's daughter Mary wed the future emperor Maximilian, and the territories of Burgundy passed into the larger dominions of the Hapsburg dynasty.

throughout medieval and modern European history. After 870 Lothair's middle kingdom and the imperial title passed to Germany, which for the rest of the Middle Ages was the Holy Roman Empire. France took on an independent identity.

VIKING AGE AND FEUDALISM

The disruptions caused by Viking sea raids from Scandinavia and overland by Magyars from eastern Europe tended to fragment and undermine any but the most local centers of power. At the same time the invaders created new and sometimes dynamic states. The western Europe that emerged from the last great invasions in 1050 was feudal. Power and control of resources was highly decentralized. The basic unit of political administration was the lord, a military leader who controlled a local castle and a small band of armed men (knights and men-at-arms). The land was allotted to the lord by a higher authority, such as a king, in return for service from the lord and his dependents. Thus a kingdom was nothing like a modern nation-state but was a collection of reciprocal relationships centered on a king. Each territory had its own laws and traditions, its own military obligations, and its own revenues and forms of taxation that no lord or king could standardize. It was not unusual for a nobleman to control fiefs from more than one monarch. The English king himself eventually controlled a host of titles to lands in France, such as the Duke of Normandy and the Duke of Aquitaine, making him the vassal of the French king.

SCANDINAVIA

The Scandinavian Peninsula was the homeland of the Viking raiders who ravaged the entire European continent during the Viking age and founded kingdoms from Norman Sicily to Kiev Rus in the present-day Ukraine. In Scandinavia, Harold Fairhair united the kingdom of Norway and founded a dynasty that lasted until 1387. Denmark was unified and converted to Christianity under its first king, Harold Bluetooth, in 965. The early history of Sweden is less clear, but the first king to unify much of the country was Erik the Victorious (d. ca. 970), who was succeeded by the first Christian king Olof (d. ca. 1020).

BRITISH ISLES

The Anglo-Saxon conquest of Britain had resulted in the formation of seven independent kingdoms: Northumbria, Mercia, Wessex, Sussex, Essex, East Anglia, and Kent (besides the Celtic kingdom of Wales in the southwest of the island). These kingdoms eventually were united under Alfred the Great (ca. 849–99), king of Wessex and then of England. From as early as 800, however, England was plagued by raids and invasions by Danes, causing much of the northeastern part of the country to become virtually a separate state under Danish control, the so-called Danelaw. King Canute I of Denmark (ca. 995–1035) finally conquered all of England. After Canute the succession of Danish and Anglo-Saxon kings was confused. In

1066 the matter was settled when William, the Duke of Normandy (a distant relation to Edward the Confessor, one of the last Anglo-Saxon kings), invaded England and became king more by rite of conquest than by lawful inheritance. William and his descendants continued as vassals to the French king in Normandy, even while becoming independent monarchs in England.

William the Conqueror's granddaughter Matilda married Geoffrey Plantagenet, the duke of Anjou in France. Their son became King Henry II of England (1133–89), because English law permitted inheritance of the throne through a female family member (which the Salic, or French, law did not). Henry and his descendants in the Plantagenet Dynasty, also known as the Angevin (from Anjou) Dynasty, ruled England throughout the rest of the Middle Ages. Members of the Plantagenet line also became the kings of Sicily and of the crusader state of Jerusalem. Henry's marriage to Eleanor, duchess of Aquitaine (1122–1204), gave England control over the French duchies of Anjou, Brittany, Normandy, and Aquitaine—the whole eastern half of France. Further, Henry began the English conquest of Ireland in 1171, a process that was completed by the end of the Middle Ages.

Henry's sons were among the most famous kings of England: Richard I, the Lionheart (r. 1189–99), and John Lackland (r. 1199–1216). Richard led the Third Crusade from 1189 to 1192 but during his journey back to England was kidnapped and held captive by a German nobleman. John, acting as regent, gained universal hatred in English history because of the taxes he had to impose to pay Richard's ransom. When he returned to the throne, Richard fought to gain an even more dominant position over the French throne and was killed in the process.

The Plantagenet king of England, Edward III (r. 1327–77), lay claim to the French throne by virtue of his descent from the French king Philip IV (r. 1285–1314), whose daughter Isabella was Edward's mother. Inheritance through the female line was not permitted under French law, however, and the French aristocracy accepted Philip's nephew, Philip VI, as their rightful king in 1328. (He ruled until 1350.) Edward pressed his claim by invading France and won a great victory at Crécy in 1346. But the general dislocations of the Black Death, or bubonic plague (1348–50), dampened the glory of this victory. For the next century British kings focused on claiming the French throne and frequently campaigned in France in a conflict that became known as the Hundred Years' War (1337–1453). Henry V (r. 1413–22) won a major victory at Agincourt in 1415 and actually forced the French king Charles VI to accept him as his heir. However, Henry's death at age 34, leaving only an infant son as heir, again prevented the English claim to the French throne from being



The coronation of William I, Westminster Abbey, London, Christmas Day, 1066 (© Museum of London)

fulfilled. The British cause in France ultimately failed, and by 1453 England lost all its possessions in France except the coastal city of Calais.

The ascension to the throne of Henry IV (r. 1399–1413), Henry V's father, had not been entirely regular. He was of the Plantagenet family but was not the legal heir. However, he had won a civil war against other claimants, and no one questioned the rule of the popular and successful Henry V. Once the infant Henry VI was on the throne, however, other members of the royal house began to press their claims against an increasingly corrupt regency government. Hostilities eventually escalated into civil war (1455–89) between the house of Lancaster and the house of York, two rival branches of the Plantagenet family. The conflicts were later known as the Wars of the Roses because of the white rose badge sometimes worn by Yorkist soldiers and the red rose of the Lancastrian soldiers. The question of who would wear the crown was settled in 1489 by the military victory and coronation as king of Henry Tudor (r. 1489–1509), whose only claim to the throne stemmed from descent from Henry V's widow and her lover, Owen Tudor.

Edward I (r. 1272–1307) had attempted to conquer Scotland on the northern extremity of Great Britain but was not entirely successful. Thereafter English policy tried to neutralize Scotland by fomenting civil war between rival Scottish claimants to the throne and occasionally intervening directly. The house of Stuart gained control of the Scots monarchy after 1371 and, after the Middle Ages, eventually gained control of England through a marriage alliance.

FRANCE

During the Viking raids, Robert, the count of Paris, succeeded the last descendant of Charlemagne as king of the Franks (r. 922–23). This was the beginning of the Capetian Dynasty,

named after Hugh Capet (r. 987–96), Robert's grandson. This long-lasting dynasty ruled France until 1328 and thereafter, through the branches of the family called Valois and Bourbon, through the French Revolution (1789–99) and after.

However, the French monarchy was not at first in a very favorable position. It directly controlled little besides the area immediately around the French capital of Paris, and after 1154 the kings of England controlled the western half of the country. Eventually Philip II (r. 1179–23) took over most of the English possessions in France during the reign of the English king John (especially as a result of the military victory at Bouvines in 1214) and secured much of the south of the country as a result of the crusade against the Albigensian heretics of that region.

In 1328 the main Capetian line died out, and Philip VI of Valois, descended from the brother of the earlier Capetian king Philip IV, became king of France. This succession was disputed by Edward III of England, whose claim to the Capetian Dynasty was more direct than Philip's but was through a female ancestor, which was legal in English but not French law. This dispute resulted in the Hundred Years' War between the English and French crowns for control of France. England was generally successful in the war, especially with the aid of its allies the dukes of Burgundy. However, in 1429 Joan of Arc, a French peasant girl who claimed to be inspired by divine voices, sparked a restorationist movement among many French nobles and ordinary people, leading to important French victories, especially in Orleans. By 1431 Joan had been captured by the English and executed as a heretic, yet this martyrdom strengthened French resolve. Especially after the defection of Philip III, the duke of Burgundy, from the English alliance in 1435, the English were quickly expelled from France, marking the end of the medieval period in France in 1453.

HOLY ROMAN EMPIRE

The eastern part of Charlemagne's empire passed to Louis the German in 843, according to the terms of the treaty of Verdun, which split the empire into three parts. Most of the central kingdom of Lothair also quickly became attached to the eastern kingdom. Northern Italy, too, was included in this territory. The Papal States in central Italy remained independent, while southern Italy was controlled by Byzantine and Islamic invaders before finally being conquered by the Normans. The kingdom of Sicily, including the southern half of the Italian Peninsula, eventually passed to the control of the kingdom of Aragon in Spain.

At first the imperial title was not of much importance and was held by various members of the Carolingian family. However, once the Carolingian line died out, new kings of the eastern Frankish kingdom were chosen by election. Earlier Germanic kings had been elected by meetings of the entire society. A relic of this custom was the parliament or diet, a legislative body that existed in all western European kingdoms during the Middle Ages as a check on royal power. But only in the eastern or German kingdom did the older practice of elective monarchy reassert itself. The elections were originally conducted by the leading noblemen. The first elected kings were the duke of Franconia, Conrad I, elected in 911, and his successor, the duke of Saxony, Henry the Fowler, elected in 919. Henry's son, Otto I, also called Otto the Great, was elected king in 936 and took for himself the title of emperor in 962 in recognition of his continuing effort to revive and defend the tradition of the Roman Empire and of his victory over the Magyars at Lechfeld in 955. This began the Ottonian Dynasty of emperors and the proper use of the name Holy Roman Empire. Otto I ruled until 973.

Election by the leading princes and churchmen continued until 1356, when the papal decree known as the Golden Bull fixed seven electors: the count of Palatine, the king of Bohemia, the duke of Saxony, and the margrave of Brandenburg, together with the archbishops of Cologne, Mainz, and Trier. This electoral system made the German emperors even weaker than the other western European monarchs because the emperor would directly owe his throne to his leading noblemen and would usually have to bribe them at the time of election with land and cash and make promises not to infringe on their powers at the expense of the central government. A tremendous blow was struck to the power of the emperor under the Salian Dynasty (1024–1125), when Henry IV (r. 1056–1106) lost to the papacy the right to appoint bishops in the empire.

Frederick Barbarossa (r. 1152–90), Frederick I of the Hohenstaufen Dynasty (1138–1254), increased the power of the

emperor by reviving Roman law (the old system of law of the Roman Empire as opposed to the traditional law of the Germanic tribes), which held that the emperor was not bound by law or custom in his actions and that the nature of the law depended on imperial decisions and decrees rather than older judicial decisions (precedents), as in common law. Frederick II (r. 1212–50), however, was already the king of Sicily when he was elected in 1215, and he concentrated on reforming and strengthening his own kingdom. Consequently, he was happy to devolve unprecedented power on the German nobles—for instance, recognizing the various dukes and princes as rulers of independent states in their own right rather than as his feudal vassals.

After the Hohenstaufens the position of emperor declined in power and importance. Emperors from various families were elected, and sometimes competing emperors were elected by different sets of electors. Emperors tended to concentrate on their own lands rather than the empire as a whole. The beginning of the Hapsburg Dynasty reversed this trend, however. Rudolph I (r. 1273–91) of Hapsburg had served as emperor, but the Hapsburg Dynasty (which would rule the empire until its dissolution in 1806) properly begins with Frederick III (r. 1440–93) and his son Maximilian I (r. 1493–1519), who brought about legal and constitutional reforms to strengthen the structure of the empire, although the imperial government remained weak compared with contemporary states such as France or Spain.

SPAIN

In 711 Spain had been conquered by Islamic Moors from North Africa. After failing to conquer France also, the Moors fell back from the Pyrenees and the Cantabrian mountains in northern Spain because the region and people were particularly poor. Local Visigothic peoples in these remote regions began to carry out raids and guerilla attacks against the Moors. As early as 718 the Visigothic king Pelayo proclaimed himself ruler of this area as the king of Asturias. By his death in 737 he had managed to recapture the city of Leon, beginning the Reconquista, the long period of retaking of Spain by Christian rulers.

Subsequently Christian knights carried out a policy of raids against nearby Moorish settlements, with occasional attacks against large Moorish cities deep in the interior of Spain when the opportunity offered. This drove the Moors from lands adjacent to Asturias, which was then repopulated with Christian peasants; in this way the border between Christian and Moorish Spain gradually shifted south through the eighth and ninth centuries. Eventually Asturias was divided because of the old Germanic custom of dividing a king's lands among his sons. By 1000 several independent kingdoms had been established in northern Spain: Portugal, León, Castile,

Navarre, and Aragon. Under Alfonso VI (1040?–1109) Castile was joined to León through inheritance and became the dominant power among the Christian kingdoms, closely followed by Aragon, which also conquered extensive overseas possessions in Italy and the Mediterranean islands. By 1228 only a small area in the extreme south of Spain around the city of Granada was left in Moorish hands. In 1469 the marriage of Queen Isabella of Castile and King Ferdinand of Aragon unified the greater part of the Iberian Peninsula. In 1492 they conquered Granada, completing the Reconquista. In 1512 Navarre was added to the unified monarchy, as was Portugal (briefly) during the 16th century.

CRUSADER STATES

Beginning with the First Crusade in 1099, western Europeans gained a number of overseas possessions in the Holy Land, or the Middle East. These were ruled by relatives of the principal European royal and noble houses. The most important possession, the kingdom of Jerusalem (1099–1291), was initially ruled by Baldwin, duke of Lorraine. Its greatest ruler, however, was Queen Melisende (r. 1131–53), who married Fulk of Anjou, part of the Plantagenet Dynasty of England.

Another crusade, however, was declared by the papacy in 1170 in northern Europe against the pagan tribes inhabiting the Baltic Coast. These wars succeeded in conquering a large territory, including much of modern Poland and the Baltic states. They were not ruled by a royal house but by the Teutonic Knights, an order of crusading knights originally founded in the Holy Land to assist German knights. The order was headed not by a king but by an elected grand master. The Teutonic Knights and their leader were drawn from the noble families of western Europe, even though there was no succession by inheritance. The Teutonic Knights operated as an independent country under papal control until 1410 when they gradually began to lose territory, a process completed by the mid-15th century.

SLAVIC KINGDOMS

The Slavs invaded Europe in the sixth century, occupying territories in the Balkans at the expense of the Byzantine Empire. The first Slavic kingdom to emerge was Moravia, but it was quickly absorbed by the Carolingian Empire. Poland became an increasingly important state, eventually controlling most of eastern Europe under the Piast Dynasty, which began with Mieszko I (r. ca. 963–92). Serbs entered the Balkans in the seventh century under the rule of the Vlastimirović Dynasty, establishing an organized kingdom around 1000. In 1346 Stephen Dušan (r. 1331–55) conquered much of the Balkans, but by 1389 the Ottoman victory at the battle of Kosovo brought the Balkans under Turkish rule.

The ancestor of the modern Russian and Ukrainian states was Kiev Rus, composed of Slavic and Viking elements. However, the independence of that state was ended and the whole of eastern Europe conquered by the Mongols in the 1230s.

MAGYARS AND BULGARS

Among the waves of peoples who invaded Europe from the east at the beginning of the Middle Ages were two groups that formed permanent kingdoms. In 895 the seminomadic Magyars, or Huns, under their king, Arpád (r. from ca. 890), entered the great basin of the Carpathian Mountains, one of the richest and most fertile areas of Europe. They conducted destructive raids throughout central Europe until 955, when they were defeated at the battle of Lechfeld in Bavaria by the Holy Roman emperor Otto I. From 680 to 681 Bulgars, people probably ethnically related to Turks or Huns, conquered much of the Balkans and founded the precursor of the modern Bulgarian state under their khan, Asparuh. Both kingdoms were eventually conquered by the Ottoman Turks at the end of the Middle Ages.

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

THE FOUR RASHIDUN CALIPHS (632–661 C.E.)

On his deathbed in 632 C.E. Muhammad (ca. 570–632) named one of his closest companions, Abu-Bakr (r. 632–34), as his successor, marking the beginning of the rule of four Rashidun, or “rightly guided,” caliphs. The caliphate period encompassed this initial 30 years, several civil wars, and two major dynasties: the Umayyads (661–750) based in Damascus, Syria, and the Abbasids (749–1258) in Baghdad, Iraq. The key characteristic of the caliphate period is the union of religious and political power under one ruler. The caliphate ended in about 935 with the death of the philosopher and theologian Hasan al-Ashari, after which time political fragmentation became decentralized and the caliphate retained religious authority only.

Abu-Bakr’s two-year reign was focused mainly on maintaining the unity of the newly created *umma*, or Muslim community. He led wars of apostasy (defection from a religious faith), in which he fought the Bedouin tribes attempting to break away from the *umma* after Muhammad’s death. His victories gradually united the Arabian Peninsula. His successor, Umar I (r. 634–44), continued this policy and enticed breakaway tribes to participate in raids on tribes surrounding Muslim-controlled areas. This practice ensured that the *umma* could provide food and other resources for its mem-

bers, as Muhammad had declared it was forbidden to raid or wage war against other Muslims.

Umar I waged wars against Iraq, Syria, and Egypt. He won a decisive victory against the Persians at the battle of Kadiya in 637, which eventually led to the defeat of the Persian Sassanids at their capital in Ctesiphon, Iraq. Umar I, however, found greater resistance in Byzantine Anatolia, but he had a decisive victory in 636 at the battle of Yarmuk between Jordan and Palestine. He conquered Jerusalem in 638; by 641 Umar I controlled most of Syria, Palestine, and Egypt. Muslim armies continued to expand westward by conquest and eventually controlled North Africa. Umar I was assassinated in 644 when a Persian prisoner of war stabbed him in a mosque. Muhammad's followers then elected Uthman ibn Affan (r. 644–56) as the third caliph.

Uthman continued the Muslim conquest, seizing Cyprus from the Byzantine Empire, Tripoli in present-day Libya, most of Armenia, parts of the Caucasus region to the Amu Darya River in Iran, Herat in present-day Afghanistan, and the province of Sind in western India. By the mid-seventh century the Muslim empire reached from North Africa in the west to the Himalayas in the east. This broad reach catapulted Uthman to great power and stretched his political skills. He made enemies in several key constituencies, including the military, wealthy Meccan clans, and followers in Medina. Disputes arose about the ownership of land, administrative posts, and scriptural interpretation of the Koran. Rivals and enemies found a more suitable leader in Ali ibn Abi Talib (r. 656–61), Muhammad's cousin and son-in-law. In 656 Uthman was assassinated in his home, and his rivals named Ali the fourth caliph.

As a relative of Muhammad, Ali ibn Abi Talib enjoyed some support among Arabian tribes as Muhammad's true successor, but he also faced resistance, notably from elements in Mecca. During the next five years the first of several civil wars broke out. A group led by Aisha (614–78), one of Muhammad's wives and his favorite; her relative Talhah; and Zubayr, a companion of Muhammad's, attacked Ali for not avenging Uthman's murder. In the ensuing battle of the camel—so called because Aisha rode with the rebels and observed the battle from her camel—Ali defeated them and proceeded to appoint his lieutenants to key posts. He was, however, not completely successful in satisfying his army's need for spoils of war and continued to meet resistance, notably from Muawiyah I (r. 661–80), the new head of the Umayyads in Syria.

THE Umayyad Dynasty

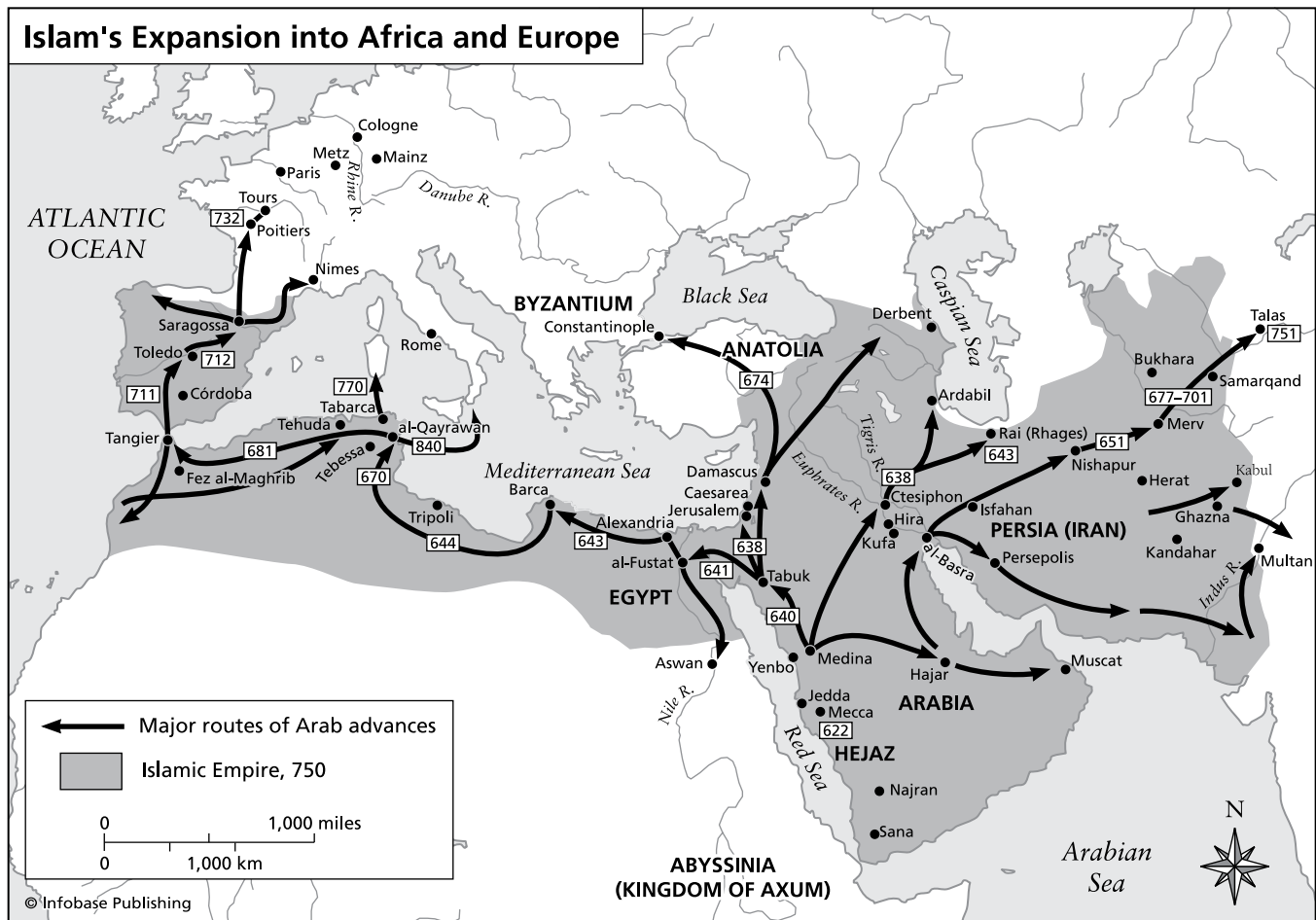
Muawiyah challenged Ali but, to avoid another civil war, attempted to negotiate a settlement. The two sides met in 657 at

Siffin (in the upper Euphrates, or present-day Iraq). Muawiyah asked neutral Muslims to manage the arbitration, which went against Ali. Upon Ali's defeat, Muawiyah declared himself caliph in Jerusalem. Ali's supporters (the Shia) were outraged and refused to accept the outcome. They became known as seceders; they held that the ruler of the *umma* should be the most pure Muslim rather than the most powerful. This is the genesis of the Shia-Sunni schism in Islam.

Muawiyah restored a strong administration and continued Umar's practice of segregating Arab Muslims from conquered populations. Initially, Muawiyah permitted Byzantine and Persian administrators to keep their posts because Arab Muslims lacked the skills required to manage complex, urbanized populations, but gradually these *dhimmis* (subjugated Christians and Jews living under Muslim rule) were replaced with Muslims. Muawiyah was faced with several challenges in ruling his new empire. Rather than acting as an absolute monarch with dynastic aspirations, he ruled at the outset more like an Arab tribal chief, following the Arabian tradition of selecting leaders from the group's strongest men. A devout Muslim, he believed that Muslims should not fight with one another and worked hard to prevent another civil war. But he also understood the threat of sectarian division. Before his death he named his son Yazid I (r. 680–83) as his successor, a move that was met with immediate resistance.

Muhammad's daughter, Fatima, produced two sons by Ali: Hasan (624–80) and Husayn (629–80). Hasan was named caliph in 661 following Ali's assassination. That same year he acknowledged Muawiyah's grip on power, abdicated, and retired to Medina. In 680 Husayn revolted against Yazid, Muawiyah's son and successor, and was killed, along with his entire entourage, when Umayyad forces met Husayn's partisans in Karbala, on the Euphrates River. The massacre at Karbala became seared into the consciousness of Husayn's followers and was a seminal moment in the schism between the Sunni and Shia sects of Islam. His burial site eventually became one of the leading sites of pilgrimage for Shiite Muslims. By 683 Umayyad forces had conquered Medina, Ali's home base, and, following the death of Yazid I, his infant son, Muawiyah II was named successor. A second civil war ensued.

During the civil war Ibn al-Zubayr was recognized as the effective caliph, but he was opposed by Kharajites and eventually was defeated and killed. The Umayyads turned to Marwan I (r. 683–85), a cousin of Muawiyah I, and his son, Abd al-Malik ibn Marwan (r. 685–705), who together defeated the rebels by 691. Abd al-Malik exerted increasing political control, replaced Persian with Arabic as the official language, and built the Dome of the Rock in Jerusalem in 691 at the site of the ancient Jewish temple and later Christian church as a



Under the reign of the Umayyad caliphs (r. 661–750), Arab armies spread Islam into northern Africa and the Iberian Peninsula.

sign of the new supremacy of Islam. Abd al-Malik also loosened the edict separating Muslims from conquered people, a policy that created resentment against the special status and privileges accorded to Arab Muslims.

Abd al-Malik was succeeded by his son al-Walid (r. 705–15), who continued to centralize power and waged additional wars of conquest. Whereas earlier conquests focused on tribal expansion and built upon the migration of peoples, these new conquests were conducted for world domination and incorporated into the Muslim empire North Africa, Spain, Transoxiana, and Sind. Al-Walid also continued his predecessors' mandates to translate Greek and Persian works into Arabic, a task that was carried out by Christian, Jewish, and Persian scholars. Christians had translated Greek works into their native Syriac, which they then retranslated into Arabic. Jews translated ancient Hebrew into Arabic, and Persians translated pre-Islamic works from their native Farsi (which eventually became written in the Arabic script) into Arabic.

Both Abd al-Malik and al-Walid built upon existing Byzantine and Sassanid civilization to develop an infrastructure that incorporated Islamic symbols. Abd al-Malik substituted Byzantine gold and silver coins with ones displaying Arabic script. Al-Walid built new mosques in Medina and Damascus, drawing from Byzantine and Sassanid building practices. They also adapted administrative practices, chancery (public archive) documents, and even military organization from existing Byzantine models.

Internal strife continued, and by the reign of Umar II (r. 717–20) it came to a head. Umar II understood that Arab privilege over non-Arabs was increasingly untenable and that the empire needed to become more inclusive, compensate Arab and non-Arab members of the military equally, recognize the tax equality of all Muslims, and relieve converts of the poll tax that was required of Christians and Jews. These reforms were implemented unevenly as they challenged the established power structure. The last Umayyad caliph, Hisham ibn Abd al-Malik (r. 724–43), died in 743, and for the remainder

of the decade yet another power struggle took place between the Shiites, Kharijis, and various tribal factions.

THE ABBASID DYNASTY

By the middle of the eighth century a branch of Muhammad's family, the Abbasids (named after an uncle called Abbas), began to lay claim to the caliphate. After leading a revolt in the Khorasan villages (near Marw), the Abbasids and their supporters seized power and declared Abu al-Abbas as-Saffah (r. 750–54) the new caliph. He decided to move the capital from Damascus to Baghdad, which was strategically located on the Tigris River. He declared the equality of all Muslims, continuing Umar's reforms and embracing both Arab and non-Arab Muslims. Arabic became the common language, conversions of conquered populations grew, and commerce expanded. Military officers were selected and promoted for their allegiance to the dynasty rather than for their ethnic origin.

In the new order the Abbasids delegated administrative posts to non-Arabs and even non-Muslims: Khorasan Persians, Nestorian Christians, and Jews participated in running the empire. Even Shiites were included. A more coherent administration emerged with three *diwans*, or bureaus, each with a distinct function. The chancery managed records and correspondence; tax collection was the domain of the department of land tax; and disbursements were handled by several bureaus, the most important of which was the military. This basic three-part structure subsequently subdivided into additional divisions and separate offices, creating an elastic administrative infrastructure that could meet the needs of a far-flung empire. Another innovation was the creation of the office of the *wazir*—a sort of chief operations officer—who was tasked with the coordination, supervision, and general management of the *diwans*. The centralized power base of the empire now had an effective administrative organ.

The provinces closest to the capital—the rest of Mesopotamia, Syria, Egypt, western Iran, and Khuzestan—were most tightly controlled by the Abbasid regime, which appointed governors on a rotating basis so that no single individual could accumulate enough power to challenge the regime. Farther out—in the Caspian region (Jilan, Tabaristan, Daylam, and Jurjan), inner Asia (Transoxiana, Farghana, Ushrusana, and Kabul), and North Africa—central control weakened considerably. In some cases the Abbasids appointed the heads of local dynasties to rule on their behalf.

The Abbasid Caliphate represented the full expression of the caliph as the supreme ruler in both the religious and political arena. Having drawn from the civilizations they conquered, the Abbasids were ready to place their own stamp on the society they created. As the ninth century progressed,

leaders in the Abbasid Dynasty patronized scholars, promoted pilgrimages to Mecca, appointed judges, drew religious leaders into their administration, and continued building mosques with Islamic decorative themes. Furthermore, they became champions of orthodox Islamic beliefs and defended the faith against heretics, or nontraditional thinkers. As a result, some poets, theologians, and scribes were repressed as the Abbasids required absolute loyalty to the caliphate. This massive consolidation of political and religious power contained the seeds of its own destruction.

The old problem of succession reemerged upon the death of Harun ar-Rashid (r. 786–809), with two of his sons pitted against one another. A third civil war ensued. Al-Mamun (r. 813–33) defeated his brother, al-Amin (r. 809–13), and declared himself caliph in 813. As a tactic to consolidate power, al-Mamun and his successor, al-Mutasim (r. 833–42), formalized the recruitment of Turkish and other enslaved soldiers into whole regiments. Al-Mutasim also moved the military and administrative parts of the regime to a new capital, Samarra, north of Baghdad. In the meantime, the central administration became weakened as a result of the growing influence of provincial leaders, interference from the military, and internal



Beaker showing a complete narrative cycle from the *Shahnameh*, the *Persian Book of Kings*, Kashan, Iran, late 12th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1928-2)

pressures. Two major factions emerged, the Banu Furat and the Banu Jarrah, each with its own *wazir* and encompassing numerous small power centers. Each faction eventually gained control of the government and served its own members' interests first, a practice that increased administrative costs and decreased efficiency. The effectiveness and power of the Abbasids' central government ebbed. By the mid-10th century the Abbasid Dynasty declined, and the empire broke into various independent provinces. The caliphate was over.

FRAGMENTATION FOLLOWING THE END OF THE CALIPHATE

Henceforth the Muslim world would be run by political leaders who, although they were Muslim in belief and practice, would not represent the highest religious authority on theological matters. Indeed, no single office for such leadership ever evolved. Political power continued to be dynastic but was highly decentralized, with several power centers throughout the Muslim world, notably in Iran, Egypt, and Spain. Several dynasties dominated the 10th century: the Samanids (819–1005) in Khorasan (eastern Iran), the Hamdanids (905–1004) in Mesopotamia, the Buyids (932–1062) in western Iran, the Ikhshidids (935–69) in Egypt, the Shiite Fatimids (909–1171) in Egypt, the Umayyads (956–1031) of Spain (or al-Andalus), and the Ghaznavids (977–1186) in Khorasan and Afghanistan.

The Samanid Dynasty was a Sunni Iranian dynasty encompassing a vast area that included Khorasan (eastern Iran), Rayy (the southern tip of the Caspian Sea), Kerman (southeastern Iran), and Transoxiana (northeastern Iran). Bukhara, in Transoxiana, was the Samanid capital; Samarqand, to the east, became an important cultural center. The Samanids largely maintained the Abbasid administrative structure: Members of local elite families governed the main power centers, with tribal chiefs or slave governors in the provinces. Under the Samanids, a Persian Islamic literature developed, as did other artistic forms. The Samanid regime lasted until the turn of the 10th century.

The Hamdanid Dynasty was Arab and composed of pastoral tribesmen. Their rule over Aleppo (Syria) and Mosul (northern Iraq and part of Mesopotamia) favored pastoral nomadic tribes over the existing sedentary agricultural population and led to economic decline.

The Buyid Dynasty held power in western Iran, Iraq, and Mesopotamia. They adapted the caliphate by appointing caliphs as nominal heads of state, recognized their leadership of Sunni Muslims, and acknowledged that their legitimacy derived from them. But real political power was held and exercised by the dynastic rulers. Largely a coalition of family members who ruled separate provinces, the Buyids' constant internal strife eventually weakened its central authority.

Several dynasties emerged in ninth-century Egypt and Syria as a result of appointments of slave governors by the Abbasids. One of the more notable was the Ikhshidid Dynasty, founded by a Turk named Muhammad ibn Tugh. The Ikhshidids ruled over Egypt, Syria, and the Hejaz (west-central Saudi Arabia).

Having seized power in Tunisia and claiming legitimacy as descendants of Ali, the Shiite Fatimid Dynasty went on to conquer North Africa, Egypt, and southern Syria. With the decline of the Abbasid Empire they established a rival caliphate; moved their capital to Cairo, Egypt; in 983 and built the al-Azhar madrasa (school), which remains a major Islamic center of learning. Cairo now competed with Baghdad as a second cultural and political center of power. The Fatimid regime integrated political and religious rule under one leader. Their administration derived from the Abbasids and contained both Jewish and Christian officials, along with Muslims. Islamic decorative themes—calligraphy, birds, animals, greenery, and fountains—thrived during this period.

On the western end of the empire, in Spain, the Arab conquest that had begun in 711 led to the establishment of a branch of the Umayyad Dynasty in the 10th century. This regime suppressed local revolts and built up a military from captives of conquered territories in northern Spain, Germany, and the Slavic states. The most notable line of leaders of this period were the Abd ar-Rahmans, especially Caliph Abd ar-Rahman III an-Nasir (r. 929–61), who centralized government control, expanded irrigation projects, continued building great mosques, and waged jihad, or holy war, against Christians from northern Spain. Córdoba and Seville became great cultural and commercial centers.

On the far eastern part of the empire a slave governor, Alptigin, seized power in Afghanistan, then called Ghazna, and founded the Ghaznavid Dynasty. Alptigin's forces went on to conquer Transoxiana, Khorasan, western Iran, and Lahore and other parts of northern India. The Ghaznavids built upon the Samanid administration and supported religious leaders and Islamic education. The regime replaced the existing establishment with enslaved soldiers. The Ghaznavids lost power to the Seljuks, members of the Oghuz tribe, when they crossed the Amu Darya River in 1025.

THE SELJUK EMPIRE

The main leaders of the Seljuk Empire (990–1118) were Tughrul Beg (r. 1040–63) and his brother, Chaghri Beg. They conquered Nishapur in 1037 and ruled Khorasan by 1040. Moving westward, they defeated the Buyids and seized both Baghdad and the caliphate in 1055. They declared themselves sultans and reigned over an empire that stretched from Khorasan to Iraq. The nomadic Seljuk also made incursions into Anatolia and

gradually accumulated scattered pockets of control. They won a decisive victory over the Byzantine Empire at the battle of Manzikurt (now Malazgirt, near the northern source of the Euphrates River) in 1071, a victory that enabled additional nomadic peoples to enter Anatolia. By the end of the 11th century the Seljuk Empire reached to the Mediterranean Sea.

The Seljuks built upon Ghazvanid and Buyid modes of administration and continued the practice of building up their armies from slave recruits from Turkish, Greek, Khorasanian, Kurd, Georgian, and other tribes. They also looked toward religious authorities to legitimize their regime. As nomads, however, their customs and practices undermined these efforts. They had no clear path for succession. Grazing rights and inheritance often went to the whole family of a ruler. Furthermore, the practice of granting tracts of land to military leaders in lieu of booty subverted the development of bureaucratic institutions. Eventually the Seljuk Empire fragmented into numerous small states ruled by leaders of its various branches. These states included Iraq, Anatolia, Azerbaijan, Mesopotamia, Syria, Khuzestan, Fars, and Kerman, among others. Renewed nomadic invasions ensued, and political power continued to fragment in the 12th century, which ultimately cleared the way for the Mongol invasions of the 13th century.

THE CRUSADES AND FURTHER POLITICAL FRAGMENTATION

Thus far, political power had passed from one Muslim dynasty to another—some Sunni, others Shiite. But by the late 11th century the Byzantine Empire initiated a counterattack to the several centuries of Muslim conquest. In 1094 Alexius I Comnenus (r. 1081–1118), the Byzantine emperor, appealed to the Western Roman Empire for assistance in stemming the Seljuk infiltration into Anatolia. In 1095 Pope Urban II (1035–99) declared the First Crusade. In 1099 crusader armies from Europe conquered Jerusalem and eventually established states in Palestine, Lebanon, Syria, and Anatolia. The crusader states lasted to the 13th century (1099–1291).

In Mesopotamia (Iraq) the Zengid Dynasty (1127–1250) reigned for most of the century. One of its more notable achievements occurred in 1144, when Imad ad-Din Zengi, the emir of Mosul in northern Iraq and Aleppo in northern Syria, defeated western crusaders in Armenia.

The founder of the Ayyubid Dynasty, Salah ad-Din (r. 1174–93), a Kurdish general known as Saladin in the West, defeated the crusaders in 1169 and reclaimed Jerusalem in 1187. He went on to defeat the Fatimids in Egypt and returned its Muslim population to Sunni Islam. The Ayyubids ruled Egypt (1169–1250) and Syria (1183–1260). They were deposed after a rebellion by Mamluks, or slave regiments. The officer Aybak (r. 1250–57) was named the first Mamluk sultan

of Egypt. The Mamluk Dynasty reigned up to the early 16th century in Egypt (1250–1517) and Syria (1260–1517). Unlike their predecessors, they managed to maintain some unity in controlled lands and governed by maintaining slave regiments and a bureaucracy in Egypt.

On the other side of the Mediterranean the Almoravids, a coalition of Moroccan Berbers, achieved political unification and founded the Almoravid Dynasty in Algeria and Morocco (1056–1147) and southern Spain (1086–1106). They established Sunni Islam over Shia and patronized the arts, philosophy, and architecture. The Almoravid Dynasty ended with a challenge from the Almohad movement, which attempted to reassert the primacy of the Koran and Hadith and emphasized moral purity. Their leader, Ibn Tumart (ca. 1080–1130), founded the Almohad Dynasty (1130–1269), which initially ruled Morocco, followed by Spain (1145), Algeria (1147), and Tunisia (1160). His successor was Abd al-Mumin (r. 1130–63), who replaced the prevailing religious oligarchy with a hereditary monarchy. Despite their efforts, however, the Almohad movement was not fully implemented. In 1212 the Almohads were defeated in Spain, and they gradually lost power as the 13th century progressed. By the end of their reign the age of the caliphates was over.

MONGOL INVASION AND RULE

The legendary Mongol chieftain Genghis Khan (r. 1206–27) was building an empire in the Far East and rapidly moving west. Between 1219 and 1229 the Mongol general Hülegü (ca. 1217–65) attacked eastern Iran and the Amu Darya River area, Azerbaijan, and Syria; he eventually defeated Muhammad (r. 1200–20), the shah of the Khwarizmian Turks, and his son Jalal al-Din Mingburnu (r. 1220–31). The Mongols laid a number of Muslim cities to ruins, including Bukhara and Baghdad, and left a broad swath of massacred populations and devastated agricultural economies. They were ultimately stopped by Baybars I (r. 1260–77), the sultan of the Egyptian Mamluk Dynasty, in 1260 at the battle of Ain Jalut in northern Palestine.

Four states emerged: the Il-Khan descendants of Hülegü in Iraq and western Iran, the Chagatai in the Syr Darya–Amu Darya river basin, the White Horde in the Irtysh River area (north and east of the Caspian Sea), and the Golden Horde on the Volga River (north and west of the Caspian Sea). Their rule was fundamentally militaristic and their lifestyle nomadic. Although they tended toward Buddhism, they eventually converted to Islam and became the main political power in central Asia.

By the end of the Middle Ages (early 16th century) the Muslim empire was composed of three distinct centers of power. The Safavid Dynasty (1501–1732) ruled Iran (that is,

the region encompassing modern-day Iran, Iraq, and several south-central Asian states). The Mughal Dynasty (1526–1858) reigned in India. Finally, the Ottoman Dynasty (1281–1922) ruled Egypt, Syria (greater Syria, which included Lebanon, Palestine, and Israel), and Anatolia or modern-day Turkey.

See also AGRICULTURE; ARCHITECTURE; ART; BORDERS AND FRONTIERS; CALENDARS AND CLOCKS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EDUCATION; EMPLOYMENT AND LABOR; EXPLORATION; FAMILY; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION;

HEALTH AND DISEASE; LANGUAGE; LAWS AND LEGAL CODES; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; ROADS AND BRIDGES; SACRED SITES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WRITING.

Africa

~ The Kebra Nagast, excerpt (ca. 1314–21) ~

39. HOW THEY MADE THE SON OF SOLOMON KING

And they made ready the ointment of the oil of kingship, and the sounds of the large horn, and the small horn, and the flute and the pipes, and the harp and the drum filled the air; and the city resounded with cries of joy and gladness. And they brought the young man into the Holy of Holies, and he laid hold upon the horns of the altar, and sovereignty was given unto him by the mouth of ZADOK the priest, and by the mouth of JOAS (BENAI AH) the priest, the commander of the army of King SOLOMON, and he anointed him with the holy oil of the ointment of kingship. And he went out from the house of the Lord, and they called his name DAVID, for the name of a king came to him by the law. And they made him to ride upon the mule of King SOLOMON, and they led him round about the city, and said, “We have appointed thee from this moment”; and then they cried out to him, “Bāḥ [Long] live the royal father!” And there were some who said,

“It is meet and right that thy dominion of ETHIOPIA shall be from the River of EGYPT to the west of the sun; blessed be thy seed upon the earth!—and from SHOA to the east of INDIA, for thou wilt please [the people of these lands]. And the Lord God of ISRAEL shall be unto thee a guide, and the Tabernacle of the Law of God shall be with all that thou lookest upon. And all thine enemies and foes shall be overthrown before thee, and completion and finish shall be unto thee and unto thy seed after thee; thou shalt judge many nations and none shall judge thee.” And again his father blessed him and said unto him, “The blessing of heaven and earth shall be thy blessing,” and all the congregation of ISRAEL said, “Amen.” And his father also said unto ZADOK the priest, “Make him to know and tell him concerning the judgment and decree of God which he shall observe there” [in ETHIOPIA].

From: E. A. Wallis Budge, trans., *The Queen of Sheba and Her Only Son Menyelek (I)*; or, *The Kebra Nagast* (London: Oxford University Press, 1932).

The Americas

~ Report by Juan Polo de Ondegardo, excerpt (ca. 1550) ~

OF THE LINEAGE OF THE YNCAS AND HOW THEY EXTENDED THEIR CONQUESTS

IT must be understood, in the first place, that the lineage of these Yncas was divided into two branches, the one called Hanan Cuzco, and the other Hurin Cuzco. From this it may be concluded (and there is no memory

of anything to the contrary) that they were natives of the valley of Cuzco, although some pretend that they came from other parts to settle there. But no credit should be given to them, for they also say that this happened before the flood. From what can be gathered and conjectured in considering the traditions of the

present time, it is not more than three hundred and fifty to four hundred years since the Yncas only possessed and ruled over the valley of Cuzco as far as Urcos, a distance of six leagues, and to the valley of Yucay, which is not more than five leagues.

Touching the Lords that the people can remember, their recollection does not carry them back beyond the time already stated. They preserve the memory of these Lords by their *quipus*, but if we judge by the time that each is said to have lived, the historical period cannot be placed further back than four hundred years at the earliest.

It must have been at about that period that they began to dominate and conquer in the districts round Cuzco, and, as would appear from their records, they were sometimes defeated. For, although Andahuaylas, in the province of the Chancas, is only thirty leagues from Cuzco, they did not bring it under their sway until the time of Pachacutec Yupanqui Ynca, who defeated those Chancas. . . . On the other side of Cuzco is the road of Colla-suyu; and they also retain a recollection of the time when the Canas and Canches, whose country is even nearer, were paid to go with the Yncas to the wars, and not as vassals following their lords; and this was in the same battle in which Pachacutec Ynca fought against Usco-vilca, Lord of the Chancas. They also recollect the time when they extended their dominion along this road to the lake of Villañaota, the point where the Collao begins. Two powerful rivers flow out of this lake, one going to the north sea, and the other to the south. The lake was worshipped by the natives, and looked upon as a noted *huaca*. A long interval of time elapsed before the Yncas advanced beyond this point. It was the successor of that lord who conquered the Chancas who began to advance beyond this point, and those provinces had no peace until the time of Tupac Ynca, father of Huayna Ccapac. We found these wars recorded in the registers of the Yncas, but each province also had its registers of wars, so that, if it were necessary, we might very easily fix the time when each province was subjugated by the Yncas.

But it is enough to understand that these Yncas at first extended their conquests by violence and war. There was no general opposition to their advance, for each province merely defended its land without aid from any other; so that the only difficulty encountered by the Yncas was in the annexation of the districts round Cuzco. Afterwards all the conquered people joined

them, so that they always had a vastly superior force as well as more cunning in the art of war. Thus it was seldom that they were completely defeated, although sometimes they were obliged to retreat, and desist from a war during a year.

No province ever attempted to disturb them in their own land, only seeking to be left in quiet possession of their territories, and this seems to me to have been a great advantage to the Yncas. There is no memory of such an attempt in their registers; but, after the districts were reduced to obedience, the great natural strength of this region conduced to its security. The four roads which diverge from Cuzco are all crossed by rivers that cannot be forded at any time in the year, while the land is very rugged and strong. There cannot, therefore, be a doubt that in this, and in possessing better discipline and more knowledge, lay the advantage they had over all the other nations of this region. This superiority is shown in their edifices, bridges, farms, systems of irrigation, and in their higher moral lives. If other nations have anything good, it has all been taught them by the Yncas. The Yncas also had a different system of warfare, and were better led, so that they could not fail to become lords over the rest. Thus they continued to extend their dominions and to subjugate their neighbors.

The second thing that may be taken for granted is that having resolved to conquer and subjugate other nations, the Yncas sought some color and pretext for prosecuting their objects. The first story that these Yncas put forward, though it was not the title which they finally asserted, was an idea that, after the deluge, seven men and women had come out of a cave which they call Paccari-tampu, five leagues from Cuzco, where a window was carved in masonry in most ancient times; that these persons multiplied and spread over the world. Hence every province had a like place of worship where people came forth after the universal destruction; and these places were pointed out by their old men and wizards, who taught them why and how the Yncas venerated the cave of Paccari-tampu. Thus in every province these places of worship are to be found, each one with a different tale attached to it. . . .

The third thing to be understood is that as soon as the Yncas had made themselves lords of a province, they caused the natives, who had previously been widely scattered, to live in communities, with an officer over

(continued)

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every ten, another over every hundred, another over every thousand, another over every ten thousand, and an Ynca governor over all, who reported upon the administration every year, recording the births and the deaths that had occurred among men and flocks, the yield of the crops, and all other details, with great minuteness. They left Cuzco every year, and returned in February to make their report, before the festival of Raymi began, bringing with them the tribute of the whole empire. This system was advantageous and good, and it was most important in maintaining the authority of the Yncas. Every governor, how great lord soever he might be, entered Cuzco with a burden on his back. This was a ceremony that was never dispensed with, and it gave great authority to the Yncas.

The fourth thing is that in every place where a settlement or village community was formed, the land was divided in the following manner: one portion was set apart for the

support of religion, being divided between the Sun and the Pachayachachic, and the thunder, which they called Chuquilla, and the Pacha-mama and their ministers, and other *huacas* and places of worship, both general and such as were peculiar to each village. It would take long to enumerate them, for they were so numerous that, if they had had nothing else to do, the sacrifices alone would have given them occupation. For each town was divided in the same way as Cuzco, and every notable thing was made an object of worship, such as springs, fountains, streams, stones, valleys, and hill summits, which they called *apachetas*. Each of these things had its people whose duty it was to perform the sacrifices, and who were taught when to sacrifice and what kind of things to offer up. Although in no part were there so many objects of worship as in Cuzco, yet the order and manner of worshipping was the same.

From: Clements R. Markham, *Narratives of the Rites and Laws of the Yncas* (London: Hakluyt Society, 1873).

Asia and the Pacific

☞ *Manifesto of Accession as First Ming Emperor (1372)* ☞

Since the Sung dynasty had lost the throne and Heaven had cut off their sacrifice, the Yuan [Mongol] dynasty had risen from the desert to enter and rule over Zhongguo [China] for more than a hundred years, when Heaven, wearied of their misgovernment and debauchery, thought also fit to turn their fate to ruin, and the affairs of Zhongguo were in a state of disorder for eighteen years. But when the nation began to arouse itself, We, as a simple peasant of Huai-yu, conceived the patriotic idea to save the people, and it pleased the Creator to grant that Our civil and military officers effected their passage across eastward to the left side of the River. We have then been engaged in war for fourteen years; We have, in the west, subdued the king of Han, Ch'en Yu-liang; We have, in the east, bound the king of Wu, Chang Shih-ch'eng; We have, in the south, subdued Min and Yueh, and conquered Pa and Shu; We have, in the north, established order in Yu and Yen; We have established peace in the Empire, and restored the old boundaries of Zhongguo. We were

selected by Our people to occupy the Imperial throne of Zhongguo under the dynastic title of "the Great Ming," commencing with Our reign styled Hung-wu, of which we now are in the fourth year. We have sent officers to all the foreign kingdoms with this Manifesto except to you, Fu-lin [Byzantium], who, being separated from us by the western sea, have not as yet received the announcement. We now send a native of your country, Nieh-ku-lun [Fra. Nicolaus de Bentra, Archbishop of Peking], to hand you this Manifesto. Although We are not equal in wisdom to our ancient rulers whose virtue was recognized all over the universe, We cannot but let the world know Our intention to maintain peace within the four seas. It is on this ground alone that We have issued this Manifesto.

From: Friedrich Hirth, *China and the Roman Orient: Researches into their Ancient and Mediaeval Relations as Represented in Old Chinese Records* (Munich, Germany: G. Hirth, 1885).

FURTHER READING

- J. B. Bury, *The Invasion of Europe by the Barbarians* (London: Macmillan, 1928).
- Patricia Crone, *God's Rule: Government and Islam* (New York: Columbia University Press, 2004).
- Patricia B. Ebrey, *China: A Cultural, Social, and Political History* (Boston: Houghton Mifflin, 2006).
- Carter J. Eckert, Ki-Baik Lee, Young Lew, et al., *Korea Old and New* (Cambridge, Mass: Harvard University Press, 1990).
- Robert Fawtier, *The Capetian Kings of France: Monarchy and Nation (987–1328)*, trans. Lionel Butler and R. J. Adam (New York: St. Martin's Press, 1960).
- Deborah A. Fraioli, *Joan of Arc and the Hundred Years War* (Westport, Conn.: Greenwood Press, 2005).
- Bernard Hamilton, *The Leper King and His Heirs: Baldwin IV and the Crusader Kingdom of Jerusalem* (Cambridge, U.K.: Cambridge University Press, 2000).
- Charles O. Hucker, *China's Imperial Past: An introduction to China's History and Culture* (Stanford, Calif.: Stanford University Press, 1994).
- John Keay, *India: A History* (New York: Grove Press, 2000).
- Michael Andrew Malpass, *Daily Life in the Inca Empire* (Westport, Conn.: Greenwood Press, 1996).
- Simon Martin and Nikolai Grube, *Chronicle of the Maya Kings and Queens: Deciphering the Dynasties of the Ancient Maya* (New York: Thames and Hudson, 2000).
- Patricia McKissack and Frederick McKissack, *The Royal Kingdoms of Ghana, Mali, and Songhay: Life in Medieval Africa* (New York: Henry Holt, 1994).
- Paul Michel Munoz, *Early Kingdoms of the Indonesian Archipelago and the Malay Peninsula* (Singapore: Editions Didier Millet, 2006).
- Dougald J. W. O'Reilly, *Early Civilizations of Southeast Asia* (Lanham, Md: Rowman and Littlefield, 2007).
- John Reader, *Africa: A Biography of the Continent* (New York: Vintage, 1999).
- Conrad Schirokauer, David Lurie, and Suzanne Gay, *A Brief History of Japanese Civilization* (Boston: Wadsworth, 2005).
- Desmond Seward, *The Wars of the Roses: Through the Lives of Five Men and Women in the Fifteenth Century* (New York: Viking, 1995).
- Svatopluk Soucek, *A History of Inner Asia* (New York: Cambridge University Press, 2001).

► employment and labor

INTRODUCTION

Employment and labor practices in the medieval world showed a remarkable degree of similarity. Their differences were in large measure a reflection of differences in the nature of resources that laborers could exploit for economic advantage. Thus, employment practices were different in the open grasslands of sub-Saharan Africa, where farming and especially herding were major sources of employment, than they were in, say, the desert regions of Mesoamerica or the heavily

forested regions of eastern North America. While tools and similar items were made by skilled workers out of obsidian (a glasslike volcanic rock) in Mesoamerica, iron was widely used in Europe and Africa, so workers in these materials developed different skills and technologies. Nevertheless, a number of common themes emerge.

First, agriculture continued to be a major economic activity, employing large numbers of people to prepare fields and plant, cultivate, and harvest crops. Additionally, people were employed in food preservation and storage. Along rivers, lakes, and coastal communities, more emphasis was given to fishing, the hunting of sea mammals, and the gathering of such foods as turtles and crabs. While hunting and gathering as a primary way of life had receded throughout most of the world, these activities remained important in regions where the population density was low and the availability of game and naturally growing food sources was high. In areas where farmland was scarce, such as mountainous regions, considerable labor was expended on such practices as building terraces for crop cultivation. In dry areas large labor forces were needed to dig and maintain irrigation systems.

A second common theme was the rising importance of the city and village. As people gathered into larger communities and as agricultural surpluses allowed people to turn to other forms of economic activity, increasing specialization of labor occurred. When virtually everyone no longer had to be involved in food production, classes of skilled artisans—potters, weavers, metalworkers, blacksmiths, sculptors, stonemasons, engineers, and architects—could emerge. In some parts of the world, notably in Europe and China, trade guilds and formal systems of apprenticeship for workers emerged. These systems helped ensure that goods were made to high standards. They also restricted membership, thus keeping prices high. As a consequence of this increased specialization of labor, states took steps to ensure that fairness reigned in the marketplace by employing classes of inspectors, for example. Penalties could be severe for a merchant who attempted to cheat customers with the use of faulty scales or coins from which precious metal had been shaved.

A third common theme had to do with the distinction between household and communal labor. In the medieval world a considerable amount of labor was performed at the household level. Farmers and herders tended to operate independently, but so did many artisans and craft workers. In this context, the entire family was involved in labor. Children could help tend herds, for example, and women not only performed domestic tasks but also produced craft goods such as textiles.

However, considerable labor was expended on communal and public works projects. In some cases, these commu-

nal projects were local. The efforts of the entire community were needed to terrace a field, for instance, or to build an irrigation system to water crops, and interlocking family relationships, often brought about by marriage, created systems of labor cooperation for tasks requiring many hands. In many cases, though, these public works projects were mandated by higher authorities, usually a king or a similar ruler. Such public works projects could have involved millions of man-hours of labor. They included the construction of roads, palaces, pyramids, granaries, temples, churches, and defensive fortifications such as walls around cities. The Pueblo peoples of the present-day southwestern United States engaged in communal labor to construct dwellings carved into cliffs, and they constructed storage facilities for grains, beans, and other foods. They also built irrigation canals.

Religious authorities were often the driving force behind community construction projects. In medieval Europe millions of man-hours, sometimes over several generations, were poured into the construction of cathedrals by hundreds of sculptors, stonemasons, and laborers as well as the workers needed to quarry and transport stone. Similarly, as Islam spread throughout Asia, the Near East, and northern Africa, mosques were constructed along with the cities that surrounded them. In the Americas religious figures drove the construction of enormous kivas, or dug-out ceremonial centers. All of these activities required massive workforces.

In some instances, slave labor was used for these projects. Even when workers were not slaves, they often performed this work as a kind of “tax” paid to the ruler. In general, because systems of currency and coinage had not yet developed in many parts of the world, workers paid taxes to a ruler “in kind,” meaning that they paid a portion of the fruits of their labor as tax. Thus, in Africa, gold miners turned the nuggets they found over to the king. In France the system was called *corvée*, referring to the practice of paying taxes with a percentage of crops or labor for a specified period of time. While coinage existed in Europe and throughout parts of the Islamic world, barter and payment in kind were still widely practiced.

A fourth common theme was the role of trade. While trade had long been a fixture of economic life, it grew in importance during the medieval period as trade routes became more passable. Trade in numerous commodities took place throughout the Eurasian landmass and into Africa, and trade routes were established throughout the Americas. In some cases, such as South America, trade was facilitated by networks of roads. This trade employed numerous people, in particular, classes of porters who carried goods from one location to the next. Marketplaces in cities became the hub of economic activity, as workers traded their wares for other

goods—and often for raw materials—that they needed. In connection with trade, states often employed large numbers of men in armies to keep trade routes open and protect the flow of goods. This was a common practice in the Horn of Africa as well as in China.

AFRICA

BY MICHAEL J. O’NEAL

The civilizations of sub-Saharan Africa rose and fell in importance as their economic fortunes changed or as neighboring peoples conquered their lands. The economies of each of these kingdoms depended heavily on two industries, trade and mining, although agriculture remained an important industry and pottery, construction, and textile work was prevalent. The trans-Saharan trade routes were the lifeblood of these communities, providing not only goods but also exposure to books and new ideas. Additionally, many sub-Saharan civilizations produced enough agricultural surpluses to support specialist classes, such as spiritual healers, musicians and artists, and large standing armies to keep trade routes open and protect the capital cities.

Employment and labor were organized in medieval Africa as either independent enterprises, most of which were operated at the household level, or government-run enterprises. Peasants and farmers raised their crops and tended their herds at the household level. Additionally, most craftspersons—including potters, textile workers, and metalworkers—operated independently out of their homes, trading the goods they manufactured at larger market cities. Traders also operated autonomously as sole proprietors of their businesses. Activities that could not be conducted at the household level were largely run by the government. Medieval Africa did not know “capitalism” as the term is understood in the modern world. That is, there were no investors who pooled their money to form a business enterprise that would realize a profit. Most projects requiring large workforces—including public works, construction, and mining—were operated by the government, although some mining and gold panning were done at the household level. In many cases slaves performed much of the labor required by the government, though in general slaves were reasonably well treated and eventually could buy their freedom. Slaves could even aspire to marry their owners’ sons or daughters.

The development of any kind of economic system depends on the establishment of a civilization and a population base large enough to supply the people’s wants. Most important, an agricultural surplus must exist to enable people to withdraw from farming and herding and engage in other economic activities. Further, there must be some type of state, an

authority with the power to redistribute agricultural production to specialist labor in other sectors of the economy. The state has to be relatively stable and able to support an army for protection and for maintaining open lines of trade and exchange. In states like the kingdom of Ghana, rulers instituted taxes on foreign traders who wanted to enter the area. These taxes were paid in salt, peacock feathers, iron, silk, and other goods. Further, specialists in the economy cannot exercise their crafts without trade and exchange, which provides the raw materials—such as metal, stone, and cotton—that specialists need to create useful goods.

The most prominent states of medieval sub-Saharan Africa included the kingdoms of Ghana (not to be confused with the modern-day nation of Ghana), Mali, Songhai, and Benin (present-day Nigeria). In 1000 this area had more cities with populations of at least 20,000 people than did any other area of sub-Saharan Africa. Two factors contributed to the region's population density. One factor was the area's abundance of fertile agricultural land. A large strip of savanna, running east to west along the southern border of the Sahara Desert, provided high-quality soil for cultivating crops and grassland for grazing herds. Accordingly, much of the labor in this region was agricultural.

The second factor was the presence and extent of trade. The region provided a vital link to northern Africa, the Mediterranean, Europe, and trade routes to the East. Traders had long been traversing the forbidding Sahara, but the growing prevalence of trading caravans using camel power increased the level of that trade. Thus traders from the north were able to cross the desert, arrive at a more hospitable region to the south, and continue around the Horn of Africa to exchange goods. This trading enterprise employed a large class of merchants, along with the porters, couriers, and other laborers needed to facilitate the exchange of goods, and numerous marketplaces emerged where goods were bartered.

Traders also traveled south along the Nile River to the interior of central Africa, though the difficulties of the journey and the lack of a population base the farther south they went limited their efforts. Of more significance was the east coast of Africa, where flourishing trade from Asia had taken place in ancient times and continued into the medieval period. Little is known about the plant foods available in eastern Africa, but there is ample evidence of considerable economic activity revolving around harvesting the sea and its coasts for fish, shellfish, and turtles. Further evidence suggests that the area was home to sizable herds of goats, sheep, and cattle. These activities set the economy of the east coast apart from the economies of and the west coast. The chief reason for the difference had to do with geography. The west coast of Africa, with its rocky shorelines, was far less accessible. Further, pre-

vailing winds from the north made travel by sea difficult on the west coast; it was easy to sail southward, but the return journey was impossible until the development of sails and rudders that allowed sailing against the wind. In contrast, the east coast was more accessible, and wind patterns made sea navigation easier.

A region's economic activity is largely dependent on the resources available there. The region south of the savanna grasslands provides a good example. The region is more forested than the savannas, and considerable economic activity was facilitated by the Niger River. Agriculture in this region was intensive. Evidence suggests that the type of agriculture practiced is what archaeologists call recession agriculture. Crops were planted and grown along floodplains after floodwaters had receded. The alluvial silt left behind by receding floodwaters was particularly rich in nutrients and easily worked, so crops could be grown in abundance and surplus grain could be stored and transported. All these activities would have employed numerous laborers for planting, cultivating, harvesting, loading, storing, and accounting for produce. The produce could be traded to other less-fortunate communities in dryer areas in exchange for crafts and other goods. Goods exchanged included salt, cattle, spices, gold, dates, copper, horses, ivory, textiles, animal hides, jasper stone, glass and glass beads, and slaves.

Important components of the sub-Saharan economy were metallurgy and mining. The kingdoms of Ghana, Songhai, and Mali depended heavily on gold, iron, and copper mining. Early in the medieval period iron was a dominant metal used to make weapons, tools, and jewelry. Most metalwork was done at the household level, and archaeological records abound with evidence of blacksmithing and other activities related to mining or working iron. Later gold was a dominant metal, used to forge craft items and as a form of tribute to kings. While some mining was organized at the state level, much was conducted at the household level. Little archaeological evidence exists to provide information about how the mining industry was organized. It is believed that children, because of their smaller stature, were sent into mines to retrieve gold nuggets. In Ghana gold nuggets were the property of the king, but individuals were allowed to keep gold dust as a form of income.

Other important contributors to the economy were pottery and textile workers. Pottery was made at the household level and shows a high degree of expertise, not only in the design and firing but also in the painstaking decorations. Clay pottery was most common, but metal pots were also prevalent, and the kingdom of Benin was particularly noted for its bronze work. Early in the medieval period clothing was made predominantly of leather and animal hides, but by the turn

of the second millennium a thriving industry in the spinning and weaving of cotton was under way.

Construction was also a major source of employment. In Ghana, for instance, the king attempted to protect the capital city by employing thousands of workers to construct what was in effect a second city about six miles from the capital, requiring a labor force to quarry stones, build streets, design and construct buildings, and maintain the city. This second city was the nation's chief trading city. Merchants and craftspeople gathered there to trade their goods. Much of this trade was conducted through a system of silent barter. Because traders did not speak the same language, gold was left in a particular place. A merchant who wanted the gold in exchange for another commodity took the gold and left goods in its place; if the amount of goods was not adequate, transactions between the two traders stopped until the seller left behind enough goods.

Many people in Benin were employed in the construction industry. The city of Benin, the kingdom's capital, featured wide, straight streets; a person could walk down a street for a mile or more and still not see the end of it. Additionally, construction of the king's immense palace required the labor of hundreds of stonemasons, designers, and builders as well as workers who transported the stone for the palace and the streets from the quarries to the construction sites. It has been estimated that to construct the walls surrounding Benin City, 5,000 men had to work 10 hours a day throughout a single dry season, though it was more likely that 1,000 men worked over five seasons.

Zimbabwe in southern Africa provides the most impressive example of stone construction. Again, resources played a major role in determining the nature of economic activity. Widely available was a great deal of granite that could be quarried in flat stones and sheets. This meant that a large class of stonemasons and construction workers could construct massive buildings and stone walls using dry stone techniques; that is, stone could be stacked without the use of mortar.

THE AMERICAS

BY MICHAEL J. O'NEAL

In pre-Columbian North America, modern notions of "labor" and "employment" were largely unknown. These institutions imply the existence of organized public or private enterprises that paid workers a wage to perform specific tasks. However, in most North American cultures during the millennium before the arrival of Europeans, labor was a household or communal activity. These cultures tended to be organized as settled or nomadic tribes comprising a cluster of clans and kinship groups that formed a commu-

nity for purposes of mutual advantage. At the head of the group was a chief, who, along with a relatively small group of elite families, directed the community's economic activities. These leaders gathered labor forces to carry out tasks necessary for survival, in exchange distributing benefits such as food, shelter, and clothing.

A chief form of labor was agricultural production, particularly the cultivation of maize, or corn, which had become a staple crop in North America during the first millennium of the Common Era, as well as in Central and South America. Of course, the level of agricultural production differed depending on the region. In the Eastern Woodlands fewer people were employed in agriculture because the region also provided ample game meat or fish, along with naturally occurring nuts, berries, tubers (that is, root vegetables), and the like. Agriculture employed far more people in agricultural lands, including the alluvial plains along major rivers such as the Mississippi and its tributaries, where individual families grew crops in the rich, well-watered soil. In the Great Plains of the Midwest hunting, particularly of buffalo, elk, and other larger game animals, continued as the major source of food. In the Southwest various forms of beans were a major crop, while along the western coasts, especially in the Northwest, fish was the primary staple.

Individuals became a labor force when it was necessary for the larger community to carry out public-works project under the direction of social and religious elites. A good example is provided by the mound-building Mississippian cultures, which flourished from about 700 or 800 until about 1400 to 1500. They are noted for their construction of enormous mounds, or elevated earthworks, that formed the centers of their community. One of the best-known examples is the city of Cahokia, which flourished in modern-day Illinois where the Mississippi, Missouri, and Illinois rivers meet. The Cahokians required an enormous labor force to construct the 120 large mounds in the area, including Monks Mound, which covers an area of 14 acres. Historians estimate that it would have taken millions of man-hours to construct some of these mounds. In addition, homes, granaries, ceremonial centers, burial grounds, stockades, and similar structures were constructed and often had to be rebuilt or refurbished as time passed.

In the view of some historians the mounds served more than practical purposes. In this way they were much like the pyramids of ancient Egypt. As public-works projects, they served to bind people to their community. They became part of their cultural identity. They legitimized the role of the elites, who administered the affairs of the realm from them. They provided the "cement" that held together a large labor force that could be mobilized for agriculture, defense, and

other purposes. And because of the role of ancestor worship in the religious beliefs of these peoples, the mounds, as the site of burials, were a way of tying workers to their ancestors' power. Labor, then, was not just a way of getting tasks done. Labor was a way of forging a common community.

The notion of communal labor extended to other areas of North America at this time. Among the peoples of the Southwest, collectively called the Anasazi (ca. 900–ca. 1300), who are the ancestors of present-day Pueblo peoples, communal labor not only helped the people meet material needs but also forged a sense of belonging to a community. Thus, enormous amounts of labor were expended on the construction of the many dwellings carved into rock cliffs or apartment-like residences; monumental architecture; kivas, or dug-out ceremonial centers; storage facilities for beans, grains, and other foodstuffs; and canals for irrigation. In the four corners area, centers like Pueblo Bonito and their environs served as hubs where elites resided and where craft production took place. They were connected by roads that integrated the outlying communities. An index of the amount of labor required is the sheer size of many of these kivas. Pueblo Bonito, for instance, built beginning in 919, was five stories tall and had 800 rooms. Given the absence of metal tools and beasts of burden, this kind of building activity could have been carried out only by a massive human labor force.

In pre-Columbian Mesoamerica at this time the nature of the labor force was somewhat more complex. Large numbers of Mesoamerican workers were necessary for the building of cities on a large scale. Construction projects like pyramids, public monuments, and apartment compounds of the cosmopolitan urban center of Teotihuacán (ca. 1–700), for example, bound people to the community and linked outlying agricultural workers to a central hub. Large labor forces also took part in the construction of the city's ceremonial centers, palaces, administrative buildings as well as irrigation systems. Additionally, large numbers of people were employed in crafts production, including jewelry, ceramics, and similar goods. Many of these goods were produced for the elite class. Most production was organized at the household level and carried out by specialists. Entire neighborhoods could be devoted to a single craft specialization.

Manufacturing employed a larger number of laborers in Mesoamerica. One major industry was the production of tools made of obsidian, a glasslike volcanic rock. Teotihuacán was a major obsidian production center. The obsidian trade required the labor of skilled workers, who forged raw obsidian into machetes, knives, points, and weapons. It also required a large class of laborers to mine the obsidian, transport it to manufacturing hubs, and then carry finished products away, all without benefit of wheeled vehicles or pack animals. In

support of this manufacturing activity was a large and affluent class of traders, who imported the raw obsidian and other commodities when necessary and served as middlemen in the exchange of tools for other commodities. One of those commodities was salt, which was extracted from coastal lowlands and then traded to the interior in exchange for tools, foods, textiles, and similar goods.

In connection with trade, a lower-class occupation developed—that of the porter. Surviving manuscript paintings show children being trained for this type of labor. These porters were based in towns along trade routes. Merchants would arrive in town and hire them to carry loads, typically of about 50 pounds, to the next town, usually a journey of a day. There the goods would be handed off to another porter, who carried the goods for another day to the next town, and so on.

The elite long-distance traders (*pochteca*) were an essential part of the Aztec economy. While the Aztec civilization (ca. 1200–1521) relied on agriculture and the labor of peasants and slaves, much of its economic activity revolved around craft production, including ceramics, jewelry, and metallurgy. But trade was a crucial economic activity. In the capital city, as many as 60,000 people gathered to trade goods in markets.

Textile production was a major labor activity throughout Mesoamerica, particularly the production of embroidered cotton cloth used to make luxury clothing for social elites. Most of this textile production was done by women working out of their homes, but it too could become a trade or tribute item, particularly under the Aztecs. Numerous crafts workers in some areas produced other luxury goods made of metal, particularly copper, including such objects as tweezers, bells, rings, necklaces, buttons, and needles.

Archaeological evidence shows that there was a considerable amount of craft specialization, which took place under the authority of social elites. Among these craft specializations was papermaking, which provided a paper made of bark that was used for administrative and ceremonial purposes. Mesoamerican society was hierarchical, and elites legitimated their power and control by sponsoring specialized craft production. One measure of the regard in which certain crafts were held is their proximity to the homes of the elite. Textile production and production of luxury goods, including goods made of gold and other metals, as well as of stone, often took place in homes very near elite residences and ceremonial centers. The feather workers and other elite craftsmen resided in the palace of the ruler Montezuma II (r. 1502–20). The Aztecs produced books of tribute showing the various kinds of raw materials and worked items requisitioned from subject peoples.

In all cases laborers were not paid with currency, largely because currency did not really exist. Sometimes, cacao

beans, the source of chocolate, were used as currency, but usually people were paid in kind. Thus, rural agricultural workers transported their surplus production to the cities. Similarly, craft goods became, in effect, the property of rulers among the Aztecs, to be distributed to other rulers and elite members of society as gifts. It was in this way that the rulers cemented their power and authority. Elite members of society and merchants also held lavish banquets, which also involved a great deal of gift giving.

During this period in South America domestic production was the norm. Households tended to cultivate their own land; make their own tools and utensils; domesticate animals; produce clay pots and other storage vessels; make clothing out of cotton, wool, and hides; and engage in other, similar activities. Thus, households were relatively self-sufficient. Extended family units provided labor for tasks that required larger labor forces, including clearing fields and harvesting crops, terracing fields, gathering lumber, and constructing houses. In the Amazon basin, for example, extended families and clans constructed earthen dikes to keep floodwaters out of their fields.

Like their Mesoamerican neighbors, South Americans relied on redistribution of goods to meet most of their needs. That is, goods such as agricultural surpluses were transported to city centers, where they became the property of rulers and other elites. In turn, these goods were distributed during times when food was in short supply in households. This type of exchange of resources as payment for labor became more commonplace as South American societies became more complex and as populations grew. By the time the Inca emerged in South America (ca. 1450), the notion that all resources—land, agricultural production, textiles, wool, cotton, metal products—belonged to the state had become entrenched. In effect, the state was supported by a labor “tax.” On a revolving basis, all citizens, including children, were required to provide labor for the state, working in agriculture, construction of public works, and crafts production of metal products, textile, and pottery. As much as two-thirds of a farmer’s output was taken by the state. In exchange, people received food, clothing, and other necessities when they needed them.

Craft specialization evolved from household production to specialized production for markets. In particular, many laborers were involved in metalwork production. Metals worked included gold, silver, copper, and *tumbaga*, an alloy of the three. These metals were used to make both utilitarian and luxury goods. However, most utilitarian goods were exchanged locally; luxury goods, in contrast, were exchanged over much longer distances. A major reason for this had to do with transportation costs. Another had to do with the role of imported luxury goods in defining the status and power of

elites. Therefore, laborers made utilitarian goods for the local market, while they made luxury goods from whatever exotic materials they could obtain—ceramics, stingray spines, turtle shells, shark teeth, conch shells, exotic woods, scarce minerals—for the long-distance trade market. Their activities were directed by those who occupied the upper strata of society.

Agricultural specialization, too, became the norm. South America is marked by a large number of climate zones and elevations. Different crops grew best at different elevations. Thus, the people of South America specialized in the production of certain crops that were suited to their microclimate, relying on local exchange to diversify their goods. As an example, up to 20 varieties of corn and 240 varieties of potatoes were grown, each adapted to the climate where they grew.

ASIA AND THE PACIFIC

BY KENNETH HALL

Asia’s medieval rural laborers worked in village-based communal or family-centered groups. Extended family households were the norm in India and China, nuclear households in Japan, and a mixture of communal and family-centered work units in Southeast Asia and the Pacific islands. Men and women performed daily chores according to local tradition, but everyone participated in food production. Local work might be assigned by local leaders (“big men” or “big women,” chiefs, or priests) who did not perform physical labor but instead delegated it to their social subordinates as well as to prisoners of war, slaves, and indebted bond servants.

Where land was plentiful and additional labor was always in demand, women enjoyed a high degree of economic and social status, which contrasts with the low economic and social esteem of Chinese and Indian women in regions of population density. In everyday life the work of men included field preparation, plowing, felling trees, hunting, metalwork, tool repair, house building, statecraft, and formal (Indian- or Chinese-based) religion. Women transplanted crops, harvested, grew vegetables, prepared food, spun thread, wove cloth, made pottery, marketed local produce, and, because of their association with fertility, participated in traditional animistic cults meant to ensure favorable weather, good harvests, and the fertility of the land and family. Both men and women shared in planting, harvesting, animal care, food storage, and field maintenance, including the construction and care of irrigation canals.

There were a number of rural labor arrangements relative to land use and the resulting income rights. Ownership and entitlements to income depended on overlapping familial, communal, and political claims, many of which had their origin in the clearance of land, the building of irrigation

dikes and reservoirs, and the resettlement of free cultivators and bondsmen on previously uncultivated lands. In addition to obligatory divisions of annual production among those holding income rights, local cultivators were subject to the revenue demands of government officials, which were payable in kind, cash, or labor services. Outside of China, population shortages and increased productivity encouraged private-family or communal village holdings of property, but by the 12th century in densely populated China, 80 percent of the rural population worked on land controlled by less than half the population.

While food production was the primary element of the economy, commercial developments beginning in the 10th century increased the market for craft products throughout the Asian region. Agricultural communities responded to the potential presented by this change because income from supplemental craft production increased the local standard of living, and it blunted the ever-increasing tax and rental demands of the elite. In India, China, and Java farmers also balanced grain and vegetable agriculture with the cultivation, processing, and weaving of cotton. In China, Japan, Korea, and mainland Southeast Asia people raised mulberry trees to feed silkworms and processed the silkworm cocoons into thread. They then wove the thread into luxurious silk fabrics for local use or export or passed the thread along to rural and urban households who devoted themselves exclusively to weaving. Farmers throughout Asia also grew hemp and ramie stalks, which provided coarser fibers for weaving less-expensive textiles for local use. Rural tax collectors frequently doubled as commercial wholesalers or brokers, who gathered local agricultural surpluses as well as the government's share of local production and sold the surplus to transport merchants or urban shopkeepers.

As a result of improved market demand and commercial transport beginning in the 10th century, some enterprising farmers migrated from the countryside to cities to supplement their family's income, leaving their subsistence farming for full-time craft work. This urbanization of labor corresponded to labor specialization in the production of textiles and other crafts such as metalwork and ceramics. Urban textile production in China took place in private, temple, and imperial workshops, which produced more sophisticated and expensive weaves than those produced in the countryside. Workshops depended on the labor of artisans and their families, supplemented by day laborers, who were hired as individuals or as contracted laborers. Full-time shop artisans organized into guilds, which separated weavers of various varieties of cloth.

Artisan and merchant specialists throughout Asia initially resided in designated sectors of a community, perhaps a

SPINNING

Spinning is the process of converting combed or carded fibers into long threads or yarns to produce cloth. In spinning, fibers are pulled from the mass of fibers, twisted to make them cling together, and wound onto a spindle. Spinning is traditionally women's work.

In the original process of spinning, fibers were pulled and twisted them by hand. In time, a spindle was developed to help with the process. The original spindle was a narrow stick about 12 inches long with the dual purpose of holding the mass of fibers at its upper end and containing the spun yarn at its lower end. A more advanced instrument, the drop spindle, was a rod that had been narrowed at both ends and inserted through a disk-shaped whorl. The whorl, made of stone, clay, or another hard substance, served as a flywheel to make the spindle drop toward the ground and rotate rapidly in one direction. Spindles and their attached whorls differed in size and weight according to the type of fiber being spun.

The Chinese were the first to invent the spinning wheel. The spinning wheel is essentially the mechanization of the drop spindle. The spindle itself was mounted horizontally between two short, slotted uprights, with bearings, to serve as an axle. The spindle tip protruded beyond the upright to accept the fibers. The whorl was grooved to act as a pulley that received a continuous stream of wound fiber from the wheel. The driving wheel would be attached by an axle to uprights on the same floorboard. A small wheel would be used for cotton or silk spinning with a larger wheel used for wool. One turn of the wheel produced many revolutions of the spindle, thereby permitting greater labor productivity in spinning yards of yarn. However, in contrast to the drop spindle, the early spinning wheel was clearly an inferior product. It too often produced yarns that were weak, uneven, with insufficient twist, and with too many knots to properly form cloth on a loom. The defects resulted chiefly from the wheel's speed. Such production defects did not matter with all yarns, particularly those that were combined with hand-spun yarns to produce cloth.

merchant/artisan quarter or specified streets. In the 12th century, in response to the generalized growth in Song-era private trade and economic specialization, China's trade guilds

and licensed firms grew out of earlier merchant associations grouped by trades in various streets and self-contained walled blocks within a city. The new guilds were organized under one member, selected as headman, who was responsible to the government for the collection of all the members' taxes or payments of collective quotas of local craft production. Guilds also were an institutional means by which the Chinese government could hold merchants and artisans accountable in a society in which merchant and artisan behavior was by nature counter to the Confucian ideal of the collective community, and they were vital in their inclusive representation of merchant and artisan interests relative to those of the Chinese imperial regime.

By the 13th century the Chinese and other developing Asian imperial regimes were demanding textiles to clothe state troops, courts, and bureaucrats and to make assorted payments in kind as rewards and gifts. Heavy state taxation forced laborers in the silk- and cotton-producing regions to commit their available labor to textile production instead of the surplus production of crops, which brought less profit and were less able to meet the state's revenue demands. Operating an urban workshop required amounts of capital that rural families lacked and allowed them to better balance the demands of the government and the opportunities of the urban marketplace. In China, as elsewhere in Asia, there was so much demand for cloth that rural weavers who created higher-quality and more sophisticated patterns had ample opportunity to make a comfortable living. The growing number of successful textile-producing workshops broke down the former distinct rural and urban division of labor in the textile-producing regions.

Other types of laborers who earned their livelihood in occupations associated with craft production included carpenters, blacksmiths, workers in gems, goldsmiths, printers, image makers (such as those who made statuary and temple carvings), and painters. There was open competition to receive the services of particularly skilled architects. Since master artisans were forbidden by custom or law to do menial tasks, others below them performed the actual work. Accomplished craftsmen built temples and palaces and were praised by name in local inscriptions and dynastic records and chronicles. In payment for their services notable artisans received honorific titles and designated income assignments from assigned land. Wealthy artisans and commercial specialists received other privileges, including the honor of having double conches blown and drums beaten at their marriages and funerals, wearing specified types of clothing, covering their houses with plaster and other decorations, and being transported in a litter.

Artisans were recognized for their contributions to a community's well-being. Blacksmiths were especially appreciated, as their work fashioning and repairing metal plows and iron farm tools was vital to local agricultural productivity. Inscriptional and dynastic records report local efforts to recruit artisans with guarantees of tax remissions, land grants, and special privileges. Laws were passed making it unlawful for valued artisans to move away from their homes, which would threaten the local economy and societal cohesion. While artisans of the highest stature received substantial rewards, lesser artisans were subject to these local restrictions, mandatory labor assessments, and the remission of craft objects to members of the secular and religious elite.

The increased economic stature of artisans, along with their local privileges relative to the traditional agricultural community, created the potential for social and political discord. Agriculturalists and members of the elite traditionally had occupied the top of the social hierarchy, while artisans and merchants, whose goal was profit over community service, occupied the bottom. Indian sources show particular concern with artisans' and merchants' legal and social status relative to Hindu religious obligations. Only artisans of the highest status among the laboring castes (Vaishya and Shudra) could perform the religious rites associated with sacred elements and structures, such as consecrating a temple site, preparing the foundation for a temple's sacred altar, or creating the central temple icon. To qualify, elite artisans were required to study the sacred texts in addition to learning the essential skills of building.

Seagoing populations the Chinese collectively called Kunlun specialized in economic activities related to the sea and coastal regions of Asia and the Pacific. In the medieval era Malay and Polynesian crews sailed the islands of Southeast Asia and the Pacific in ingeniously designed and built double-outrigger canoes and larger seagoing vessels. Men spent most of their productive time fishing the sea for fish, sea turtles, and octopus for their own and others' consumption; they also harvested coconut and breadfruit and hunted native animals, notably land snails and tropical birds. Women grew taro, a cash crop highly in demand regionally; gathered wild foods from the jungle; fished inland ponds; and wove cloth and mats from tree and plant fibers. In the absence of regular trade, local seafarers commonly turned to open piracy to acquire the commodities necessary for their own subsistence.

Labor in the eastern Indonesian archipelago during the Sung and Yuan eras is highlighted in Chinese literary sources, which discuss the local laborer's role in the provision of cloves from the Moluccas, nutmeg from the Banda Islands, camphor from Borneo, sandalwood from Timor, and tor-

toiseshells, sea slugs, and pearls from a variety of eastern archipelago sources. These products were in demand in China as medicinals and aromatics that were classified as either fine goods subject to government monopoly or coarse goods available for open-market exchange. Beginning around 1200 there was sufficient international demand for sea and island products that local labor specialized in their collection and export, to the exclusion of their piracy and cultivation of subsistence grains. Instead, they accepted volumes of imported rice from Java in exchange for their specialty crops. Mixtures of upstream and downstream island populations cultivated these desirable marketplace commodities in partnership with sojourning maritime traders who provided their connection to the international marketplace.

Numerous urban-based corporate trading communities existed in the medieval era, including those who specialized in international trade. In the Middle East, India, Southeast Asia, and China they were often centered in firms formed by merchant families who sent their members to Asia's ports of trade and caravan centers to transact business. These family agents might have several bases of operation. For example, sojourning merchants traveling from one Indian Ocean port to another had to follow the shifting seasonal monsoon winds. Having reached their destination, they would have to stay several months until the reversal of the monsoon season's wind allowed them to make their return voyage. In their absence, local-resident trading partners or perhaps the family of the woman they took as their local wife looked after the interests of the transient merchants.

International trade guilds based in southern India, at their height from 1000 to 1400, were a notable alternative to the family firm in their ability to represent the collective interests of their members, whose commercial goals ran counter to local communalism. These international guilds were inclusive of local and foreign members and trade associations, collectively represented in an executive council. Individual merchants were free to enter trade partnerships with other organization members or with nonmembers. Members swore a code of mercantile conduct that set them apart from other itinerant traders. The most prosperous members became so-called merchant princes who held monopoly privileges over certain goods, and they were allowed by local authorities to display the symbols of the wealthy and powerful, such as carrying umbrellas against the heat of the day, riding on elephants, and living in multi-storied houses. In an age in which there was periodic political insecurity, the international trade guilds employed mercenary troops to safeguard their business interests, caravans, ships, and warehouses and to be lent in support of local rulers who favored their commercial interests.

EUROPE

BY JUSTIN CORFIELD

People in medieval Europe were involved in farming, for the large part growing their own food and tending to use barter rather than exchanging any money during the early Middle Ages. Barter also was used by people working in villages in a wide range of tasks involving agriculture. But for the sale of agricultural goods in towns and cities and also for specialized services in urban areas there was a need for payment, with certain occupations becoming lucrative because of the income they were able to generate. To restrict the number of people who could do particular tasks, regulations were enacted to control the quality of work, which led to the guild system and also the training of apprentices.

The vast majority of people in Europe in medieval times lived in or near villages. There is a wide range of surviving source documentation about the spread of the population, the most well known being the English Domesday Book, a sort of census completed in 1086 on the order of William the Conqueror (r. 1066–87). Parts of the record have not survived, but the original document listed every village in the country and detailed the number of people living in each village. Byzantine records for eastern Europe also list the number of men whose service could be called upon in times of war, showing that most people lived in villages. These written records are mirrored by archaeological data from other parts of Europe which show a large rise in population up until the Black Death of the fourteenth century. In some parts of Europe, especially in the east, the existence of serfdom precluded serfs from leaving the land for work in the city. However, even when movement was not restricted by law, many families lived in villages for generations.

Most villages were formed into parishes, around a parish church. In countries where there was constant fighting, the houses themselves would be set close together, often with a wall around them for protection. This created a strong sense of community, and allowed for a system of barter when work done by one person might be repaid by another at a later stage. Hence a shoemaker in a village could be paid for his shoes at harvest time. Similarly, many parish priests were maintained entirely by the parish, with goods provided by parishioners during the year. In feudal Europe even the lord of the manor might take much of his payment in kind, either in crops or in labor.

In towns and especially in cities, where there was far greater specialization in work and less control over the population, the system of barter was not as effective. As a result, if somebody needed to pay an artisan with coins, that person

also would have to collect payment for his own work. With no exact measure of time, payment was made for a day's work; the term *day laborer* was commonly used to describe people who were hired for such work. These were probably some of the first people to be paid a "wage," but there were other ways to calculate payment. Most artisans charged for individual items, for example, and lawyers drafting documents charged by the word.

From the 1300s on trade brought considerable wealth to much of Europe, with craftsmen and artisans working in towns and cities, which they had done since Roman times. To try to regulate these craft workers, from the early Middle Ages specialized guilds emerged and flourished in such cities as London, Florence, and Genoa. Often known as "liveried guilds" because of the distinctive clothes (liveries) worn by practitioners of various trades, these associations were able to restrict the number of people entering a particular field of business, with the dual aims of ensuring the quality of the product or service and keeping prices high. In order to join a guild, a boy typically would have to serve a fixed period as an apprentice, after which he would become a full member of

the guild. During the period of apprenticeship the master had the responsibility for caring for the youth, feeding him and providing him lodgings, educating him, and also teaching him the particular craft. Although there were cases of masters who took advantage of their apprentices, most masters established good working relationships; there are instances of masters, on retirement, handing over or selling their businesses to their former apprentices.

Extensive apprenticeship records are available for England, parts of Italy, and Germany, showing that similar patterns tended to emerge. Most records indicate that a large number of boys from villages in the countryside became apprenticed at local towns. There were also a number who were apprenticed in distant cities—often the master having had some connection with the village from which the apprentice came or sometimes being a distant relative. Some guilds even imposed strict rules on who could be an apprentice. In Paris no boy could be apprenticed as a weaver unless he was the son of a weaver.

For the making of food there were guilds for bakers, butchers, and fishmongers. Although bakers tended to be found throughout a town or city, butchers and fishmongers often congregated in particular places. Butchers had to be near the location where animals were slaughtered, since it was done soon before sale; fishmongers needed to be close to the wharfs where the catch would be landed. The skinners, tanners, and curriers (who dressed leather), as well as other people involved in leatherwork, usually worked close to the location of the butchers. Girdlers and saddlers had their businesses near the horse markets.

Butchers and cooks existed throughout Europe from ancient times, but their guilds did not emerge until the late 12th century. The earliest reference to the Butchers' Guild in London dates to 1179, and the first cook's shop, in Cookes Row, London, is mentioned in a roll from nine years earlier. Most of the guilds, however, started at a later date. Their emergence was connected with particular crafts, among them, chandlers (makers of candles and soap), cobblers (shoemakers and shoe menders), and drapers (dealers in cloth and dry goods). Competition could arise between members of different guilds. To circumvent this, directives in some cities such as Paris regulated the guilds not by what they produced but by the material with which it was made, thus, for example, separating robe makers using cloth from those who made robes from fur.

Traditionally regulations were placed on the sale of alcohol, often because of the collection of taxes; for this reason, inns and taverns had to be registered. Some of these establishments were tied to particular brewers. Coopers (who made and repaired wooden casks in which the beer was stored) typically were located close to breweries. Vintners in many



Corbel in the form of an angel holding a shield with the arms of the Grocers' Company, London, 1466 (© Museum of London)

cities imported wine from southern France and northern Italy. For cities and towns located near bodies of water, watermen and ferrymen transported people and goods—usually operating in very strictly regulated guilds that fiercely saw off any opposition. Carters did the same for land transport. As in villages, blacksmiths and ironmongers worked throughout a city, along with builders and carpenters. In cities there was also more use of glass, which increased dramatically during the Middle Ages; glaziers were working in every city by the end of the medieval period.

Within houses candles were the only method of illumination at night, and some cities, such as London, had rival guilds of tallow chandlers and wax chandlers. Bowyers made bows, a particularly important occupation in England, which heavily relied upon them in battle. Armorers had workshops throughout medieval Europe, and the best craftsmen usually were located around the palaces of kings and other rulers, whom they supplied with armor. Although cutlers could produce knives, they tended to specialize in the making of cutlery; the fork was first used in Byzantium in the 10th century.

Many women made clothes for the family at home, so there were relatively few clothes shops. Shops tended to sell lengths of cloth to be made into clothing, and cloth workers, drapers, and dyers often were situated close to each other. At the higher end of the market were haberdashers (dealers specializing in men's clothing), merchant tailors, and mercers (dealers in expensive, high-quality fabric such as silk). Some of these guilds, such as that of the mercers in London, became extremely powerful; Mercer's Hall became a center of city intrigue. The mercers required an apprenticeship of nine years, and there were many famous members of their guild, including Sir Richard Whittington (d. 1423)—the “Dick Whittington” of children's stories—who was Lord Mayor of London on three occasions. Such was the wealth of some of these guilds that the haberdashers', merchant tailors' and mercers' guilds in London were all wealthy enough to found their own schools.

The four most specialized occupations were those of goldsmiths, barber-surgeons, apothecaries (people who sold drugs and medicinal preparations), and lawyers. Many of the medical associations and law societies in Europe today have their origin in guilds that operated in medieval times. The making of spectacles was concentrated in Antwerp from the mid-14th century on and led to the formation of a guild there that also jealously guarded entry to the profession. With each of these guilds closely shielding access to membership, it was not long before people came to realize that membership of a particular guild could be an easy path of personal enrichment.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Employment and labor were very complex social issues in the medieval Islamic world, as the spread of Islam incorporated many different cultures with different employment and labor practices into the Islamic sphere. New rulers in conquered territories faced two problems. One was the occasional shortage of labor, as war sometimes resulted in the deaths of laborers or in their flight to escape the Muslim invasion. The other problem was that of determining how to apply Islamic laws to local employment and labor practices. Throughout the medieval era matters of employment and labor generally were resolved through markets and the balanced application of state laws and regulations; the maintaining of this balance allowed for the development of the most prosperous economic era the world had known until then, often called the “golden age” of Islam.

Labor shortages seem to have been most acute in two regions: the western Near East, particularly the Levant, and northern India. In the case of the western Near East, the Arab invasions resulted in the loss of farmers and the fleeing from cities of Greeks and others who took along their wealth and skills. In India the burning of cities and the occasional wholesale slaughter of locals resulted in the loss of craftspeople and their employees, with many people likewise escaping from the conquered lands and taking along their skills and labor. In general, once Islamic rule was imposed, the new rulers engaged the local populations in work and tolerated local employment and labor practices. This was probably a practical matter, because making sweeping changes in local labor practices could have created unmanageable chaos in local economies. Further, Islamic laws were perhaps difficult to apply specifically to employment practices.

In rural areas farmers often were allowed to pursue their work as they wished. Muslim leaders usually focused their efforts to control and organize labor in the cities. The conquests of Islam typically resulted in the growth of cities, with laborers leaving the countryside to find work in the many building projects and other enterprises sponsored by Islamic governments. Rural populations were often heavily taxed—though generally less so than under previous rulers—making employment in the city seem a preferable avenue toward earning a living.

A chronic problem in the cities of the early Islamic world was the general unrest of unskilled laborers. Islamic cities tended to be slightly different in layout from modern cities. The urban area itself was defined by its marketplaces, mosques, shops, and houses. At the edges the city was surrounded by gardens, where many laborers living in the city went to work during the day, producing fruits and vegetables for the city's markets. The gardens eventually blended into

the countryside, where farms could be found. The region of the gardens included places for caravans to stop and trade their wares, and near these were areas where unskilled laborers could gather, hoping to find employment in the gardens, with the caravans, or in workshops. These semiemployed laborers sometimes rioted. Sometimes a charismatic imam's fiery oratory against the supposed immorality and unfairness of rulers would inspire outright revolts among unskilled laborers. A persistently aggravating factor among laborers was that while merchants were regarded with respect, those who worked with their hands were held in contempt and frequently were treated accordingly.

Marketplaces in Islamic cities were among the wonders of the medieval world. In them could be found fresh food, clothing, shoes, furniture, tools, and beautiful jewelry. To regulate the marketplaces and those who made the goods, governments employed two people, the *sayafi* and the *muhtasib*. The word *sayafi* is often translated as "money changer," but this term is not entirely accurate; a *sayafi* would indeed exchange local money for foreign money, thus enabling visiting traders to do business in the city, but he would also assess the values of coins. The *sayafi* was in charge of determining the percentage of silver or gold in individual coins and then weighing the coins to determine exactly how much actual silver or gold was present. Coins were sometimes damaged through use or shaved on their edges by unscrupulous people. By determining the actual content and weight of coins, the *sayafi* played an important role in ensuring that workers were paid exactly what they were owed by their employers.

The *muhtasib*—the equivalent of the modern-day ombudsman—was one of the most important figures in the business life of a city. The word *muhtasib* translates fairly well as "market inspector," even though the authority of the *muhtasib* extended beyond the functioning of the markets. The *muhtasib* was responsible for ensuring that the rules of Islamic ethics and morality were followed in the marketplaces and workshops of the city. He also was charged with ensuring that markets functioned smoothly, for the state viewed the integrity of the marketplace as critical to its foundation as well as with ensuring social justice. This meant that he and the law enforcement officers who worked for him would force shop owners to clear the streets of their displays—shop owners constantly tried to set their wares outside their storefronts where the goods could be easily seen, thus blocking traffic. The use of the wheel for transportation was largely abandoned in Islamic lands, with donkeys, mules, and horses bearing riders and burdens. As such, streets needed to be wide enough only for two donkeys to pass side by side; narrow byways were often jammed with traffic.

The *muhtasib* ensured that all weights and measures were accurate, including those used by the *sayafi*. Further, he made sure that people were paid what they were supposed to be paid,

the market-determined "prevailing wage." In addition, he enforced public morality; for instance, public drunkenness was not tolerated. The *muhtasib* had the authority to punish anyone who violated the rules. He also collected the poll tax from *dhimmis*, a term for non-Muslim "People of the Book," that is, those people who adhered to the religions that recognize the god of Abraham—Jews and Christians. In exchange, the state would extend hospitality and protection to members of the other revealed religions (religions whose scriptures had been received through the word of God), including freedom to practice their faith and exemption from military obligations. Jews often filled the roles of sea merchants that had been held by Greeks under the Byzantine Empire. They also were allowed to hold jobs Muslims regarded as inferior. Both Jews and Christians often held government posts, sometimes as a practical necessity for the functioning of the state, and the experienced bureaucrats of newly conquered lands were often Jews and Christians. Nonetheless, Jews had to wear yellow bands on their shoulders and Christians had to wear blue belts, just as Jews and Muslims were subjected to similar humiliations in Catholic Europe, particularly post-Islamic Spain. Despite their inferior status, however, Jews and Christians were not consigned to ghettos, as Jews were in parts of medieval Christian Europe.

Workers in the Islamic world were not organized into formal guilds. Even in former Byzantine territories, existing guilds disappeared, perhaps because under the Byzantine Empire guilds had been part of the government's system for controlling workers, and few people would have sought to retain them. Instead, various groups of employers had leaders who spoke on their behalf to government officials. Workers engaged in similar crafts and traders selling similar wares typically aggregated in separate sections of the market in order to promote competition and comparative shopping. A community might have several loosely organized groups of furniture makers, bakers, stonemasons, and other such workers, each with its own leader. Another way of organizing under a leader was by territory in a city, with all workers of any kind represented on the basis of where they worked or where they lived. Often, the leaders would choose a head to speak for all of them on important matters.

Workplaces often were owned by governments or religious institutions. As such, palaces and mosques could have workshops attached to them. For instance, in the 1300s the sultan in Delhi, India, had 36 workshops that employed thousands of workers. The most prestigious craftspeople, such as metalworkers, were located near the palaces of rulers. Other jobs were closely associated with mosques and the marketplaces near mosques, including papermakers, lawyers, and booksellers. Sometimes a city became organized around the kinds of work done in it. In the medieval city of Fez al-Bali, in Morocco, for example, a stream flowed through the city,

with the main mosque upstream and the papermakers, lawyers, and booksellers nearby. Near the palace were the metalworkers. Downstream were the millers and dyers, as dyeing was smelly and created pollution, making it a trade to be kept downstream from most of the city. (In many parts of the early Islamic world, one of the tasks of the *muhtasib* was to check and minimize the effects of pollution in communities; for example, brick-manufacturing factories could not be located near textile markets.) Farther downstream, at the edge of the city, were the butchers, who generally were regarded as the most unclean of all workers. Sometimes the sheer number of workers in a city made organizing crafts by territory nearly impossible. For instance, craftspeople had about 200,000 residences in Cordoba, Spain, with about 80,000 shops scattered throughout the city, near marketplaces and along streets.

The nomads and farmers who lived outside the cities made much of what they needed themselves. Itinerant craftsmen roamed rural areas providing their services to those who paid for them; prominent among these were smiths who repaired tools. People in rural areas would select sites for small markets where they could exchange goods. Sometimes these sites became villages or towns, where craftsmen would set up permanent workshops to serve the people who came to the market.

The interests of the workers in cities and those in rural areas often conflicted. In the market-exchange environment that prevailed in the Islamic world, farmers wanted to earn profits on what they grew, while workers in cities wanted cheap food. Notable efforts were made by rulers to balance the needs of the rural workers who produced food and the need of city workers for food they could afford. Ala-ud-Din Khalji, the sultan of Delhi in the late 1200s and early 1300s, paid particular attention to this matter. In accord with the Islamic emphasis on social justice, he instituted price controls on goods viewed as necessities, such as food and clothing. To

enforce these price controls he employed public inspectors and auditors. Further, various types of grains were identified and made subject to sales at fixed prices. In order to ensure adequate supply at fixed prices even during poor crop seasons, the sultan oversaw the stockpiling of grains. Ala-ud-Din Khalji became celebrated for keeping basic necessities affordable for even the lowliest of laborers.

A negative result of such price controls—one that could arise in any market-exchange setting—was that many farmers, not earning enough profits, abandoned farming. They then became part of the semiemployed labor force in cities. Another problem was that low prices often kept wages low, such that even if food and other goods were inexpensive, some workers did not earn enough money to pay for them. However, a system of public assistance was typically organized, as funded by revenues from the institution of *zakah*, whereby Muslims are obligated to contribute to public charity; *zakah* is one of the five pillars of Islam.

See also AGRICULTURE; ARCHITECTURE; ART; BUILDING TECHNIQUES AND MATERIALS; CITIES; CRAFTS; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; ECONOMY; FAMILY; FOOD AND DIET; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HUNTING, FISHING, AND GATHERING; LAWS AND LEGAL CODES; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MILLS AND MILLING; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; NOMADIC AND PASTORAL SOCIETIES; NUMBERS AND COUNTING; OCCUPATIONS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WEIGHTS AND MEASURES.

Europe

Ordinance of Laborers (England, 1349)

The king to the sheriff of Kent, greeting. Because a great part of the people, and especially of workmen and servants, late died of the pestilence, many seeing the necessity of masters, and great scarcity of servants, will not serve unless they may receive excessive wages, and some rather willing to beg in idleness, than by labor to get their living; we, considering the grievous incommunities, which of the lack especially of ploughmen and such laborers may hereafter come, have

upon deliberation and treaty with the prelates and the nobles, and learned men assisting us, of their mutual counsel ordained:

That every man and woman of our realm of England, of what condition he be, free or bond, able in body, and within the age of threescore years, not living in merchandise, nor exercising any craft, nor having of his own whereof he may live, nor proper land, about whose

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tillage he may himself occupy, and not serving any other, if he in convenient service, his estate considered, be required to serve, he shall be bounden to serve him which so shall him require; and take only the wages, livery, meed, or salary, which were accustomed to be given in the places where he oweth to serve, the twentieth year of our reign of England, or five or six other commone years next before. Provided always, that the lords be preferred before other in their bondmen or their land tenants, so in their service to be retained; so that nevertheless the said

lords shall retain no more than be necessary for them; and if any such man or woman, being so required to serve, will not the same do, that proved by two true men before the sheriff or the constables of the town where the same shall happen to be done, he shall anon be taken by them or any of them, and committed to the next gaol, there to remain under strait keeping, till he find surety to serve in the form aforesaid.

From: Albert Beebe White and Wallace Notestein, eds., *Source Problems in English History* (New York: Harper and Brothers Publishers, 1915).

Europe

Abbey of Stavelot: *Corvée of Labor* (France, 1126)

In the name of the Holy and Indivisible Trinity. Cuonon, by the grace of God, Abbot of Stavelot. Just as it is right to keep alive those things which have been well and truly decreed to be inviolate and holy, so there is no question at all that those things which have been corrupted by perversion ought to be returned to their proper use. Therefore, let it be known to your posterity that we have discovered a certain corrupt and altogether reprehensible use, or rather abuse, which we on the advice of our monastery and of our faithful people have corrected by this present charter. For since it was the ancient custom that all, who have a rural possession within the boundaries of the villa of Stavelot, should bring lime three times a year to the monastery, negligent officials, having accepted money for the cartage, worked two evils, i.e., they oppressed the people by this exaction and they neglected both the walls of our buildings and the crumbling walls of the inner cloister. And so we, resisting this two-fold evil, have decreed, and by this present charter have confirmed our decree, that, for the future, serfs will

bring lime or stone for burning to our monastery, and if they are not commanded to transport the lime, they need not pay any commutation or redemption at all, except that if there be an abundance of lime, they may pay for one cartload of lime six loads of timber for building purposes or two for fuel. Moreover, they will go three times a year, first in the month of May, then between the feast of St. John and that of St. Peter, at the end of the month of June, and thirdly between the feast of St. Remaclus and that of St. Remigius. Let them bring this lime or stone prepared for burning from our manors, that is Louveigné, or Xhoris, or Filot, or Ozo.

Done at Stavelot in the year of the Incarnation 1126, Lothar being King of the Romans, Alberon Bishop of Liège, and Cuonon Abbot of Stavelot.

From: Roy C. Cave and Herbert H. Coulson, *A Source Book for Medieval Economic History* (Milwaukee, Wis.: Bruce Publishing Co., 1936).

FURTHER READING

- I. G. Doolittle, *The City of London and Its Livery Companies* (Dorchester, U.K.: Gavin Press, 1982).
- S. D. Goitein, "The Working People of the Mediterranean World during the High Middle Ages." In *Studies in Islamic History and Institutions* (Leiden, Netherlands: E. J. Brill, 1968).
- François Icher, *The Artisans and Guilds of France: Beautiful Craftsmanship through the Centuries*, trans. John Goodman (New York: Harry N. Abrams, 2000).

- E. Stuart Kirby, *Introduction to the Economic History of China* (London: Routledge, 2006).
- Kenneth R. Hall, *Trade and Statecraft in the Age of the Colas* (New Delhi, India: Abhinav Publications, 1980).
- Kenneth R. Hall, *Maritime Trade and State Development in Early Southeast Asia* (Honolulu: University of Hawaii Press, 1985).
- Timothy R. Pauketat and Thomas E. Emerson, eds., *Cahokia: Domination and Ideology in the Mississippian World* (Lincoln: University of Nebraska Press, 1997).

Rebecca Storey and Randolph J. Widmer, "The Pre-Columbian Economy." Paper presented at the Latin American Studies Association, Washington, D.C., September 6–8, 2001. Available online. URL: <http://lasa.international.pitt.edu/Lasa2001/StoreyRebecca.pdf>. Downloaded on August 29, 2007.

Abraham L. Udovitch, "Labor Partnerships in Early Islam," *Journal of Economic and Social History of the Orient* 10 (1967): 64–80.

Steadman Upham, Kent Lightfoot, and Roberta Jewett, eds. *The Sociopolitical Structure of Prehistoric Southwestern Societies* (Boulder, Colo.: Westview Press, 1989).

► exploration

INTRODUCTION

During the millennium that defines the medieval period, peoples throughout the world continued the explorations they had begun in ancient times. Portions of the world were relatively densely populated. Cities in the Middle East were large and highly developed, as were those in China and other parts of Asia. Central Mexico's population was dense, the cities of northern and western Europe were growing, and the region surrounding the Mediterranean Sea had long been the home of dense civilizations such as Rome, Greece, and Constantinople. Other parts of the world, however, were still sparsely populated: the Great Plains of North America, the non-Andean portions of South America, swaths of sub-Saharan Africa, the frozen steppes of the Eurasian landmass, and islands in the Pacific, the Caribbean, and other parts of the world. These and other areas of the world were ripe for exploration.

Exploration during the Middle Ages was motivated by a number of factors. One was the search for resources. As people became increasingly sedentary, settling in towns and cities rather than leading a nomadic existence, they exhausted their physical environment. Forests were cut down for lumber and firewood, land was converted to agricultural uses, and mines were emptied of their ores. As populations continued to grow, nations explored surrounding regions with a view to replenishing their resources and providing room for more and more people. A related motivation was defense. By extending the reach of the territory under its control, a medieval state or kingdom could better defend itself against foreign invaders. Again, such territory had to be explored before it could be brought under a state's influence.

Trade, too, was a motivating factor behind medieval exploration. Trading requires someone to trade with. A culture that evolved beyond subsistence agriculture developed classes of specialists who were able to produce surpluses of goods, and many of these goods were traded internally and with border regions. But to acquire other types of goods unavailable in the local region—pottery, glassware and mirrors, precious stones and metals, tools, ivory, lumber, spices, animal

hides, wine, feathers, and a host of other goods—communities had to establish trade routes with other cultures, which necessarily implied exploration of these routes, sometimes over vast distances. As the medieval period unfolded, vibrant trading networks developed, linking, for example, Asia with the Middle East and from there to Europe or linking the cultures of sub-Saharan Africa with the Mediterranean region, the Middle East, and Europe or linking the cultures of Mesoamerica as well as those up and down the Andes region of South America.

While the development of seafaring technology did not motivate exploration, it certainly facilitated it. In ancient times seafarers were limited in the distances they could travel. Lacking rudders, navigational tools, and sails that allowed sailing against the wind, sea explorers tended to remain within sight of land. But as the technology of sea travel evolved, new vistas were opened, such as the southwestern coast of Africa or the innumerable islands, inlets, peninsulas, and coves of the Asian coastline, explored in a series of seven voyages the Chinese launched in the early 15th century. Of course, seafaring technology enabled contact between the Americas and Europe, as European explorers, driven by "gold, glory, and God," spread throughout the New World in search of wealth, fame, and the desire to spread their religion. The first of these explorers were the Spanish conquistadors following the voyages of Christopher Columbus, though strong evidence suggests that the Scandinavians had explored the northeastern coast of North America centuries before, and claims have been made that African explorers reached the New World before Columbus did. Late in the medieval period it became possible for the first time for seagoing explorers to circumnavigate the globe, rounding the southern tips of Africa and South America.

Another factor that led to exploration was warfare, and during the medieval period warfare and religion were often two sides of the same coin. The most prominent example was the Crusades, which spanned the 12th and 13th centuries. The Crusades originated in a desire on the part of Christian Europeans to protect Christians and holy sites of the Middle East from what they regarded as the depredations of Islam. Accordingly, in 1095 Crusaders departed from Europe, primarily what is now France, for the Holy Land, inaugurating the first of seven Crusades. The endeavor ended in 1291, with the fall of the last crusader stronghold at the Mediterranean city of Acre.

While the Crusades led to considerable bloodshed, they also had positive outcomes. Europeans returned to their homes with new ideas, new foods, and new words in their vocabulary. They gained exposure to Arabic knowledge of engineering, mathematics, and astronomy. The Crusades inspired a desire for westerners to translate Arabic texts and to

explore the vast regions of the Middle East and western Asia. Missionaries were sent to explore these regions and win converts, and schools were established in Europe to teach the languages of these regions. Travelers, many of them dispatched by the Christian pope, returned with a new understanding of geography.

The movement of people and ideas was not one way. At the same time, Asian explorers and conquerors were exploring the lands to their west. Arabic Muslims made voyages of exploration into eastern Europe and India, and African Muslims made similar voyages, usually in the form of pilgrimages, to the Middle East. All of this exploratory activity led to the diffusion of people and ideas, contacts with new cultures and ideas, and a general shrinking of the world as people were beginning to understand, often for the first time, that new lands, new cultures, and new peoples could be found over the horizons.

AFRICA

BY BRADLEY A. SKEEN

Africans from south of the Sahara did not engage in the kind of systematic exploration conducted, for instance, by the European state of Portugal. Beginning in the 1440s Portugal sent fleets of ships to reconnoiter the African coast and eventually find a new route to Asia around the Cape of Good Hope on the southern tip of the continent. Undoubtedly, many Africans were trailblazers who were led by restlessness or circumstances to discover fresh pastures and farmlands and new trade routes. During the Middle Ages the Bantu peoples especially spread out across Africa, but those explorers remain unknown to us. Africans did, however, become caught up in Portugal's network of exploration and trade that extended along the coasts of their nations, and African ambassadors traveled to Lisbon and Rome for the first time. Ethiopia was isolated as the only traditionally Christian country in Africa surrounded by hostile Muslim states. The Ethiopian government and the Catholic Church, therefore, found it expedient to send representatives to Europe, seeking a new horizon of diplomacy and learning.

In the Middle Ages the first Africans brought to Europe were slaves, traded across the Sahara and then from Islamic ports on the Mediterranean to cities in Spain and Italy. As in most slaveholding cultures, a small number of the enslaved Africans in Europe managed to obtain their freedom. For them their traumatic journey ended with the discovery of a personal new world that brought them lives and experiences far different from anything they could have experienced in Africa. The Holy Roman Emperor Frederick II (r. 1212–50) had a corps of black trumpeters at his court that

made a display of the cosmopolitan character and power of his rule, though the trumpeters' status as slaves or free men is unknown.

The spread of Islam to northwestern Africa and Arabia isolated Ethiopia as a Christian country, bringing to an end its monopoly on the Indian Ocean trade between Europe and Asia. As a result, Ethiopian culture and politics turned inward. In the later Middle Ages, however, Ethiopia began to make efforts to contact the Christian world of western Europe, especially after the Crusades displayed European military power in the Near East. Ethiopia began to look to Christian Europe as an ally against Islam and so sent envoys into an unknown wider world.

Emperor Lalibela of Ethiopia (r. 1185–1225) was posthumously made a saint in the Ethiopian Orthodox Church. Several centuries after his death the *Gadla Lalibla*, a hagiography of the emperor, was composed. According to that tract, he made a pilgrimage to Jerusalem in his youth, perhaps during a period of political exile, before Muslim forces took the city from the crusaders. According to the same source, after hearing of the loss of the city by the Christians, Lalibela was ordered by God in a dream to build a new Jerusalem on the site of his home city of Roha and rename it after himself. In the city of Lalibela he built the famous rock-hewn churches of Ethiopia, drawing on his exploration of the wider Christian world beyond Ethiopia.

Emperor Lalibela's pilgrimage was a precursor to a tradition of religious pilgrimages and diplomatic journeys by Ethiopians that became more prevalent after the founding of a new dynasty in 1270 (which claimed descent from King Solomon through the Queen of Sheba) and reached a peak in the 15th century. The first Ethiopian diplomatic mission to Europe toured Rome, Genoa, and Avignon in 1306. (It is uncertain whether they also visited any of the Spanish kingdoms.) Ethiopia had already sought a military alliance with European powers against the common enemy of the Islamic states on the Mediterranean. Ethiopian representatives attended the Council of Florence in 1441, invited by the pope to help in unifying Christendom. Thereafter the tempo of Ethiopian diplomatic activity increased.

In the mid- to late 15th century Emperor Zara Yakob sent ambassadors to the Vatican, Venice, Milan, and Florence as well as to Lisbon. The emperor directed the ambassadors to act as diplomats and to increase his prestige at home and abroad. In addition, he charged the ambassadors with soliciting scholars and technical experts to join the Ethiopian court and with asking European rulers to donate sophisticated weapons and other technological devices for Ethiopians to copy as well as technical books and texts describing advances in scholarly disciplines, such as geography and theology. Em-

peror Zara Yakob was attempting to bring to Ethiopia what had become a very new world.

The Santo Stefano degli Abissini in Rome was converted from a church into a monastery for Ethiopian monks around 1179. Pope Sixtus IV expanded the monastery in 1479 as Ethiopian envoys became more common. Aside from hosting diplomatic missions, it provided a residence for Ethiopian clergy living and studying in Rome (usually between two and 30 individuals). With their Western educations and new contacts made in the wider world, priests trained in Rome brought new learning and new technical developments back to Ethiopia. By the late 15th century an Ethiopian monastic community was permanently settled in Jerusalem and acted as a source of information about political and military developments in Islamic states with whom Ethiopia was frequently at war.

The Portuguese expanded into the Atlantic islands and down the African coast beginning in the mid-15th century. They were interested in favorable trade contacts and could obtain gold and slaves profitably in western Africa. In Senegal and other areas they built forts as a basis for their trade network. The first organized African state they encountered (other than the Islamic kingdoms of North Africa) was Benin (modern-day Ghana and western Nigeria). Oba Esigie, the king of Benin, encouraged the establishment of a Portuguese trading post at Quantum (1485) and began to rely on Portuguese mercenaries in his conflicts with local African states. In 1486 Esigie sent his son as an accredited ambassador to the Portuguese court in Lisbon, the first African to hold such a position in Europe. Carried there on Portuguese ships, Esigie's son would have been the first African to return home from Europe with reports on conditions there, refining and expanding the Benin monarchy's knowledge of their new ally.

Portuguese involvement in the kingdom of Kongo (modern-day Congo) was more extensive. The Kongo monarchy was elective and limited in its powers. The king at the time of the Portuguese contact (1483), Nzinga a Nkuwu, quickly saw that a close alliance with the European newcomers (who established a station on the island of São Tomé) would help him consolidate his own power. He converted to Christianity and took the name João I (the Portuguese form of John) in 1491. He encouraged Portugal to send missionaries and build churches at its own expense, which it was happy to do. Constrained by the example of the king, many Kongolesse noblemen converted. The Christian ideology of the divine right of kings allowed João to increase his authority. As a reward for conversion, the Portuguese made a gift to João of firearms, naval vessels, and mercenaries and later supported his son Alfonso in a civil war over the succession against a non-Christian opponent.

João was anxious to strengthen his ties with Portugal further and also sent a diplomatic mission to Lisbon. Another of João's sons, known to the Portuguese as Dom João da Silva, arrived in Lisbon as an ambassador in 1484. He made a second embassy from 1488 to 1490. Another of the king's relatives, Dom Pedro, was made ambassador to Portugal in 1493 and was soon joined by yet another family member, Dom Henrique, who was ordained the first bishop from the kingdom of Kongo.

In 1484 the Portuguese established the Convento de Santo Elói in Lisbon to house the diplomatic missions from Kongo. It also became a center for educating missionaries and clergy, mostly members of the royal family and other nobility. In this way the kingdom of Kongo was provided with a corps of citizens trained in European languages (especially Latin) and European diplomatic protocol. King Alfonso's son, Henry, became one of the brightest students at this institution and later became bishop of Kongo. The Portuguese crown was happy to pay for this institution because it provided a ready source of translators for its own officials in the kingdom.

João I went beyond this, however, and persuaded the Portuguese to establish a school in Lisbon where the sons of Kongolesse noblemen could be trained as missionaries. Graduates of this school later were dispatched to Rome to form a Kongolesse diplomatic mission to the pope as well. Particularly after the return from Lisbon of the first students who could report on conditions there, members of the Kongo court and the households of other great noblemen began to adopt Portuguese dress and manners. This was facilitated by the return of Kongolesse diplomats, all of whom were given gifts of Portuguese court dress. This elite display increased their status within the kingdom of Kongo.

The Kongo diplomatic mission in Portugal brought to the kings of the Kongo and the elite class that supported them increased power and status in their homeland (especially through the institution of the Catholic Church), an introduction to the wider Atlantic world, profitable trade relations, and a militarily valuable ally. Although the Portuguese initiated the contact that resulted in these benefits, the Africans facilitated it by venturing beyond their homeland to the new world of European culture and politics.

THE AMERICAS

BY J. J. GEORGE

The climax of the period from 500 to 1500 in the Americas is defined by the arrival of European colonialists. As Europeans settled on native lands, a hemisphere already in a state of continual flux witnessed its most permanent and decisive

changes, including the transformation from native, autonomous development to its colonial antecedent. The final outcome unfolded over many generations and in some sense continues as researchers uncover native artifacts buried either long before the conquest or as a direct result of it. Data are genuinely scant regarding the concept of exploration—how it was carried out and what the consequences were—and deductions necessarily speculative. Exploration in the style of the Age of Exploration or the Enlightenment—as in the maritime journeys of Ferdinand Magellan (ca. 1480–ca. 1521), Christopher Columbus (1451–1506), Vasco da Gama (1460–1524), and Captain James Cook (1728–79)—is essentially unknown in the Americas, although some surprising similarities arise when comparing the Native Americans with their colonial counterparts through the lens of the exploratory impulse.

The idea of exploration carries with it a few basic assumptions. In its broadest context Native American exploration extends from prehistoric antecedents marked by diffusion and migration. Considered in this early context, exploration was a defining aspect of daily existence. Even when occurring within well-defined areas, the wandering that is indicative of nomadic, seminomadic, and hunter-gatherer cultures, which continued into the 16th century and beyond in areas such as the North American plains, is inherently tied to exploration. In this sense exploration is more or less a permanent facet of existence.

From another viewpoint exploration is a consequence or extension of sedentarism. Settlement pattern data and diffusion statistics indicate that by 500 the Americas were populated—heavily in some areas, such as central Mexico, and moderately to scarcely in others, such as vast regions of the Arctic and Canada, the North American plains, the intermediate zones of the Caribbean, and non-Andean areas of South America. As sedentarism increased, land and resources within a particular localized area sometimes grew scarce. In certain areas, such as the Mayan lowland regions of the Yucatán, Belize, Guatemala, and Honduras, where land had to lay fallow between plantings, additional agricultural plots precipitated expansion. Increasing territorial needs, at least initially, coincided with the exploratory impulse.

Similarly, as population densities increased, greater demand for agricultural and other products necessitated not only the consolidation of existing land but also the expansion of agriculture into peripheral areas as well as a search for new sources of sustainability. The trend toward urbanism, even rudimentary urbanism, coincided with greater social and political complexity. The greater complexity of these settlements—whether village or hamlet, city or city-state, or empire—necessitated the growth of exchange sys-

tems to maintain an entrenched population and to support its growth. Thus itinerant traders shuttled outward toward markets, by definition a form of exploration.

State-level or city-state-level organization was evident by 500 in central Mexico at Teotihuacán, Mayan settlements such as Tikal, and South American polities like Moche. Perhaps unavoidably, forms of exploration tied to trade became state sanctioned in these areas, often with a militaristic counterpart. Later, in the civic and imperial examples of the 15th- and 16th-century Aztec and Inca empires, the state monopolized all internal and external workings, including trade and exchange, such that exploratory impulses were inherently tied to consolidation of resources and expanding territory and influence.

The example of European and American exploration from the 15th to the 19th centuries suggests that exploration is rarely, if ever, into purely empty land; the same was true for intraregional exploration by Native Americans. Traveling within any country in the Americas would result, sooner or later, in stumbling on some form of settlement or nomadic group. Of course, that was the situation Spanish and Portuguese explorers stepped into, beginning with Christopher Columbus's arrival in the West Indies in 1492, which signaled the beginning of the end of Native American culture as an autonomous development. Sailing on preconditions of securing both financial backing and royal sanctioning, the Spanish and Portuguese expeditions generally were state adventures, especially considering that few persons of the time outside royalty could afford the initial capital expenditure necessary to outfit an entire expedition. The traditional reasons given for the conquistadors' motivation has always been threefold: gold, glory, and God—and not necessarily in that order.

It might seem strange, then, to say that to a surprising degree, within its own localized context, the Native American exploratory impulse is similar to its European counterpart. Yet spreading religion, acquiring wealth, securing advancing borders or pushing outward into frontier regions, and establishing trade and exchange over long distances are reasons that the two cultures share and that inform their respective exploratory impulses.

Caught up in expensive regional affairs tied to national defense, sustainability, and expansion, Europeans considered procuring wealth abroad a primary, if not necessary, motivation for royally sanctioned explorations. Gold acquired abroad for the state financed and sustained the monarchy back home. It should be said that patriotism had its limits. Private motivations must also be considered, and for the European explorer acquiring gold for the state usually translated into some form of personal wealth, if not in gold then either

in royalties or land, of which the conquistadors often claimed vast amounts as their own private estates.

While the individual conquistadors went in search of gold to aid the state with the explicit desire of attaining vast personal wealth, their private impulses were also inextricable from the acquisition of glory and personal fame. The third portion of the “gold, glory, and God” proposition was the moral sanctioning provided by the Catholic Church, whose own motivations were intricately intertwined with the expanding state. In general, beside each conquistador was a priest whose objective was converting the native population to Christianity, thereby providing the colonial impulse with its moral foundation.

Whereas the impulses, reasons, and motivations for European exploration are a matter of historical record, similar data for Native American examples are matters of archaeology and reconstructing imperfect prehistorical conditions. In this scenario impulse is often indecipherable, or an inferential deduction, from the material remains. For Native Americans religion, or cult, and state were often inseparable; consequently, spreading religion was a form of conscious imperialism. Throughout the Americas iconographic evidence gleaned from ceramic distribution indicates that the dispersal of imagery was akin to spreading a message, quite often of a religious nature, suggesting that territorial gain was accompanied and facilitated by religious imagery of the dominant or conquering polity.

For example, in South America images associated with the Wari and Tiwanaku cultures (ca. 500–ca. 1000) found far from their civic origin indicate expansion and control of an imperial nature. That the images are associated with cult religious trends indicates a level of coordination between empire and religion that is at least equal to the European example. However the campaigns ensued, it is clear that the exploratory impulse eventually resulted in consolidated religious influence. Similarly, far-reaching trade networks spread the new iconography over vast areas of the altiplano, or high plains.

For the state the accumulation of wealth carries both practical and symbolic connections. Accumulating wealth through conquest or through trade and exchange demands some form of exploration, both internally and externally. Whereas the wealth derived from European exploration was shipped overseas, exploration in the Americas was a more localized enterprise, even though energy expenditures remained high given that beasts of burden were unknown in Mesoamerica and North America and the llama was used as a pack animal in Andean South American.

Exploration for the Native American seems to have existed in contrary forms, either predicated by state expansion

and its increasing demand for goods acquired through trade or as a condition of a nomadic or seminomadic way of life. As with the Europeans, exploration for Native Americans was often inextricable from religious imperatives.

ASIA AND THE PACIFIC

BY TOM STREISSGUTH

Island dwellers of Southeast Asia were in constant need of land for settlement and cultivation. In search of new homelands, they had been exploring the western limits of the Pacific Ocean since the second millennium B.C.E. From the northern coast of New Guinea and nearby islands they set out in several waves of exploration across the Pacific Ocean. By the early medieval period they had reached Tonga and Samoa by sailing east through the islands of Melanesia (the island group lying immediately northeast of Australia). In the meantime a distinctively Polynesian culture was emerging, with its own social hierarchies, methods of cultivation, stone and wood carving methods, and languages.

Despite less favorable winds and currents, Polynesian explorers pushed eastward to the Mariana Islands and the Society Islands, which include the island of Tahiti. Eventually they reached Easter Island, at the western limits of the Pacific Ocean, as well as Hawaii and the two main islands of New Zealand, which were settled around 1000.

For these voyages the Polynesians developed sturdy, double-hulled canoes that were capable of navigating long voyages across the Pacific. These craft were 50 to 60 feet in length and held one or two masts for sails made of reed matting. Navigation was by observation of the clouds, stars, ocean waves and currents, and the flight patterns of migratory birds. A platform of beams lashed between the two hulls provided living space and storage. These ships were large enough to accommodate as many as two dozen colonists as well as food, weapons, domesticated animals, and a stock of plants and seedlings that provided a base for agriculture in a new homeland.

Historians trace the Polynesian migrations mainly through a study of oral tradition and linguistics. Legends on New Zealand tell of colonists who arrived from the Society Islands and the Cook Islands, while Hawaiian tradition relates that original settlers of that archipelago came from the island of Tahiti. The Polynesian tongues have been related to languages spoken in Southeast Asia, particularly the Indonesian archipelago. This language family also reached Madagascar, indicating that Southeast Asian explorers also sailed west across the Indian Ocean.

The philosophy of Buddhism spread through Asia mainly by the voyages of long-distance merchants, who called at ports

in Southeast Asia and traveled overland via the Himalayan passes to Tibet and the plains of southern China. Buddhism also inspired an epic voyage by a Chinese monk named Xuanzang, born in about 602. Troubled by the contradictions posed by Buddhist doctrines, Xuanzang resolved to search for original Buddhist texts in the homeland of the faith—India. At the age of 28, he set out from the town of Liangzhou. Two companions soon abandoned the journey, leaving Xuanzang to face the dangers alone. He survived a capture by river pirates and the attentions of a khan of western China, who was so taken with Xuanzang's ability that he ordered the young man to remain and join his court as a scholar. When the monk, in protest, refused to eat, the khan relented and rewarded him with enough money to pursue his explorations for the next 20 years.

It took Xuanzang four years to cross the deserts of central Asia and finally reach northern India. He traveled the length and breadth of the Indian Subcontinent, but he spent most of his time in the city of Nalanda, where he studied Buddhist holy books in their original Sanskrit language. After a voyage of 16 years, he finally returned to China in 645 with more than 500 cases of books and writings and soon began translating the texts he had collected. The emperor called him to the capital and ordered a full report. In reply Xuanzang set down *Records of the Western Regions of the Great Tang Dynasty*, the first account of a foreign exploration by a Chinese traveler, which became a key resource for later scholars.

After the fall of the Yuan Dynasty (1279–1368) China entered the period of the Ming Dynasty (1368–1644). The Ming emperors ruled what the Chinese knew as the Middle Kingdom, the center of the world that lay between the earth and heaven. It was a realm self-sufficient in food, resources, and technology, the most advanced in the world throughout the medieval period. The Chinese emperors had command of a vast bureaucracy of governors and administrators who strictly controlled the movement and the place of residence of their subjects, while tributary states beyond the borders paid money and allegiance to the emperors.

A faction of the Ming government favored exploration and expanded trade, and with this purpose in mind the Yongle Emperor (Zhu Di) of the early 15th century dispatched a trusted officer, the admiral Zheng He (ca. 1371–ca. 1433), at the head of a series of expeditions to the East Indies, Southeast Asia, India, and the Indian Ocean coasts of the Arabian Peninsula and Africa. Zheng He employed the compass, a Chinese invention of the 11th century, as well as a sophisticated system of flags and bells used for signaling. His first voyage set out in 1405 and included 62 vessels built and gathered at Nanjing, a port on the Yangtze River. The fleet was led by four immense flagships measuring 400 feet long and 160 feet wide.

The ships were specialized craft, each with a purpose, holding food and water, arms, trading goods, or horses.

The fleet reached Southeast Asia (including the island of Java), the Strait of Malacca, and finally Calicut, a trading post on the southwestern coast of India. There the Chinese remained until the spring of 1407, when they set off for the voyage home; during this voyage Zheng He fended off a series of assaults by pirates in the waters off Sumatra. A second voyage, from which the admiral was absent, returned to Calicut and remained there until 1409.

The third voyage of the Ming Dynasty treasure fleet lasted from 1409 to 1411. This expedition furthered China's trade with India and also defeated the king of Sri Lanka, who was taken in chains back to the Ming capital of Nanjing. On the fourth voyage Zheng He took 63 ships past the Strait of Hormuz and into the Persian Gulf, where the Chinese obtained a treasure of gemstones, pearls, and other valuables. A detachment of ships continued to the African coast, calling at Arab trading posts and trading with African states of the interior.

Ambassadors brought to China returned to their homelands during the fifth voyage from 1417 until 1419, but the emperor was eager to pursue trade with Africa and so ordered a sixth expedition, which was launched in the spring of 1421. This was the largest treasure fleet dispatched by the emperor, numbering more than 500 ships. According to one hypothesis, the armada divided itself at several points, with admirals dispatched on smaller fleets with instructions to sail to the limits of the earth. From artifacts, ship remains, local legends, and a few rare charts, the proponents of the "1421 hypothesis" have attempted to reconstruct these voyages and have come to the astonishing conclusion that Chinese navigators preceded the Spanish and Portuguese to the Western Hemisphere as well as the farthest reaches of the Pacific Ocean, by several generations. The hypothesis postulates, in brief, that Admiral Hong Bao sailed around the Cape of Good Hope, down to the Strait of Magellan and the tip of Antarctica, then east to Australia; another admiral, Zhou Man, sailed around the southern tip of South America and across the Pacific Ocean to the East Indies and the coasts of Australia and New Zealand. In the most improbable feat of arctic navigation, Zhou Wen left the fleet at the Cape Verde Islands, sailed north to the coast of North America, around the northern limit of Greenland, and then through the Arctic Ocean along the northern coasts of Siberia before returning to China.

Whatever the true achievements of the sixth treasure fleet, its return marked the beginning of the end of Chinese exploration. The emperor's death brought to the throne his grandson Zhu Zhanji as the Xuande Emperor (r. 1425–35). This ruler ordered a seventh voyage that left in 1433 and

turned out to be the last for Zheng He, who is believed to have died in the course of it. After the ships returned, the emperor ordered them broken up and ended trade and contact with all foreigners. Fearing the contamination of new modes of thought, the Chinese emperors began to isolate their realm from the rest of the world. They put up strong resistance to explorers and merchants who were arriving off their coasts in ever-greater numbers from Europe. With trade restricted and China largely cut off from the technological improvements that were occurring in Europe, the later Ming emperors presided over a gradual decline in China's economic fortunes that lasted through the end of the 20th century.

EUROPE

BY TOM STREISSGUTH

The first ocean explorers of medieval Europe may have been Irish. After the fall of the Western Roman Empire, Irish monasteries preserved the writings of the early Christian church fathers as well as classical writings of the Greeks and Romans. Irish monks roved the cold seas of the North Atlantic Ocean in small carracks, sturdy craft that easily handled strong winds and steep waves. Carracks sailed to the Hebrides, the Orkneys, and the Faeroe Islands and may have reached the shores of Iceland as well. One tradition described in the 10th-century manuscript *Navigatio sancti Brendani Abbatis* (The Voyage of Saint Brendan) holds that Saint Brendan of the sixth century set out from Galway and roamed the North Atlantic for several years before returning home. Some historians believe that Brendan may have reached Newfoundland, though no evidence has been uncovered to prove it.

The Irish were precursors to the Vikings of Norway, skilled mariners who sent entire fleets of longboats into the Atlantic to colonize Iceland, Greenland, and North America. According to some traditions, one of these intrepid Norsemen, Gunnbjörn Ulfsson, was blown off course and became the first European to lay eyes on a mass of sheet ice, glacial valleys, and rocky coast in the far north. Erik the Red sailed to this region in the late 10th century, naming it Greenland to attract settlers to what he promised was a fertile new land of opportunity. Erik had fled Norway after being involved in violence, and his penchant for trouble followed him to Iceland; he was banished from that country, prompting his excursion west.

The Vikings gradually ceased their raids on the European continent after two centuries of mayhem. A treaty had been signed, and the king of France had ceded Normandy. Norway, however, provided marginal land for a rising population, and many Norse still had few prospects at home. To escape poverty, colonizing expeditions made their way westward into

unknown seas and territory. Erik the Red explored Greenland for three years and in 985 founded the Western Settlement and the Eastern Settlement, both on the southwestern coast. These sites traded with Iceland and the homeland for three centuries before succumbing to the cold climate and disease outbreaks in the 14th century.

Erik's son, Leif Eriksson, voyaged as far as the northern reaches of Newfoundland, which he called Vinland for the prospect of growing wine grapes in the region. The settlement at what is now L'Anse aux Meadows struggled for several years with a harsh climate and conflict with hostile *skraelings*, or Native Americans. Trade with Europe was hindered by

EXPLORERS OF THE WHITE SEA

The ice-bound coasts of the Barents Sea and the White Sea was the last region in Europe to be explored and settled. The pioneers in this territory were settlers from medieval Novgorod, a principality of northern Russia and a center of shipbuilding and exploration. These seafarers, called Pomors, first arrived on the White Sea coast in the 12th century, when they founded the towns of Kholmogory and Kola. They explored northern Scandinavia, the Arctic Sea, the island of Novaya Zemlya, and the coasts and river mouths of northern Siberia. Expert navigators, they employed sundials, magnetic compasses, and star charts in finding their way along these featureless coasts.

The Pomors used a craft known as a *koch* that was adapted to travel in hazardous icebound seas. The *koch* had two masts for sails and an extra layer of oak planking to protect it from the ice. Its rounded hull allowed it to more easily escape the ice when surrounded. A false keel permitted the boat to be dragged across tundra or ice without damage to the hull. The *koch* carried two light anchors, which could be dropped on the ice or in the sea, as well as small iceboats, large sleds that could be used to transport people and cargo.

By the end of the medieval period the western European nations of England and Holland were sending expeditions to this region and seeking to open trade with Siberia, which in the 21st century is the last frontier of the Eurasian landmass. The Pomors survive as a distinct ethnic minority of northern Russia, living in and around Arkhangel'sk, the most northerly port in the world.

sea ice, storms, and long distances, which made the journey of several months in an open longboat a risky proposition, even for Norway's experienced navigators. Finally the site was abandoned, its people leaving behind scant but definitive evidence that the Norse were the first Europeans to colonize North America.

Italy's medieval explorers were motivated not by the prospect of settlement but by the promise of riches through trade with China and the other empires of Asia. In 1245 Giovanni da Pian del Carpine was the first to venture east, dispatched by Pope Innocent IV across the steppes and deserts of central Asia, to the Mongol khanates, the realms founded after the victorious campaigns of Genghis Khan in the 1220s. The pope sought information on the frightening horde of mounted archers who had ravaged central Asia, Persia, and the Middle East. He also may have wanted to form an alliance with the khans against the Muslims, with whom the Christians were still fighting for control of Jerusalem and fortifications in Palestine.

A disciple of Saint Francis of Assisi, Carpine left behind a record of his travels to the domain of Rus, founded by Swedish Vikings, and to the court of the Great Khan at Karakorum, in modern-day Mongolia. He detailed the journey to the court of Batu Khan, the ruler of the Golden Horde, which lay just north of the Caspian Sea. Carpine's party crossed the river of Syr Darya (the ancient Jaxartes), survived the deserts of what is now Xinjiang in western China and in the summer of 1246 reached Karakorum. Güyük Khan resisted the Christians' efforts to baptize him and instead sent a letter to the pope demanding that the Europeans submit to the authority of the Mongols.

Carpine was followed to the East by the Polo family, ambitious Italian merchants willing to risk the dangers of long-distance travel for a chance at opening trade with China. Niccolò and Maffeo Polo were traders from Constantinople who lived with the khan of the Golden Horde and later in the city of Bukhara (in modern-day Uzbekistan). In 1266 they reached Khanbalik (modern-day Beijing), a city of northern China that became the seat of Kublai Khan, a descendant of Genghis Khan. The Polos returned to Europe at Kublai Khan's request, to bring Christians east to educate his followers. On their second journey the Polos brought Niccolò's son Marco, who remained in the khan's service for several years as a diplomat and as the governor of the city of Yangzhou. Marco set down an account of his travels after returning to Europe, where he was briefly made a prisoner. *The Travels* gained a wide and admiring audience in Europe and inspired a lust for travel and exploration among many readers in the generations to follow.

The Iberian Peninsula was the base for important explorations of the distant reaches of the Atlantic Ocean begin-

ning in the 15th century. The Portuguese conquest of Ceuta, a Muslim port on the southern rim of the Mediterranean, brought information that a rich source of gold lay at the opposite end of trans-Saharan caravan trails, then controlled by Berber and Muslim merchants of North Africa. The common belief, however, was that sailing past Cape Bojador, at the western limit of the Sahara, was impossible. Winds and currents were contrary, and, it was thought, anyone foolish enough to venture past the cape would drop off the edge of the earth and never return.

Doubling Cape Bojador became possible with the caravel, a lighter and nimbler craft rigged to sail close to the wind if necessary. Hoping to bypass the overland trade routes and control a faster sea-lane to the gold fields of western Africa, Henry the Navigator, a son of the Portuguese king, began arranging voyages of exploration to the hazardous, uncharted waters. The Portuguese touched at Madeira, the Canary Islands, and the Azores; Gil Eanes passed Cape Bojador in 1434, and Diogo Gomes reached the Cape Verde Islands in 1455. The Portuguese built forts and trading posts at the river mouths and obtained gold, slaves, and ivory to sell in European markets.

After the death of Henry the Navigator, King João II continued royal patronage of sea exploration. The kingdom of Castile, Portugal's main rival, surrendered its rights to sail past Cape Bojador in 1479 and effectively gave up the Indian Ocean and the East Indies to the Portuguese. In 1487 Bartholomeu Dias became the first European to round the Cape of Good Hope, at the southern limit of Africa. Dias sailed for some distance up the eastern coast of Africa Vasco da Gama followed Dias's route in 1497, reaching India and opening the sea route to the East Indies. Returning to Portugal, da Gama's success inspired King Manuel to support another voyage by Pedro Álvares Cabral. Setting out in 1500, Cabral ran into a storm and was blown off course as far as the coast of Brazil. In the meantime, Portugal established fortified posts in India, Malaysia, and the Moluccas, or Spice Islands.

After the unification of Castile and Aragon by the marriage of Ferdinand and Isabella in 1492, Spain followed the lead of Portugal in exploration. After many years of trying and failing to win a patron, the Genoese mariner Christopher Columbus finally persuaded the Spanish monarchs to support his notion that the Indies could be reached by sailing west. Columbus reached San Salvador, a small island in the Bahamas, and returned with a report of success, not realizing that he had reached an entirely new hemisphere. Pope Alexander VI, the former Cardinal Rodrigo Borgia and a Spaniard, supported Spain's claims to the western islands. By signing the Treaty of Tordesillas in 1494, Portugal and Spain agreed to divide their discoveries along a meridian lying 370

leagues west of the Cape Verde Islands. Columbus returned three times to the Caribbean, discovering Hispaniola, Cuba, Jamaica, the northern coast of South America, and the eastern shores of Central America.

By the close of the medieval period a race was on among the European nations to explore and claim as much new land as possible in the hope of establishing settlements, mines, and farms that could be exploited as sources of raw materials and as consumer markets for home industries. Seeking a northerly route to Asia, the British hired the Italian captain Giovanni Caboto (also known as John Cabot), who made two voyages to the coasts of Canada before being lost at sea on his way home. During an expedition begun in 1501 Amerigo Vespucci, a member of a Spanish expedition under the command of Gonçalo Coelho, speculated that Europe had discovered a “new world,” and in honor of Vespucci the German mapmaker Martin Waldseemüller named the discovery America. The conquest and colonization of the Western Hemisphere by the Europeans would enrich the treasuries of the European kingdoms, ignite three centuries of intercontinental warfare, result in the death and enslavement of millions, and propel Europe to the forefront of the world economy.

THE ISLAMIC WORLD

BY BRADLEY SKEEN

The essence of much of Islamic exploration is captured in the Sinbad tales from the *Arabian Nights*—a collection of mostly Persian folk stories that is one of the cornerstones of Islamic literature—with individual merchants venturing off known routes and returning with fantastic tales of foreign lands. Such exploration was often performed along trade routes that had existed since antiquity but had never before been followed by Arabs and Islamic culture. Exploration usually was undertaken either by individual merchants seeking out new markets or by missionaries trying to convert foreigners, particularly foreign rulers, to Islam. Islamic cartography, the scientific codification of the results of exploration in maps and descriptive narratives, was based on that of the Roman Empire but was greatly expanded, since Arab merchants were far more active in central Asia, the Indian Ocean, and even the Pacific Ocean than were the Romans.

One of the most famous Islamic voyages of exploration was an embassy from the caliph al-Muqtadir to the king of the Volga Bulgars. In 920 the Bulgar king, who ruled territories on the Volga River on the border between Asia and Europe, well north of the Caspian Sea, sent a letter to the caliph offering to convert to the orthodox Islam practiced in Baghdad if the caliph would send an ambassador to instruct him and

would build a mosque for him. An ambassador, Nadhir al-Harami, was duly sent, leaving Baghdad on June 21, 921. His secretary, Ahmad ibn Fadlan, kept a diary of the 2,500-mile overland journey, and substantial fragments of this survived in a later geographical Arabic text.

The route Fadlan describes is extremely circuitous, perhaps because the traveling party wished to avoid the more direct route across the Caucasus Mountains and along the shores of the Caspian Sea, which was controlled by the Jewish Khazars. They headed far to the east in following the Silk Road, a network of trade routes with China that crossed central Asia. At Bukhara, in modern-day Uzbekistan, they left the trade route to follow the course of the Amu Dar'ya north to the Aral Sea, where they wintered at the town of al-Jurjaniya. Fadlan, used to the intense heat of the Baghdad climate, was amazed at the cold, remarking that he had to sleep under furs and blankets and that his beard became caked with ice from the freezing of the water vapor in his breath. The winter temperature in that region is usually just below the freezing point but can sometimes drop to as low as -104 degrees Fahrenheit; Fadlan reported that he learned there for the first time that men and animals alike can freeze to death.

The party finally reached the tents of the Bulgar king on May 12, 922. The effort to exploit the king's offer to convert to orthodox Islam ultimately failed because he also wished in exchange to be paid a large sum of money, to be used to build a fortress. In his journal, meanwhile, Fadlan continued to express amazement at the strangeness of the locale. The party was then around latitude 48 degrees north—about the same latitude as the U.S.-Canada border—and Fadlan saw for the first time the aurora borealis, also known as the northern lights. The king told him that the phenomena were manifestations of battles between tribes of jinn (supernatural creatures), with those that had converted to Islam fighting against those that had not. Fadlan observed that because of the short summer nights, the local Muslims combined the sunset and evening prayers, two of the five daily prayers required of all Muslims.

Modern Western interest in Fadlan's text has centered on his ethnographic description of traders from Kievan Rus at the Bulgar king's camp. This kingdom, centered in the area of modern-day Ukraine, was the precursor of Russia and is generally thought to have become organized by Vikings from Scandinavia who conquered the local Slavic population. Fadlan considered the Rus to be culturally—as well as racially—inferior to those from his native Baghdad. In his journal he dwells at great length on what he considers their drunkenness, poor hygiene, and sexual depravity, comparing them in these respects to donkeys. He similarly denigrates the “pagan” religion of the Rus in comparison to Islam.

Fadlan was an eyewitness to one of the elements of Viking society known best in modern times, the “Viking funeral,” as often featured in Hollywood films. An important Viking chieftain was cremated in a large ship, together with his grave goods, but the burning ship was not cast adrift on the water; rather, the entire ship was placed in a large grave dug in the ground and was covered over with a mound of earth, or barrow, after burning. The grave goods included expensive weapons, clothes, and furnishings, as the destruction of such costly objects was believed to honor the dead. Also, several domestic animals were sacrificed and placed in the ship to be burned. Fadlan demonstrates much interest in one of the dead chieftain’s slave girls who volunteered to be sacrificed as well. During the several days of necessary preparations, this girl was treated as a member of the aristocratic class and was given her own servants, with whom she prepared her master’s funeral clothing. On the day of the funeral, she had intercourse with several of the chieftain’s officers. At last she was hoisted on a sort of crane up into the sky, where she had an ecstatic vision of her master in paradise (Valhalla), where she believed she would shortly join him. She, too, was then ritually killed, and the entire assemblage was burned.

The first Muslims to voyage to India during the annual monsoon were missionaries. In 664 the Muslim scholars Malik ibn Dinar and Sharaf ibn Malik reached Kodungallur, on the southwest Indian coast, together with their students and families. They built the first mosque in India and thus initiated a series of missionary journeys that would continue through the Far East for the rest of the Middle Ages, with emissaries spreading out along the trade routes as far as southern China. Not long after the year 700, missionaries reached the city of Guangzhou, which became the center of Islamic culture and trade in southern China.

The tradition of Arabic geographical writing was originally based on the work of Greek geographical writers such as Aristotle and Ptolemy, with Arab travelers eventually pressing into areas unknown to the Greeks. Mohammed Abdul-Kassem ibn Hawqal (fl. 943–69) traveled the eastern African coast (probably with Arab merchants) as far as latitude 20 degrees south, to conclude in his book *Surat al-ardh* (The Face of the Earth) that Aristotle’s speculation that the equatorial regions were too hot for human life to exist was simply wrong. Abu Abd Allah Muhammad al-Idrisi (ca. 1100–65) worked for Roger II, a Christian king of Sicily, and produced updated versions of the maps in Ptolemy’s atlas using commercial and geographical learning from Islamic culture; these maps were still consulted as late as the time of Columbus. Ibn Jubayr (1145–1217) wrote an account of his travels around the Mediterranean that is more like modern travel literature than Is-

lamic geographical writing. Interestingly, he mostly traveled on Genoese (that is, Christian) merchant ships.

An unusual case with regard to exploration was that of Abu Abdullah Muhammad ibn Battuta who, strictly speaking, did not “explore” anything in the sense of discovering new geographical facts unknown to his civilization. He was, however, the most widely traveled man in the history of the world prior to the 19th century. Trained as a lawyer in his home city of Tangier, in Morocco, he set out at the age of 22 in 1325 on the hajj, the religious pilgrimage to Medina and Mecca. Once he had fulfilled this duty, Ibn Battuta did not stop traveling but, working as a merchant, judge, ambassador, or soldier and sometimes making repeated pilgrimages back to Mecca, he crisscrossed almost the entire Islamic world, from Spain to China, from southern Africa to the Balkans, and from central Asia to Timbuktu, covering a total distance of at least 75,000 miles. About 1353 he returned to Morocco, where he dictated his memoirs and lived without conducting any further travels, dying sometime after 1368.

A rare instance of exploration undertaken for the love of adventure is mentioned by al-Idrisi. He describes the voyage of a band of men from Lisbon who set out to find the Canary Islands (known from ancient Greek geographical writing), which lie in the Atlantic a few hundred miles off Morocco. They indeed found the islands, seemingly quite by chance, to discover an Arab already living there who could translate for them with the native Guanches; that man was the sole survivor of an early Arab voyage about which nothing more is known.

Perhaps the most outstanding Arab navigator and geographer at the end of the Middle Ages was Ahmad bin Majid (1421–ca. 1500). In his *Kitab al-fawaid fi usul ilm al-bahr wa l-qawaid* (Book of Useful Information on the Principles and Rules of Navigation) (1490), one of many geographical works, he describes the art of sailing upon the Indian Ocean, including the details of navigating the monsoon that made travel between the Red Sea and India possible. He also describes the technique of fixing a port’s latitude by observing the distance of Polaris, the North Star, above the horizon, a technique that was by then probably hundreds of years old in the Arab nautical tradition but was just being adopted by the Portuguese and other Europeans. Bin Majid was actually employed by the Portuguese explorer Vasco da Gama to navigate to India once the expedition had sailed around the southern cape of Africa. This renowned journey effectively ended the Islamic monopoly on trade between the Far East and Europe.

One last item worthy of mention was really more of an Arab cartographic experiment than a journey of exploration, but it bore the most important consequences for later exploration. In the early ninth century the Islamic astronomer al-Farghani (known in Western languages as Alfraganus; d. after

861) performed an experiment to determine the distance of one degree of longitude at the equator. Astronomical calculations were carried out to find two sets of two places in Iraq that were precisely 1 degree apart and were separated by flat, featureless land. The distances involved were physically measured with the equivalent of a yardstick. The result obtained indicated that 1 degree of longitude at the equator would be equal to 56⅔ Arab miles. Columbus happened to read this measurement in a Latin translation and therefore calculated that the distance going west by sea from Portugal to Japan, instead of the correct 12,000 miles, would be about 3,000 miles—in fact, the actual distance from Portugal to the West Indies. How was such an error made? Al-Farghani calculated in Arab miles; converted into modern units, the result of his calculations is a figure between 67 and 70 miles, and indeed

the actual figure is 69 miles. But Columbus made the mistake of interpreting the word *mile* in terms of the much shorter Italian nautical miles with which he was familiar, giving the badly incorrect figure on which he based his plans.

See also AGRICULTURE; ASTRONOMY; BORDERS AND FRONTIERS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EMPIRES AND DYNASTIES; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; INVENTIONS; LITERATURE; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SCIENCE; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

Asia and the Pacific

~ Ma Duanlin, Wen hsien t'ung k'ao (*Encyclopedia of Government Institutions, late 13th century*) ~

The Wai-kuo-t'u ["map of foreign countries"] says: From Yung-ch'en north there is a country called Ta-ts'in. These people are of great size; they measure five or six ch'ih [six to seven feet] in height. The Kuei-huan-hsing-ching-chi says: The Fu-lin country is in the west of Shan [Armenia], separated by hills several thousand li; it is also called Ta-ts'in. Its inhabitants have red and white faces. Men wear plain clothes, but women wear silk stuffs beset with pearls. They have many clever weavers of silk. Prisoners are kept in the frontier states till death without their being brought back to their home. In the manufacture of glass they are not equaled by any nation of the world. The royal city is eighty li square; the country in all directions measures several thousand li. Their army consists of about a million men. They have constantly to provide against the Ta-shih. On the west the country bounds on the western sea [the Mediterranean]; on the south, on the southern sea [Red Sea?]; in the north it connects with K'o-sa T'u-ch'ueh [the Khazars]. In the western sea there is a market where a silent agreement exists between buyer and seller that, if the one is coming the other will go, and vice-versa; the seller will first spread out his goods, and the purchaser will afterwards produce their equivalents, which have to wait by the side of the articles to be sold

till received by the seller, after which the purchase may be taken delivery of. They call this a spirit market.

There is also a report that in the west there is the country of women who, being affected by the influence of water, give birth to children. It is further said: the country of Mo-lin [Alwa, or Upper Nubia] is on the south-west of the country of Yang-sa-lo [Jerusalem?]; crossing the great desert 2,000 li you come to this country. Its inhabitants are black and of ferocious manners. Cereals are scarce, and there is no vegetation in the way of shrubs and trees; horses are fed on dried fish; men eat *hu-mang*, that is, the Persian date. The country is very malarious. The hill tribes which one has to pass in pursuing the overland road of these countries are of the same race. Of religions there are several kinds: there is the Ta-shih, the Ta-ts'in, and the Hsun-hsun religion; The Hsun-hsun have most frequent illicit intercourse with barbarians; while eating they do not speak. Those who belong to the religion of Ta-shih have a rule by which brothers, children and other relatives may be impeached for crime without implicating their kin, even if the crime be brought home to them. They do not eat the flesh of pigs, dogs, donkeys, and horses; they do not prostrate or kneel down before the king, nor before father or mother, to show their veneration;

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they do not believe in spirits and sacrifice to heaven alone. Every seventh day is a holiday, when they will refrain from trade and not go in or out, but drink wine and yield to dissipation till the day is finished. The Ta-ts'in are good physicians in eye-diseases and diarrhea, whether by looking to matters before the disease has broken out or whether by extracting worms from the brain [trepanning].

In the south-east of this country you go to Chiao-chih [Cochin China]; there is also a water-road communicating with the I-chou and Yung-ch'ang principalities [both in the present Yunnan]. Many rare things come from there. It is said that in the west of Ta-ts'in there is the water of a sea; west of the seawater there is a river; the river flows south-west; west of the river there are hills extending from south to north; west of the hills there is the Red Water; west of this is the White Jade Hill; west of the Jade Hill is the Hill of the Hsi-wang-mu [western king's mother] who lives in a temple built of jadestone. Coming from the western boundary of Ar-hsi [Parthia], following the crooked shape of the sea, you also come to Ta-ts'in [at Aelana (modern Elat)], bending round over 10,000 li. Although in that country the sun, the moon, and the constellations appear not different from what they are in Zhongguo, former historians say that in the west of T'iao-chih [Babylonia] you go a hundred li to the place where the sun sets; this is far from being true. . . .

The Dwarfs. These are in the south of Ta-ts'in. They are scarcely three ch'ih [four feet] large. When they work in the fields they are afraid of being devoured by cranes. Whenever Ta-ts'in has rendered them any assistance, the Dwarfs give them all they can afford in the way of precious stones to show their gratitude. The Hsuan-ch'u. Their country contains many "birds of nine colors," with blue pecks, green necks, red-brown wings, red breasts, purple crests, vermilion feet, jade-colored bodies, yellowish backs, and blackish tails. Another name of this animal is "bird of nine tails," or chin-feng [the brocaded phoenix]. Those which have more blue than red on them are called Hsiu-luan [embroidered argus pheasant]. These birds usually come from the west of the Jo-shui [weak water]. Some say that it is the bird of the Hsi-wang-mu [western king's mother]. The coins of the country are the same as those of the country of San-t'ung. The San-t'ung are a thousand li south-west of Hsuan-ch'u. The inhabitants have three eyes, and sometimes four tongues by means of which they may produce one kind of sound and speak one language. They trade in plantains, also in rhinoceros' horns and ivory; they make golden coins on which they imitate the king's, also the queen's face [with the king's together.]; if the husband is changed, they use the king's face; if the king dies, they re-melt the coin. The above three countries border on Ta-ts'in whence they are here appended.

From: Friedrich Hirth, *China and the Roman Orient: Researches into their Ancient and Mediaeval Relations as Represented in Old Chinese Records* (Munich, Germany: G. Hirth, 1885).

Europe

~ "The Voyages to Vinland," excerpt from The Saga of Eric the Red (1387) ~

Here Begins the Brief History of the Greenlanders

. . . There was now much talk about voyages of discovery. Leif, the son of Eric the Red, of Brattahlid, visited Biarni Heriulfsson and bought a ship of him, and collected a crew, until they formed altogether a company of thirty-five men. Leif invited his father, Eric, to become the leader of the expedition, but Eric declined, saying that he was then stricken in years, and adding that he was less able to endure the exposure of sea life than he had been. Leif

replied that he would nevertheless be the one who would be most apt to bring good luck and Eric yielded to Leif's solicitation, and rode from home when they were ready to sail. When he was but a short distance from the ship, the horse which Eric was riding stumbled, and he was thrown from his back and wounded his foot, whereupon he exclaimed, "It is not designed for me to discover more lands than the one in which we are now living, nor can we now continue longer together." Eric returned home to

Brattahlid, and Leif pursued his way to the ship with his companions, thirty-five men. One of the company was a German, named Tyrker. They put the ship in order; and, when they were ready, they sailed out to sea, and found first that land which Biarni and his shipmates found last. They sailed up to the land, and cast anchor, and launched a boat, and went ashore, and saw no grass there. Great ice mountains lay inland back from the sea, and it was as a [tableland of] flat rock all the way from the sea to the ice mountains; and the country seemed to them to be entirely devoid of good qualities. Then said Leif, "It has not come to pass with us in regard to this land as with Biarni, that we have not gone upon it. To this country I will now give a name, and call it Helluland." They returned to the ship, put out to sea, and found a second land. They sailed again to the land, and came to anchor, and launched the boat, and went ashore. This was a level wooded land; and there were broad stretches of white sand where they went, and the land was level by the sea. Then said Leif, "This land shall have a name after its nature; and we will call it Markland." They returned to the ship forthwith, and sailed away upon the main with north-east winds, and were out two "doegr" before they sighted land. They sailed toward this land, and came to an island which lay to the northward off the land. There they went ashore and looked about them, the weather being fine, and they observed that there was dew upon the grass, and it so happened that they touched the dew with their hands, and touched their hands to their mouths, and it seemed to them that they had never before tasted anything so sweet as this. They went aboard their ship again and sailed into a certain sound, which lay between the island and a cape, which jutted out from the land on the north, and they stood in westerling past the cape. At ebb-tide, there were broad reaches of shallow water there, and they ran their ship aground there, and it was a long distance from the ship to the ocean; yet were they so anxious to go ashore that they could not wait until the tide should rise under their ship, but hastened to the land, where a certain river flows out from a lake. As soon as the tide rose beneath their ship, however, they took the boat and rowed to the ship, which they conveyed up the river, and so into the lake, where they cast anchor and carried their hammocks ashore from the ship, and built themselves booths there. They afterward determined to establish themselves there for the winter, and they accordingly built a large house. There was no lack of salmon there either in the river or in the lake, and larger salmon than they had ever seen

before. The country thereabouts seemed to be possessed of such good qualities that cattle would need no fodder there during the winters. There was no frost there in the winters, and the grass withered but little. The days and nights there were of more nearly equal length than in Greenland or Iceland. On the shortest day of winter, the sun was up between "eykarstad" and "dagmalastad." When they had completed their house, Leif said to his companions, "I propose now to divide our company into two groups, and to set about an exploration of the country. One-half of our party shall remain at home at the house, while the other half shall investigate the land; and they must not go beyond a point from which they can return home the same evening, and are not to separate [from each other]. Thus they did for a time. Leif, himself, by turns joined the exploring party, or remained behind at the house. Leif was a large a powerful man, and of a most imposing bearing—a man of sagacity, and a very just man in all things. . . .

It was discovered one evening that one of their company was missing; and this proved to be Tyrker, the German. Leif was sorely troubled by this, for Tyrker had lived with Leif and his father for a long time, and had been very devoted to Leif when he was a child. Leif severely reprimanded his companions, and prepared to go in search of him, taking twelve men with him. They had proceeded but a short distance from the house, when they were met by Tyrker, whom they received most cordially. . . . Leif addressed him, and asked, "Wherefore art thou so belated, foster-father mine, and astray from the others?" In the beginning Tyrker spoke for some time in German, rolling his eyes and grinning, and they could not understand him; but after a time he addressed them in the Northern tongue: "I did not go much further [than you], and yet I have something of novelty to relate. I have found vines and grapes." . . . They slept the night through, and on the morrow Leif said to his shipmates, "We will now divide our labors, and each day will either gather grapes or cut vines and fell trees, so as to obtain a cargo of these for my ship." They acted upon this advice, and it is said that their after-boat was filled with grapes. A cargo sufficient for the ship was cut, and when the spring came they made their ship ready, and sailed away; and from its products Leif gave the land a name, and called it Wineland.

From: American Historical Documents, 1000–1904. New York: P. F. Collier, 1910).

The Islamic World

~ Excerpt from *"The First Voyage," The Seven Voyages of Sinbad the Sailor (ca. 800–ca. 1400)* ~

I had inherited considerable wealth from my parents, and being young and foolish I at first squandered it recklessly upon every kind of pleasure, but presently, finding that riches speedily take to themselves wings if managed as badly as I was managing mine, and remembering also that to be old and poor is misery indeed, I began to bethink me of how I could make the best of what still remained to me. I sold all my household goods by public auction, and joined a company of merchants who traded by sea, embarking with them at Balsora in a ship which we had fitted out between us.

We set sail and took our course towards the East Indies by the Persian Gulf, having the coast of Persia upon our left hand and upon our right the shores of Arabia Felix. I was at first much troubled by the uneasy motion of the vessel, but speedily recovered my health, and since that hour have been no more plagued by sea-sickness.

From time to time we landed at various islands, where we sold or exchanged our merchandise, and one day, when the wind dropped suddenly, we found ourselves becalmed close to a small island like a green meadow, which only rose slightly above the surface of the water. Our sails were furled, and the captain gave permission to all who wished to land for a while and amuse themselves. I was among the number, but when after strolling about for some time we lighted a fire and sat down to enjoy the repast which we had brought with us, we were startled by a sudden and violent trembling of the island, while at the same moment those left upon the ship set up an outcry bidding us come on board for our lives, since what we had taken for an island was nothing but the back of a sleeping whale. Those who were nearest to the boat threw themselves into it, others sprang into the sea, but before I could save myself the whale plunged suddenly into the depths of the ocean, leaving me clinging to a piece of the wood which we had brought to make our fire. Meanwhile a breeze had sprung up, and in the confusion that ensued on board our vessel in hoisting the sails and taking up those who were in the boat and clinging to its sides, no one missed me and I was left at the mercy of the waves. All that day I floated up and down, now beaten this way, now that,

and when night fell I despaired for my life; but, weary and spent as I was, I clung to my frail support, and great was my joy when the morning light showed me that I had drifted against an island.

The cliffs were high and steep, but luckily for me some tree-roots protruded in places, and by their aid I climbed up at last, and stretched myself upon the turf at the top, where I lay, more dead than alive, till the sun was high in the heavens. By that time I was very hungry, but after some searching I came upon some eatable herbs, and a spring of clear water, and much refreshed I set out to explore the island. Presently I reached a great plain where a grazing horse was tethered, and as I stood looking at it I heard voices talking apparently underground, and in a moment a man appeared who asked me how I came upon the island. I told him my adventures, and heard in return that he was one of the grooms of Mihrage, the king of the island, and that each year they came to feed their master's horses in this plain. He took me to a cave where his companions were assembled, and when I had eaten of the food they set before me, they bade me think myself fortunate to have come upon them when I did, since they were going back to their master on the morrow, and without their aid I could certainly never have found my way to the inhabited part of the island.

Early the next morning we accordingly set out, and when we reached the capital I was graciously received by the king, to whom I related my adventures, upon which he ordered that I should be well cared for and provided with such things as I needed. Being a merchant I sought out men of my own profession, and particularly those who came from foreign countries, as I hoped in this way to hear news from Bagdad, and find out some means of returning thither, for the capital was situated upon the sea-shore, and visited by vessels from all parts of the world. In the meantime I heard many curious things, and answered many questions concerning my own country, for I talked willingly with all who came to me. Also to while away the time of waiting I explored a little island named Cassel, which belonged to King Mihrage, and which was supposed to be inhabited by a spirit named Deggal. Indeed, the sailors assured

me that often at night the playing of timbals could be heard upon it. However, I saw nothing strange upon my voyage, saving some fish that were full two hundred cubits long, but were fortunately more in dread of us than even we were of them, and fled from us if we did but strike upon a board to frighten them. Other fishes there were only a cubit long which had heads like owls.

One day after my return, as I went down to the quay, I saw a ship which had just cast anchor, and was discharging her cargo, while the merchants to whom it belonged were busily directing the removal of it to their warehouses. Drawing nearer I presently noticed that my own name was marked upon some of the packages, and after having carefully examined them, I felt sure that they were indeed those which I had put on board our ship at Balsora. I then recognised the captain of the vessel, but as I was certain that he believed me to be dead, I went up to him and asked who owned the packages that I was looking at.

"There was on board my ship," he replied, "a merchant of Bagdad named Sindbad. One day he and several of my other passengers landed upon what we supposed to be an island, but which was really an enormous whale floating asleep upon the waves. No sooner did it feel upon its back the heat of the fire which had been kindled, than it plunged into the depths of the sea. Several of the people who were upon it perished in the waters, and among others this unlucky Sindbad. This merchandise is his, but I have resolved to dispose of it

for the benefit of his family if I should ever chance to meet with them."

"Captain," said I, "I am that Sindbad whom you believe to be dead, and these are my possessions!" . . .

Throwing himself upon my neck he exclaimed, "Heaven be praised that you have escaped from so great a danger. As to your goods, I pray you take them, and dispose of them as you please." I thanked him, and praised his honesty, begging him to accept several bales of merchandise in token of my gratitude, but he would take nothing. Of the choicest of my goods I prepared a present for King Mihrage, who was at first amazed, having known that I had lost my all. However, when I had explained to him how my bales had been miraculously restored to me, he graciously accepted my gifts, and in return gave me many valuable things. I then took leave of him, and exchanging my merchandise for sandal and aloes wood, camphor, nutmegs, cloves, pepper, and ginger, I embarked upon the same vessel and traded so successfully upon our homeward voyage that I arrived in Balsora with about one hundred thousand sequins. My family received me with as much joy as I felt upon seeing them once more. I bought land and slaves, and built a great house in which I resolved to live happily, and in the enjoyment of all the pleasures of life to forget my past sufferings.

From: Andrew Lang, ed., *The Arabian Nights' Entertainments* (London: Longmans, Green and Co., 1898).

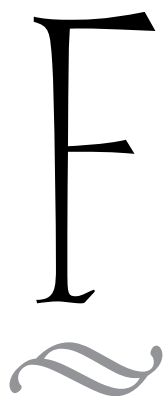
FURTHER READING

- Pier Donini, *Arab Travelers and Geographers* (London: Immel, 1991).
- Ross E. Dunn, *The Adventures of Ibn Battuta, a Muslim Traveler of the Fourteenth Century*, rev. ed. (Berkeley: University of California Press, 2004).
- James Robert Enterline, Erikson, *Eskimos, and Columbus: Medieval European Knowledge of America* (Baltimore: Johns Hopkins University Press, 2004).
- Felipe Fernández-Armesto, *Pathfinders: A Global History of Exploration* (New York: Norton, 2006).
- John Block Friedman and Kristen Mossler Figg, eds., *Trade, Travel and Exploration in the Middle Ages: An Encyclopedia* (New York: Garland, 2000).
- Frances Carney Gies, "To Travel the Earth," *Saudi Aramco World* 29, no. 1 (1978): 18–27. Available online. URL: <http://www.saudiaramcoworld.com/issue/197801/to.travel.the.earth.htm>. Downloaded on September 10, 2007.
- Ibn Jubayr, *The Travels of Ibn Jubayr*, trans. Roland Broadhurst (London: Jonathan Cape, 1952).
- Gavin Menzies, *1421: The Year China Discovered America* (New York: Harper Perennial, 2004).
- James E. Montgomery, "Ibn Fadlan and the Rusiyyah," *Journal of Arabic and Islamic Studies* 3 (2000): 1–25.
- David Northrup, *Africa's Discovery of Europe: 1450–1850* (New York: Oxford University Press, 2002).
- The Oxford Atlas of Exploration* (New York: Oxford University Press, 1997).
- Paul Rozario, *Zheng He and the Treasure Fleet, 1405–1433: A Modern-Day Traveller's Guide from Antiquity to the Present* (Singapore: SNP International, 2005).
- Andrea Felber Seligman, "Ambassadors, Explorers, and Allies: A Study of African–European Diplomatic Relationships, 1400–1600." Available online. URL: <http://repository.upenn.edu/cgi/viewcontent.cgi?article=1066&context=curej>. Downloaded on August 29, 2007.

"Sinbad the Seaman." In *The Book of the Thousand Nights and a Night: A Plain and Literal Translation of the Arabian Nights Entertainments*, vol. 6, trans. Richard F. Burton (London: Burton Society, 1885). Available online. URL: http://www.wollamshram.ca/1001/Vol_6/vol6.htm. Downloaded on September 10, 2007.

Caroline Stone, "Ibn Fadlan and the Land of the Midnight Sun," *Saudi Aramco World* 30, no. 2 (1979): 2–3.

John Thornton, *Africa and Africans in the Making of the Atlantic World, 1400–1800* (Cambridge, U.K.: Cambridge University Press, 1998).



► family

INTRODUCTION

The family has long been the ugly stepchild of history. Traditional history focuses on politics, wars, and revolutions but not the ordinary happenings of everyday life. The private world, one dominated by women, simply seemed too common to be of any scholarly interest. In the 1970s this situation began to change gradually as historians examined social and cultural history. However, all of the problems of family history have not been resolved. Emotional history and sexual history remain fields with major gaps of knowledge at the start of the 21st century. The very definition of a family also differs from region to region, thereby complicating studies of the family. While the medieval Europeans established nuclear families, Africans lived in clans, with family relationships extending far beyond the nuclear family. A father or mother to a medieval African was not the same as a father or mother to a medieval European or Asian.

Scholars of the family have been burdened with a lack of sources. For many regions, including the Americas, most evidence about family life must be drawn from archaeological sources. Attempts to do justice to women of the medieval period have encountered special difficulties owing to the character of the documentary sources that are typically used. The writings of church leaders and theologians have been repeatedly cited, with little consideration of the accuracy of their descriptions of conditions or of their audience.

By a similar method of investigation, a modern scholar might conclude that modern Catholics never practice birth control. Law books and manuals have also been misleading. William Blackstone's 18th-century pronouncement that European women lacked any legal rights in the medieval era enjoyed wide acceptance until the 1970s.

Childbearing is at the heart of the family. It is also one of the few aspects of medieval life that was not shaped by class standing or wealth. Rich or poor, women suffered and were injured in labor. Often, they died during birth, along with the child. Contraception by mechanical, medicinal, and magical means found limited use in all cultures, though it had little effectiveness. Abortion and infanticide apparently had been practiced since ancient times in all regions of the world and continued in the medieval era. Females were the targets of infanticide much more than males because the cost of raising a daughter and providing a dowry were more costly than the labor that she could provide to a family. However, females in the Americas and Africa seem to have been much more highly regarded than females in Europe, Asia, and the Islamic world. American and African women were valued for their childbearing and ability to link clans. This valuation probably reduced female infanticide rates in this region.

The gender roles of men and women influenced all aspects of the family. Males and females in Europe, Asia, and the Islamic world had different ages of consent, and a double standard gave sexual freedom to the man but not the woman. While the Islamic world emphasized polygamy (where either spouse could

have more than one mate), Europeans celebrated celibacy and practiced monogamy. In the Americas polygyny (where only the man could have more than one mate) was apparently common, and it clearly was established as a widespread practice in medieval Africa. In Europe, Asia, and the Islamic world women in general were secluded in harems or segregated at home away from the male worlds of business, politics, and religion. In the Americas and Africa women enjoyed both greater power and more freedom. Again, the inhabitants of the Americas and Africa seem to have had far more equality than men and women in other parts of the medieval world.

Throughout the world there has been a distinction between men's work and women's work. Activities within the household have been considered feminine, with a strong connotation of inferior importance except in the Americas. Men's work has involved the more socially valued tasks of governing, fighting, and providing family wealth. Accordingly, men generally have been provided with educations outside the home, while women have been restricted to learning how to cook and make clothing for the family and engage in other household-related tasks. Women had limited legal rights outside the home, including limits on taking legal action, such as suing, pleading in court, giving evidence, or witnessing wills.

The medieval world was largely a man's world. Women and children resided in a realm that had little relative importance. As a result, much evidence about the medieval family has been lost to the ages.

AFRICA

BY AMY HACKNEY BLACKWELL

The family and family relations were at the center of all significant life events in medieval Africa. African peoples had many different family types, and it is impossible to provide one single definition of a medieval African family. In most African societies, however, people defined themselves in terms of their positions within their families.

The largest family unit was the clan, which comprised many people related by blood and marriage. The clan was one of the most important social units in African societies. Among the Bantu, for example, family relationships extended far beyond the nuclear family. Bantu children called all their father's brothers "father," all their mother's sisters "mother," and all the children of those two relatives "sister" or "brother." Children of the father's sisters were considered cousins. Among many Bantu peoples the clan made all important decisions, and individuals did not have much say in their own lives. For example, when a man died the clan would choose who would inherit his property.

African peoples had both patrilineal and matrilineal clan systems. In a patrilineal system people traced their ancestry through their fathers and the male line. The Bantu had a patrilineal system. People living under a matrilineal system traced ancestry through their mothers. Patrilineal systems were more common.

The clan often arranged marriages among members, choosing partners based on their family relationships and statuses. Incest between blood relatives was taboo and strictly avoided. Definitions of incest, however, varied from people to people. In some southern African cultures marriage between cousins was desirable, whereas in others it was abhorrent. Individuals might request particular partners and use go-betweens to negotiate between the families. Fathers might speak to one another to arrange a match between their children.

Throughout African grooms had to pay the bride's family a bride-price—property or money paid in exchange for the bride's presence, including her work and her children. The bride-price frequently was paid in livestock, such as goats or cattle, but it could also include pots, baskets, lengths of cloth, or metal goods. The higher the status of the bride's family the higher was her bride-price.

In most marriages brides were younger than their grooms, sometimes much younger. Many tribes commonly betrothed infants or children. In Somalia men could become engaged to women who were not yet born. Actual marriages and sexual intercourse did not usually take place until the bride reached puberty, though this was not always the case. Men were not allowed to marry until they were quite mature and owned enough property to support a wife.

In some cultures, usually hunter-gatherers such as the small people of the central African forests or the inhabitants of the southern deserts, weddings took place almost casually, when a man and woman decided to live together and produced a child. In most places, however, wedding ceremonies were joyous occasions involving the entire clan. The bride was the star of the wedding, accorded respect because she would provide the link between the families' ancestors and descendants. Weddings involved singing, dancing, feasting, and special costumes. The marriage might occur in several stages over a number of years, especially when children were betrothed. There might first be a betrothal ceremony to celebrate the marriage contract. When the bride was old enough, she might go to her husband's house for brief visits, during which she might sleep with her husband but would spend most of her time at her father's house. Among some peoples the bride might not live permanently with her husband until their first child was two or three years old.

Where the married couple lived was determined by whether the society was patrilineal or matrilineal. In a matri-

lineal society the groom would go to live with his wife's family in their village. In a patrilineal society the bride would live with her husband's family. Nuclear families were not the most common living arrangement in most of Africa. Instead, people thought of themselves as living in extended families. A couple might share a hut with their youngest baby, but in some places such as Senegal it was common for husbands and wives to sleep in separate huts. A wife might cook in her mother's or mother-in-law's house, sharing the food and the work with a group of relatives.

Clans decided what would happen to a family when a husband or wife died. Often if a man died, his brother or another close male relative became responsible for his widow and children. This man would adopt the children as his own and make no distinction between them and his own offspring. Even if the parents were not dead, it was not unusual for an uncle or other relative to adopt a child, especially from a family that had many children.

Polygyny, the practice of a man having more than one wife, was fairly common throughout Africa. It was allowed under many traditional religions. Islam also allowed men to have several wives, which meshed well with traditional practices in some areas. As a practical matter most men did not take more than one wife. Maintaining wives was expensive, and keeping more than one family happy could be complicated. Generally only chiefs and wealthy men practiced po-

lygyny, and some kings reportedly had hundreds of wives. In a polygynous household the first wife had the highest status and often had a say over whether the husband could introduce more wives. Although one man's wives might benefit by sharing work, often the women did not get along with one another and would try to make one another's lives difficult. Typically a husband favored the newer and usually younger wife, which caused feelings of jealousy among all his previous wives.

Extramarital affairs were fairly common among African peoples. It was not unusual for a man to sleep with the wives of his male relatives; a son was particularly prone to sleeping with his father's many wives (though not with his own mother). Taking lovers was often tolerated. In some societies, however, women caught in adultery were punished more harshly than men under the same circumstances.

Divorce occurred regularly among most African groups. Sometimes it was caused by extramarital affairs. Other causes were barrenness, witchcraft, and bad temper. Depending on the group, either sex could initiate divorce proceedings. Usually this would involve a public hearing in which the partners would list their grievances in front of elders. If a divorce was granted, the parties had to arrange their communal property. The woman's family might have to refund her bride-price, and the partner at fault could lose rights to the produce of a harvest or hunt.

FAMILIES OF THE SMALL-STATURED PEOPLE OF CENTRAL AFRICA

The small people who inhabited the jungles of central Africa had a fairly simple family structure. The basic social unit was a nuclear family: a man, a woman, and their children. Marriages happened almost casually. A man and woman might live together for a time and then wander apart to search for other partners. The community would not acknowledge a marriage as complete until the couple had produced a child, but even then the pair might separate. Occasionally a man would end up with two wives; this could occur if he and his first partner separated and he found another spouse, only to have his first wife return.

The small-statured people of central Africa passed their property along gender lines. Mothers passed their baskets, knives, and pots to their daughters. Men passed their bows and arrows, spears, and hunting nets to their sons. If parents died young, their siblings or other relatives would hold their goods in trust for their children.

These people did not have the elaborate clan system of other African peoples. The small people hunted in bands of several families, but these groups were flexible and did not always include the same members. This allowed the hunting parties to share their game equally, with all members being treated the same for participating in the hunt, instead of being treated preferentially out of kin obligations. Each member of the party would be called by a specific kin name that determined which portion of the catch went to whom.

The small-statured people of central Africa addressed one another by family terms, such as *grandfather* or *brother*, but these terms did not correspond exactly to a person's position in a family. For instance, it was not unusual for a boy to call his older brother "father" if the difference in their ages was great. The term *sibling* could also mean "friend." Children would call all older women "mother" and all men "father." All men and all women would act as parents to all children in their group. Husbands and wives addressed one another as "man" or "woman."

Childbirth often occurred in some private setting, away from settlements and crowds. Women among the hunter-gatherers of the southern deserts and jungles would go off by themselves to give birth. In more settled groups women might go to a special hut to give birth with the aid of other women. Childbirth was dangerous, and many women and infants died in the process. Women whose genitals had been modified by cutting and sewing were particularly prone to complications such as bleeding and infection.

Women tried to space their births so that they would not have too many young babies at once. Their most effective methods of spacing births were extended breast-feeding, which can suppress fertility, and taboos on intercourse while breast-feeding. Infanticide immediately after birth was common, especially if a mother had another child who was still nursing and needed to be carried. Keeping a newborn could jeopardize the lives of both babies. If a woman decided not to keep her infant, she might smother it or bury it or simply leave it lying on the ground in the bush. When she returned to her village no one would question her.

If a woman did keep her newborn, she might spend several days in seclusion before rejoining her village or group. Newborns often died during their first days of life, so tribes would wait several days before acknowledging them. If the child was still alive after about three to seven days, it would be named, and the village would celebrate the birth with a feast and hold a naming ceremony. The child's name was very important. The parents might choose the name, but often a village elder performed this task, selecting a name that reflected the child's position in his or her lineage or communicated some desirable trait such as courage. Some villages performed tests before the naming ceremony to determine the child's legitimacy; for example, the grandmother might drop the umbilical cord into a container of milk to see if it floated. If it sank, the child would be considered illegitimate.

Within the household men and women performed different jobs determined by culture and tradition. Men typically did the hunting and might be in charge of a particular crop. Women might grow their own crops; in western Africa, for example, women often grew the rice. Women typically did the cooking and might cook for their grown sons even after they had moved into their own huts. Among pastoralists women did much of the work of milking the livestock. Both sexes might weave cloth, depending on the society. The presence of people within a family constituted part of its wealth. It enhanced a man's status to have several wives and many children. These people could all contribute work to the household, which increased its harvests and the size of its herds.

A person did not leave a clan simply by dying. African peoples believed that their ancestors continued to live near

them and influence their daily lives. Bantu people had poets who memorized lengthy lists of ancestors, going back many generations. At naming ceremonies these poets would perform, singing the story of the clan by reciting the names of its former members. Because ancestors were so important, families followed specific rituals when handling their dead. Every clan had its own funeral customs. Some buried their dead within the village; others had burial grounds some distance from living areas.

THE AMERICAS

BY ANGELA HERREN

Throughout the Americas the period from 450 to 1500 marked the transition in many regions from scattered hamlets or villages to dense concentrations of residential groupings that sprang up around ceremonial centers and supported populations in the tens of thousands. While some groups continued nomadic or seminomadic ways of life supported by hunting, fishing, and gathering activities, others developed intensive agricultural production and trade activities that supported some of the largest metropolitan centers in the early Americas, changing the family experience forever.

In native North America many cultures maintained a nomadic hunting-gathering existence through the first millennium of the Common Era, congregating in small settlements with impermanent architecture. However, the cultivation of staple crops like corn, beans, and squash led to the establishment of permanent villages in the Four Corners region of the American Southwest, the area where the borders of Utah, Colorado, Arizona, and New Mexico meet. In the fifth century families lived in pit houses—underground single-room structures with earth-roofed domes. By the eighth and ninth centuries multiroom masonry structures dominated, giving way to compact villages like Pueblo Bonito, which housed more than 1,200 people at the beginning of the 10th century. The multifamily dwelling units of the Anasazi (ca. 900–ca. 1300) represent some of the earliest permanent architectural structures in North America. Often built into protective overhanging cliffs, these mud-brick structures integrated domestic family units, storage and working areas, and underground ritual spaces called kivas. The Hopi, the Zuni, and the Pueblo peoples of the Rio Grande are descendants of the Anasazi.

In Mesoamerica archaeological remains indicate that in areas of high population density many families lived in clusters surrounding a civic or ceremonial core. Skeletal remains document the practice of cranial deformation, the shaping of the soft skull of an infant with boards to achieve a desired profile, and indicate a high infant mortality rate. Information recorded at the time of European encounters in the 16th



Stone sculpture of Tlazolteotl, a goddess associated with fertility, Huastec culture, Mexico, ca. 900–1521 (© The Trustees of the British Museum)

century provides greater detail about family traditions surrounding marriage, pregnancy, and birth among the Mexican (Aztec) and Mayan cultures.

At Teotihuacán (ca. 100–ca. 700) families lived in approximately 2,200 apartment compounds, each housing 60 to 100 family members related to each other through patrilineage. Each compound had high walls and a single entrance that restricted access. Open courtyards and shrines serviced the residents. Elaborate murals and sculptural decor indicated that families of high status lived closest to the ceremonial center. Dominated by red pigments, the stucco murals in many compounds featured images of warriors, deities, and sacrifice, perhaps templates for proper worship by the

city's many inhabitants. A major urban center, this central Mexican city achieved populations estimated between 85,000 and 200,000 by the fifth century, making it the sixth-largest city in the world at that time. In addition to apartment compounds, the Pyramid of the Sun, Pyramid of the Moon, and Temple of the Feathered Serpent as well as various palace and administrative structures lined the roughly north-south axis of the 3-mile-long Avenue of the Dead. Families in this cosmopolitan city would have interacted with Zapotec, Mayan, and Veracruzian “foreigners” inhabiting various enclaves within the city.

Just as Teotihuacán reached its apogee, the Toltec people began to expand settlements at the central Mexican site of Tula. By the Tollan phase (ca. 950–ca. 1150 or 1200), Tula's rulers established a new ceremonial center, and a population of 30,000 to 40,000 inhabited surrounding apartment complexes. Each complex contained up to five square or rectangular rooms. Like the structures in Teotihuacán, these flat-roofed units were surrounded by high walls, while centrally located altars and courtyards facilitated domestic activities and ritual.

Although Mayan and Mexican peoples erected monumental stone pyramids, temples, palaces, and other civic and religious structures, perishable thatch-roofed dwellings continued to house most of the population. Mayan households of the Classic (ca. 200–ca. 900) and Postclassic (ca. 900–1521) periods, located in the regions of southern Mexico, Belize, Guatemala, and Honduras, cultivated vegetables and fruit trees in kitchen gardens. Like the Mexica of Tenochtitlán in central Mexico from the 14th to 16th centuries, the Maya hunted fish, fowl, and larger mammals like deer and peccary. Both Maya and Mexica raised small dogs and turkeys for food and sacrifice.

Among the Mexica, commoners married at around 20 years of age. The families of the bride and groom negotiated an arrangement, and then the couple chose an auspicious day for the ceremony. After a banquet at the home of the bride's family, the adorned and painted bride was borne to the groom's house, where the evening ceremony occurred. Seated on a straw mat before a lit hearth, the couple received gifts, and a matchmaker knotted the bride's blouse and the groom's cloak together, signifying the union. After the ritual events of the marriage ceremony, elderly relatives counseled and advised the couple during a four-day period of feasting.

In the Mayan and Mexican cultures women bore responsibility for child rearing and maintaining the home. Midwives assisted at the birth of a child and conducted ritual purification and naming ceremonies. The Yucatec Maya venerated Ix Chel as the supernatural patron of midwives, while the Mexica propitiated the purifying water deity Chalchi-

uhtlicue. Shortly after a Mexican birth, a diviner consulted a *tonalamatl*, or book of days, to determine the nature of the child's birthday and its future implications. If the day was deemed inauspicious, the diviner mediated by selecting a beneficent day for baptismal rites. During this ceremony Mexican boys received a symbolic shield and weapons along with tools of the profession they might engage in. Girls received a small tunic and weaving instruments. Women who endured the pain of childbirth were likened to warriors on the battlefield and were honored as such in death. Scholars believe that the 260-day ritual calendar may be based on a nine-month human gestation period.

Sixteenth-century Spanish accounts of the Taíno, a large ethnic group that inhabited the Greater Antilles, describe their house structures and village layout. Like their Caribbean ancestors, the Taíno built impermanent wood and fiber dwellings. Large thatch-roofed structures housed the members of an extended family. A long rectangular plaza or ball court, with the home of a lord at one end, formed the nucleus of the village; private homes surrounded it. Villages accommodated as many as 1,000 nuclear families.

In the Andean region of South America the highland site of Tiwanaku (ca. 100–ca. 1000 C.E.) contains residential groupings that may have accommodated populations as high as 30,000 to 60,000. Most families lived outside the moat that surrounded Tiwanaku's ceremonial core, while high-ranking political and religious practitioners may have occupied the city center. The Incan culture of the 14th to 16th centuries venerated this earlier site as a sacred place of origin and attempted to emulate the fine stone masonry of the site's ruined buildings in Cuzco. An impressive example of the mortarless stone architecture sits high atop the Andean mountain range, where elite residences made up the Incan site of Machu Picchu.

Sixteenth- and 17th-century accounts by Spanish and mestizo authors provide information about Incan social mores. This society valued duality and complementarity and was organized in kin groups called *ayllu*. The lineages of the kin groups were divided into two parts, called moieties. Marriage partners came from separate moieties, and Incan law forbade marriage to close relatives. The Inca often turned to omens to help select marriage partners. Incan society permitted rulers to take many wives, and the last two rulers are documented as taking their sisters as primary wives to emphasize the divinity of the ruling lineage and promote peaceful succession.

ASIA AND THE PACIFIC

BY AMY HACKNEY BLACKWELL

Family was very important throughout medieval Asia. Family relationships dictated almost every aspect of a person's life,

from educational and marriage possibilities to how a person would spend any given day.

Contraception was not widely available or effective in medieval Asia. The most commonly used contraceptive techniques were withdrawal and douches with such substances as lemon juice, which were not reliable means of preventing births. Most women experienced many pregnancies and births during their lives. Every pregnancy was risky because there were few medical treatments for complications of pregnancy and birth. Many women died giving birth.

Once a child was born, it was almost invariably breastfed, either by the mother or by a wet nurse. In some societies, such as that of New Guinea, husbands did not sleep with their wives when they were nursing babies or toddlers; people believed that semen from the man would contaminate the woman's milk. Women often nursed their babies for two or three years, so this period of abstinence could space births several years apart.

Infant mortality rates were high throughout Asia and the Pacific. Although exact numbers are not known, historians estimate that between 30 and 50 percent of all babies born did not reach adulthood. Many infants died at birth. Some of them died of natural causes, while others died of infanticide, a typical method of reducing family size. Female infants were the most common victims of infanticide. In many Asian societies male offspring were desired and female children considered a burden. If a newborn's mother died in childbirth, the infant also stood a good chance of dying. Older babies and children died of illnesses and accidents.

Family was the foundation of Chinese society. Confucianism, one of the prevailing philosophies, placed great importance on relationships and the duties family members owed one another. Younger people were supposed to respect and serve their elders. Their elders, in return, were supposed to look out for the welfare of their juniors. Children had to revere their parents and other ancestors. Wives were expected to obey their husbands without protest.

Chinese people traced their lineage back several generations through the male line. In the Mandarin Chinese language, each position in a clan had its own name. For example, a paternal great-great-grandmother had a different name from a maternal great-great-grandmother. An aunt by blood and an aunt by marriage had different names. Different types of cousins had their own separate terms. Dead family members were still considered part of the family, and the living often consulted their dead ancestors about important matters. All children took their father's surname.

Females were considered inconsequential in China, useful only as workers and to produce children. A woman who married would move into her husband's home, where three to

five generations might all live together; the wife had to serve her mother-in-law. Women usually married outside their own villages. This separated women from their own relatives and friends and increased their disadvantages within their husband's homes. A man might take several wives and concubines, and these women would have their own dominance hierarchy, with the first wife or the mother of the oldest son holding the highest rank.

Chinese couples were expected to produce children; a failure to have offspring was considered a betrayal of both living parents and dead ancestors. Sons were the most desired children because they were the ones who would care for their parents in their old age. Parents arranged marriages for their

children by consulting astrologers to find auspicious wedding partners and dates and by interrogating prospective in-laws about their financial situation. Weddings were festive occasions, with large numbers of guests and lavish banquets.

Medieval Hindus in India divided themselves into four *varnas*, or social categories: Brahmin, the priest-scholars; Kshatriya, warriors; Vaishya, merchants and artisans; and Shudra, laborers. These groupings were further subdivided into many castes that defined the kind of work a person did. Caste status was inherited from one's parents, and a person's caste name often functioned as his or her surname. Hindus married within their own castes.

The Hindu religion taught that marriage was a sacred relationship between the souls of the partners and that this union could extend beyond one lifetime. Most marriages were arranged by the parents of the new spouses, who would examine the caste, financial status, genealogy, and appearance of their prospective in-laws before agreeing to the union. Once the match was made, the families exchanged gifts, which were sometimes substantial. Wedding ceremonies were lengthy and involved the singing of many Vedic mantras. During the ceremony the bride's family formally handed their daughter over to the groom's family and asked them to care for her. The groom finalized the marriage by tying a symbolic thread around the bride's neck.

The wife was recognized as an important figure within the family—the symbolic goddess of the household. Ideally, husband, wife, and children all were supposed to love and care for one another. Spouses were expected to enjoy a sexual relationship with each other, an idea expressed in the Hindu text called the Kama Sutra. Polygamy did exist, and it was not uncommon for men to have concubines in addition to their wives.

Widows often found themselves at a disadvantage in the community. A widow's husband's family might not want to support her, which could leave her and her children destitute. Sometimes a widow would commit suicide at her husband's funeral in a ritual called *suttee*. In this practice, which became common between the fifth and 10th centuries, a widow would come to her husband's funeral dressed in wedding robes or other fine clothes, unlike the other mourners. She would then join her dead husband on the funeral pile and allow herself to burn to death.

In Japan families typically lived in small groups consisting of a married couple, their children, and sometimes the husband's parents and unmarried siblings. The husband was the head of the household, and the wife was expected to obey his orders. An oldest son would inherit his parents' home and farm; in return, he was expected to care for his parents until they died. When a woman married, she left her own family's



Children at play, China, ca. 1368–1644; children were a favorite theme in Chinese art, symbolizing the desire of families to have many sons. (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1916-60)

home and moved in with her husband. She was expected to care for the house, prepare meals, and serve her in-laws, which was often a source of strife and dissatisfaction.

Although Japanese parents wanted boys as offspring, they sometimes welcomed female children as a free source of labor. In fact, in some rural areas parents would hope that their first child would be a girl so that she could help the mother raise a younger son. All children, except for eldest sons, had to leave their family homes when they grew up. Parents arranged all marriages. They might try to find a younger son a wife with no brothers so that the son could take over his father-in-law's home and business. In such a case, the groom might take his wife's family name as his own, so that his father-in-law's name could continue.

Australian aboriginal society was organized around a complex web of extended family relationships. An Australian family was a collection of clans, which included males and females of all ages and all relationships. A person's role in the clan was defined by his or her position in relation to others. Kinship rules determined who could marry whom; in many groups a person had to marry someone who was related to him or her in a particular way, as defined by the group's genealogical rules. Family relationships also determined who could live where. Family groups fluctuated in size over the seasons as the nomadic people traveled around, hunting and gathering.

Men were primarily in charge of hunting. Women gathered nuts, roots, and fruits. Elders of the extended family kept the society's accumulated knowledge and passed it on to younger members through storytelling and advice. Everyone in the group contributed to the clan's well-being.

The entire community was responsible for raising children. A child would consider all of his mother's female relatives to be equivalent to his biological mother. Each woman watched all her relatives' children, feeding them or correcting them as needed. All members of the clan—men and women, young and old—considered all of their relatives to be both their responsibility and a source of help. Parents did not consider their biological children to be their exclusive responsibility.

Like the aboriginal Australians, Pacific islanders relied on the support of large extended families to feed themselves and raise their children. Extended families operated as single economic units, working together to raise crops and livestock and catch fish. The kin group organized family social events, such as wedding feasts and funerals. Clans extended across islands, and when an islander traveled to another island he could expect to find kin there who would let him stay with them. Hospitality was considered a natural part of clan membership and not a burden. Many transactions were the result of reciprocity, with every person taking and giving favors and goods to kinsmen.

Within the Pacific islander family group a man might be the head of his immediate household, including his wife and children, but he did not hold unquestioned authority over them. If he abused his wife, her father or brother would intervene. Uncles, grandfathers, aunts, grandmothers, and other relatives all participated in the rearing of children, fulfilling the same role as biological parents. Children thus thought of themselves as having several parents, not just two. As they grew up, they might live with various relatives in different households, not just with their parents.

Women's roles varied from island to island. In Yap (Micronesia) women were fairly powerless and could easily be disinherited by their husband's siblings. In Palau, by contrast, women helped choose new chiefs and even exercised veto power. Throughout the Pacific women usually had some say in how land was apportioned among clan members.

EUROPE

BY AMY HACKNEY BLACKWELL

For most of the medieval period the majority of European families lived in small houses, often with only one room in which everyone ate, worked, and slept. Animals sometimes shared the space as well, separated from the human living area by a fence. Married couples did not have their own rooms, and privacy was virtually unknown.

Life expectancy was short. The average life expectancy was only 35 to 40 years, though these numbers reflect a high infant mortality rate. During the plague years of the 14th century, however, life expectancy dropped to less than 20 years. Death had many causes during the Middle Ages. Women often died in childbirth. Men died in wars. Children who lived past their precarious first two years could still die of illness and accidents. There is good evidence that medieval families were emotionally devastated by the loss of their family members, especially their children. Although death was common, people did not accept it with equanimity. Frequent deaths and a high birthrate meant that medieval families were often in flux, with members frequently dying and new ones entering by marriage or birth. Most marriages ended within a few years as the result of the death of one of the partners, and it was common for adults to marry more than once. The Christian church did not allow divorce, but it did not really have the power to prevent couples from separating if they wanted to. Celtic civil laws did allow divorce under a variety of circumstances, the most common of which were adultery or barrenness.

The medieval family functioned as an economic unit. Children were expected to help their parents with household work. There were almost no schools in western Europe

throughout most of the medieval period, so children did not attend school. Children of both sexes helped with daily tasks or large jobs, such as carrying water, fetching firewood, or harvesting crops. These tasks often were carried out by groups of people, as part of a larger community, such as a village. Girls performed housekeeping tasks and child care at home. Boys learned their fathers' trades with the expectation that they would carry on their family's business. In the later medieval period some boys were sent to live with the families of other tradesmen as apprentices.

Parents tried to launch their grown children into solid adult lives, if possible. Distribution of property varied, depending on the region. In some areas the oldest son inherited all of his father's property, and the younger sons inherited nothing. In other areas fathers divided their property among their children; this provided for more children, but it also reduced the sizes of parcels of land. Families of property had to furnish dowries for their daughters. A dowry was a gift of money, cloth, or property that the bride brought to her marriage. It usually remained the property of the woman, though her husband might have the use of it. Women could not inherit property, so the dowry was all they received from their own families. Providing property for sons and dowries for daughters was an endless problem for medieval families, and folklore and history are full of the stories of families who found themselves struggling financially because of these heavy burdens.

Wealthier families could not provide actual property for all their children. It was common for families to send their younger sons and some of their daughters to monasteries and convents, respectively. The monastic organizations would keep their children safe and fed, and the families in return could expect spiritual goodwill. A family member who belonged to the church could say extra prayers just for his or her relatives. Having a son in the priesthood was considered especially advantageous politically because priests had a great deal of power within their towns. Although monks and nuns were generally celibate and childless, priests often had mistresses and children of their own. The celibacy of the clergy had long been a matter of some debate, but it was not until 1074 that Pope Gregory VII decreed that priests should not be married.

Peasants had more latitude in the choice of a spouse than the nobility. They often married for love or because of an unintended pregnancy, although marriages to consolidate businesses also occurred. Among the nobility, marriages were a way of establishing or firming up alliances. Parents chose the spouses of their children for political reasons. It was not uncommon for children to be betrothed without ever having met one another. Medieval brides were typically quite young,



Medieval illumination showing a family group, France, ca. 1275–99
(The Pierpont Morgan Library)

often in their teens or even as young as 12. Men tended to marry later, once they had established themselves in a trade and could support a family.

Many medieval Europeans married with no ceremony. In many societies, if the members of a couple declared to one another “I am yours” and then lived together as husband and wife, their town would accept them as a married couple. During the 11th century the church declared that a priest had to bless a marriage for it to be official, and gradually it became standard practice to have weddings in churches.

Some families took this formality further, having a priest officiate at betrothal ceremonies and holding large public feasts to celebrate engagements. For more formal marriages an engaged couple would post an announcement of the engagement on the church door several weeks before the scheduled wedding. This provided their friends and relatives an opportunity to announce any reason why the marriage should not proceed. Reasons could include blood relationship, monastic vows, or an existing marriage.

Wedding ceremonies and celebrations varied by social class and financial resources. Wealthy and noble families

held huge weddings with many guests, entertainers, and more food than anyone could eat. Peasant wedding feasts were simpler. The religious ceremony was very similar to the one used today in Christian churches. A couple who could afford rings would exchange them, placing them on the fourth finger of the left hand.

There was no reliable contraception in medieval Europe. The church disapproved of contraception and abortion, based partly on the writings of Saint Augustine of Hippo (354–430). It also tended to disapprove of sexual contact in general, even within marriage. Under church doctrine the only approved method of contraception was abstinence. Women, however, were not allowed to refuse sexual relations with their husbands. Couples tried to space births using primitive methods such as withdrawal. Some women used herbal potions to prevent pregnancy or to stop pregnancies already in progress. Infanticide was a common method of keeping family size manageable. If a newborn was unwanted, perhaps because the mother was unmarried or already had too many children, she might abandon it in the woods or on the street. Some of these children were rescued by strangers, but many of them died. Medieval people did not like the idea of infanticide, and certainly finding dead babies in the street was upsetting. In an effort to prevent newborns from dying, Pope Innocent III, in the 13th century, ordered churches to install devices known as foundling wheels. A foundling wheel was a turning drum in the wall of a church where a woman could place her baby and leave without being seen. A priest or nun would then retrieve the child, though raising abandoned babies was difficult and often unsuccessful.

Medieval infants depended on their mothers to feed them. The only safe food for newborns was breast milk, so most mothers nursed their own babies. A wealthy woman might hire a wet nurse to feed the child so that she could save herself the trouble and perhaps conceive again sooner. Nursing babies reduced fertility somewhat, which did help space out pregnancies. In some areas people believed that having sex while nursing would sour a woman's milk, so men stayed away from their wives until their babies were weaned at about the age of one or two. Noblewomen often were under particular pressure to produce a male heir for their husbands, so they did not necessarily want to postpone subsequent pregnancies.

Medieval laws recognized the importance of relationships by blood and marriage in matters of inheritance. Law codes defined several types of children based on the parents' legal and marital status. A child born of legally married free-born parents was entitled to full inheritance rights. A natural child was one born of a relationship that was acknowledged but not legally binding in the community, such as the rela-

tionship between a lord and a concubine. Natural children could inherit less than legal offspring. The important factor here was that the father had to acknowledge his own natural children. A third category of children had no inheritance rights at all; these were children born to serfs or children of uncertain paternity.

Kinship was very important to medieval people. People could trace their genealogies back several generations and acknowledged a wide range of relatives, including distant cousins. Brothers were expected to support one another. Celtic peoples allied with their uncles and cousins in battle. Among the Germanic peoples and the Vikings the relationship between a man and his sister's son was especially close, partly because a man knew for certain that he was related to his sister's children but had to trust his wife that his sons were his. Poems written in Iceland in the 12th century are full of references to kinsmen, cousins, and uncles. Many Europeans used the fosterage system to strengthen relationships with relatives. They would send their children to live for a time with the family of a relative to be trained in battle or household skills. Thereafter the child would feel a close relationship with his or her foster family, and the family would have built up an alliance.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Arabia had small cities, but much of the land was occupied by nomads. The laws of government had little reach in Arabia, and people had slight hope of being protected by laws. Thus, people relied on their families for help. Someone who was in need was supposed to be aided by family members. For instance, a woman who had been abandoned by her husband could expect to be taken in and cared for by brothers, sisters, uncles, aunts, or even cousins. A man who had been robbed would be aided by his family or his family's clan, a loose group of related families who shared common, often revered, ancestors. A family or a clan that did not help a family member lost status among the other families and clans of Arabia, and a failure to help a family member in need could be held against a family for several generations.

The relative status of men and women in pre-Islamic Arabian families is the subject of much dispute among modern historians, as it was among medieval Muslim historians. Some historians held that both men and women practiced polygamy, or marriage in which a spouse has several mates. Others believed that only men were allowed to practice polygamy. One relationship that later caused much disagreement among Muslim scholars was the temporary marriage, the *nikah mutah*, which was a marriage with a contractual time limit.

Documentation is slight with respect to the ways in which pre-Islamic Arab customs related to women, but most historians believe that Islamic law, the sharia, probably improved the lot of Arabian women but worsened the lot of women in the conquered lands of the Near East, North Africa, Spain, Afghanistan, Iran, and India. The sharia placed wives a step below husbands in marriage but gave wives rights to own property apart from their husbands' property and to seek redress in a court of law if they were mistreated.

Historians often refer to medieval Islam as an urban culture because the sharia was much more likely to be enforced in cities than in the countryside. Cities and some towns had courts. Anyone living within the city or town would have ready access to a court of law, and women were allowed to leave their homes and go out in public to take cases to court. The Koran is very clear about some aspects of marriage and vague about others, and throughout the medieval era legal scholars debated the meaning of sometimes obscure phrases in the Koran, creating a great deal of case law (law based on court interpretations of the law rather than taken directly from the Koran or government edicts).

Among the pre-Islamic Arabs a prospective groom had to pay the father or male guardian of the bride a bride-price, a sum of money or property, for the girl or woman. Under the sharia the money was to be paid directly to the bride, and it was hers to keep and use as she saw fit. This gift to the bride was called the *mahr*. If her husband divorced her, the *mahr* still belonged to her. In cities of the Islamic world this law was enforced to varying degrees, depending on the integrity of the judges, but in most cases judges were honest men who took their tasks seriously and would find in favor of the wife should the husband attempt to take her property. The law said that the wife could voluntarily give some or all of her property to her husband, but her husband was expressly forbidden to force her to relinquish her property. If a husband forced his wife to surrender her property, courts would order the property returned to her. Further, almost all judges in cities had not only the authority but also the muscle, in the form of law enforcement officers, to ensure obedience to their rulings. On the other hand, in the countryside women were often sold into marriage and were forced to hand over their property to their husbands, brothers, uncles, or male cousins. Such a woman might find a court to hear her case in a regional town, but she frequently had no choice and no source of help.

The sharia plainly declared that both the man and the woman in a prospective marriage had to agree to be married. This moral point was central to the thinking of medieval Muslims: God expected both husband and wife to fulfill their obligations in marriage, and for those obligations to be valid, each of the marital partners must understand those ob-

ligations and freely accept them. In the countryside this view could be ignored, with girls and women forced into marriages that they would not choose for themselves. In cities agents of the courts could make sure that all aspects of the legal contract for marriage were properly understood and freely accepted by both bride and groom. If either the bride or the groom objected on the basis of being forced into an unwanted match, a judge could annul a marriage and order someone to care for the girl or woman.

One problem was the ages of brides and grooms. A groom tended to be older than a bride, sometimes decades older, because he was expected to have the income to pay completely for the maintenance of his wife and children, as required by the sharia. Sometimes a bride could be a small child. The third wife of the prophet Muhammad (ca. 570–632) was said to have been between six and nine years old when she was betrothed. However, the sharia was clear that such a young child was not legally responsible for her own actions and could not enter into a legally binding contract, seemingly making illegal a betrothal or a marriage at such an early age. Medieval legal scholars never resolved this problem, and in general the marriage of girls to much older men occurred throughout the Islamic world, especially in the countryside, where the power of reformist judges in cities and towns did not reach.

On the other hand, the bride was sometimes much older than the husband, as was Muhammad's first wife. One of the attractions of an older woman was that she often had considerable financial resources of her own, especially if she was the widow of a wealthy man. Such a woman could help a young husband set himself up in business. An older woman who had borne sons would have a powerful role in her extended family, providing her new husband with family connections that could immediately elevate his status in the world. The older woman often could improve her marriage contract. For instance, the widow Umm Salamah required her prospective husband, Abu al-Abbas, to promise not to take any other wives, even though a man could have up to four wives at the same time, and not to have sexual relations with any of his slaves. Even after he became al-Saffah, the first Abbasid caliph (r. 749–54), he remained true to his marriage contract, even while courtiers urged him to enjoy the females of his court.

For the whole of the medieval era it is hard to find information about the home life of ordinary people, partly because medieval Muslim writers believed it to be improper to discuss people's private lives. Marriage was principally for procreation. Both husband and wife entered into a marriage contract with the understanding that producing children was their primary obligation. Having children was paramount for maintaining a family's continuity and for contributing to

its future prestige. Many a Muslim writer notes that the best guarantee for love is for lovers to be married and that marrying for love is good but that being in love takes second place to the procreative potential of bride and groom. Having several wives could help a man have children. The wealthy and powerful, such as sultans, could have four wives and numerous concubines, but the sharia was usually interpreted to require that each wife be set up in her own household, equal to the household of each other wife. Few among the vast majority of men could afford to meet this requirement, so the practice was restricted to the small minority of very rich people.

In theory, a married woman was never to be unescorted among men not of her immediate family. She was to be watched carefully so that when she became pregnant, there could be no doubt that her husband was the father. In extreme cases wives were imprisoned under lock and key in the women's quarters, the harem. In the countryside and among the working class, cloistering a wife was impractical because wives took part in the family business, perhaps grinding grain or preparing goods for sale. Birth was attended by female family members, female friends, and midwives, and the process of birth apparently varied by local custom, from crouching down during labor to standing with legs spread apart. At birth the father whispered in the infant's ear the *adhan*, the call to prayer, and then the *shahada*, the first pillar of Islam, that there is no god but Allah and that Muhammad is his messenger.

Small children were the responsibility of their mothers, and a child would remain with the mother if she was divorced. When children reached the age of reason, which varied by regional custom, the father took responsibility for them, even

after divorcing their mother. A disciplined household was considered ideal, and the wife was supposed to obey her husband. The husband was expressly allowed to beat a wife into submission, although if a wife could prove that the beatings happened for no reason, she could gain a court-ordered annulment or divorce from her husband. In the majority of Muslim households the partnership of husband and wife in society, family life, and daily work was of great importance and may have discouraged abuse of women, at least in cities and towns, where courts were available. There are hints that the lives of women in the countryside of Arabia and North Africa could be hellish because of the lack of law enforcement.

Inheritance laws favored male family members because under the sharia, men bore the financial burden of caring for a family. The laws varied somewhat according to time and place, but in general if a man died first, then his will could leave one-third of his wealth to anyone he chose; another third would go to his wife, and the rest would go to his children, with sons receiving twice as much as daughters. If the wife died first, the wealth could go to her husband or to her children or male relatives, such as brothers.

See also AGRICULTURE; ARCHITECTURE; CHILDREN; CITIES; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; FOREIGNERS AND BARBARIANS; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE.

Asia and the Pacific

≈ Taika Reform Edicts (Japan, 645) ≈

Again, there have been very many cases in which wives or concubines, when dismissed by their husbands, have, after the lapse of years, married other husbands, as ordinary morality allows. Then their former husbands, after three or four years, have made greedy demands on the second husband's property, seeking their own gain.

Again, there have been very many cases in which men, relying on their power, have rudely demanded people's daughters in marriage. In the interval, however, before going to his house, the girl has, of her own accord, married another, and the rude suitor has angrily made demands of the property of both families for his own gain.

Again, there have been numerous cases of this kind. Sometimes a wife who has lost her husband marries another man after the lapse of ten or twenty years and becomes his spouse, or an unmarried girl is married for the first time. Upon this, people, out of envy of the married pair, have made them perform purgation.

Again, there are cases in which women, who have become men's wives and who, being put away owing to their husbands' dislike of them, have, in their mortification at this injury, compelled themselves to become blemished slaves.

Again, there are cases in which the husband, having frequent occasion to be jealous of his wife's illicit intercourse with others, voluntarily appeals to the authorities to decide the matter. Let such persons not lay their information until they have obtained, let us say, three credible witnesses to join with them in making a declaration. Why should they bring forward ill-considered complaints? . . .

All such practices are habitual among the unenlightened vulgar. Let them now be discontinued without exception, and not permitted again.

W. G. Aston, trans. *Nihongi: Chronicles of Japan from the Earliest Times to A.D. 697* (London: Kegan, Paul, Trench, Trübner, 1896).

Europe

≈ *The Contract of Marriage, in the Ecloga of Leo III (Byzantium, 726)* ≈

The marriage of Christians, man and woman, who have reached years of discretion, that is for a man at fifteen and for a woman at thirteen years of age, both being desirous and having obtained the consent of their parents, shall be contracted either by deed or by parol.

A written marriage contract shall be based upon a written agreement providing the wife's marriage portion; and it shall be made before three credible witnesses according to the new decrees auspiciously prescribed by us. The man on his part agreeing by it continually to protect and preserve undiminished the wife's marriage portion, and also such additions as he may naturally make thereto in augmentation thereof; and it shall be recorded in the agreement made on that in case there are no children, one-fourth part thereof shall be secured in settlement.

If the wife happens to predecease the husband and there are no children of the marriage, the husband shall

receive only one-fourth part of the wife's portion for himself, and the remainder thereof shall be given to the beneficiaries named in the wife's will or, if she be intestate, to the next of kin. If the husband predeceases the wife, and there are no children of the marriage, then all the wife's portion shall revert to her, and so much of her husband's estate as shall be equal to a fourth part of his portion shall also inure to her as her own, and the remainder of his estate shall revert either to his beneficiaries or, if he be intestate, to his next of kin.

If the husband predecease the wife and there are children of the marriage, the wife being their mother, she shall control her marriage portion and all her husband's property as becomes the head of the family and household.

From: Edwin Hanson Freshfield, trans., *A Manual of Roman Law: The Ecloga* (Cambridge, U.K.: Cambridge University Press, 1926).

The Islamic World

≈ *Ibn Battuta: Excerpt from Travels in Asia and Africa (1325–1354)* ≈

LIFE AT WALATA

My stay at Iwalatan lasted about fifty days; and I was shown honour and entertained by its inhabitants. It is an excessively hot place, and boasts a few small date-palms, in the shade of which they sow

watermelons. Its water comes from underground waterbeds at that point, and there is plenty of mutton to be had. The garments of its inhabitants, most of whom belong to the Massufa tribe, are of fine Egyptian fabrics.

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Their women are of surpassing beauty, and are shown more respect than the men. The state of affairs amongst these people is indeed extraordinary. Their men show no signs of jealousy whatever; no one claims descent from his father, but on the contrary from his mother's brother. A person's heirs are his sister's sons, not his own sons. This is a thing which I have seen nowhere in the world except among the Indians of Malabar. But those are heathens; these people are Muslims, punctilious in observing the hours of prayer, studying books of law, and memorizing the Koran. Yet their women show no bashfulness before men and do not veil themselves, though they are assiduous in attending the prayers. Any man who wishes to marry one of them may do so, but they do not travel with their husbands, and even if one desired to do so her family would not allow her to go.

The women there have "friends" and "companions" amongst the men outside their own families, and the men in the same way have "companions" amongst the women of other families. A man may go into his house and find his wife entertaining her "companion" but he takes no objection to it. One day at Iwalatan I went into the qadi's house, after asking his permission to enter, and found with him a young woman of remarkable beauty. When I saw her I was shocked and turned to go out, but she laughed at me, instead of being overcome by shame, and the qadi said to me "Why are you going out? She is my companion." I was amazed at their conduct, for he was a theologian and a pilgrim [to Mecca] to boot. I was told that he had asked the sultan's permission to make the pilgrimage that year with his "companion"—whether this one or not I cannot say—but the sultan would not grant it.

From: Ibn Battuta, *Travels in Asia and Africa 1325–1354*, trans. and ed. H. A. R. Gibb (London: Broadway House, 1929).

FURTHER READING

- Elisheva Baumgarten, *Mothers and Children: Jewish Family Life in Medieval Europe* (Princeton, N.J.: Princeton University Press, 2005).
- Karen Olsen Bruhns and Karen E. Stothert, *Women in Ancient America* (Norman: University of Oklahoma Press, 1999).
- Patricia Buckley Ebrey, *Confucianism and Family Rituals in Imperial China* (Princeton, N.J.: Princeton University Press, 1991).
- David Herlihy, *Women, Family and Society in Medieval Europe* (Providence, R.I.: Berghahn Books, 1995).
- James E. Lindsay, *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- Patricia Plunket, ed., *Domestic Ritual in Ancient Mesoamerica* (Los Angeles: Cotsen Institute of Archaeology, University of California, 2002).
- Robert S. Santley and Kenneth G. Hirth, eds., *Prehispanic Domestic Units in Western Mesoamerica: Studies of the Household, Compound, and Residence* (Boca Raton, Fla.: CRC Press, 1993).

► festivals

INTRODUCTION

The impulse for humans to gather together to celebrate important events, community milestones, and rites of passage runs as far back as human history itself. During the medieval period people toiled hard as they tried to scratch out a living.

Their lives were precarious. At any time disease could strike, rivers could flood, crops could fail, the ground and skies could dry up, and earthquakes, storms, and volcanic eruptions could disrupt and destroy their lives. People generally had few sources of entertainment, so community festivals were an important way of putting aside the hardships of life for a while.

While the nature of these festivals varied across the world, of course, a number of common themes can be identified. First, many festivals revolved around religious events. In Christian Europe numerous ancient festivals having to do with the arrival of spring or winter were transformed by the church into such religious festivals as Easter and Christmas, while Halloween evolved from an ancient Celtic Feast of the Dead to the church's All Souls' Day. Many modern traditions associated with holidays—Easter eggs and bunnies, Halloween costumes and "trick or treat," Christmas trees and Nativity scenes—are survivals from medieval religious celebrations, themselves survivals from more ancient pre-Christian Roman and Celtic traditions.

Additionally, communities in Christian Europe conducted festivals surrounding the life of a patron saint who was important to the area or country; Saint George of Scotland was a good example. These festivals could be marked by processions, during which statues of the saint were car-

ried through the streets; similarly, in Japan a portable shrine called a *mikoshi* would contain the spiritual essence of the local god, or *kami*. The chief festival of Islam is the month-long Ramadan, Islam's most sacred month, and Asian, African, and American nations conducted religious festivals as well. In the Americas, for instance, priest-rulers, dressed elaborately in feathers and headdresses, led processions to sacred sites, where sometimes blood sacrifices were offered to the gods. Accordingly, priests, shamans, rabbis, and other religious figures typically played a key role in guiding these events.

For some religious communities, religious festivals were a way of propitiating the gods or ensuring good fortune; for others they were a way of celebrating historical events in the history of the religion, such as the birth of Christ or Muhammad; in still others, such as China and Africa, it was believed that festivals were a way of making contact with ancestors. In some cultures, such as those of Mesoamerica but elsewhere as well, the king was regarded as a divine figure, so festivals were held to celebrate the king's accession to the throne or to acknowledge his birthday. In all cases, though, the cycle of festivals throughout the year formed, in effect, a calendar that marked the passage of both temporal and sacred time.

A second common theme is the nature of the festivals themselves. People used festivals to "blow off steam." Festivals became a way to invert the social order, so many cultures had festival days on which lower social classes adopted the roles of those in higher classes and vice versa or when servants were able to mock their masters without fearing punishment. Typically, festivals included music, singing, dancing, and in some cases, considerable consumption of alcoholic beverages. People dressed in costumes, held parades or candle-lit processions, feasted, lit bonfires, set off fireworks, and played pranks on one another. Festivals typically included popular forms of entertainment, depending on the culture. These entertainments might have included athletic contests (such as the ball games of Mesoamerica), plays (such as the liturgical dramas of Christian Europe), jugglers, recitation of epic stories celebrating the culture's history and its historical heroes, and so forth. Social rules were cast aside as the entire community participated in the organization of the event, contributing food, labor, and other resources.

A third common theme is the importance of the passing of the seasons. Nearly every world culture, particularly those in northern and southern climates, celebrated the arrival of the warmth of spring after the cold of winter. This was a major event, for it meant that the people had survived another season during which the ground froze, hunting was difficult, the fields lay under a blanket of snow, and people remained huddled in shelters merely trying to survive. Spring was a time for planting and renewal, which could take the form, as it did

in China, of cleaning the house from top to bottom and visiting the graves of ancestors. As the earth turned green with new life, spring became a symbol of fertility, procreation, and rebirth, so springtime festivals often were times when young people courted each other, and revelry could often have definite sexual overtones. Autumn was a time for the fulfillment of the promise of spring as crops were harvested, herds were moved to winter pasture, and people began to prepare for the winter. Autumnal festivals were a way for communities to celebrate the harvest. During the depths of winter, people held festivals to break up the boredom of confinement and look forward to spring. In many cases winter festivals had a religious dimension, for they were a call to the gods for the arrival of spring.

A fourth common theme is that festivals were held in connection with more personal events and rites of passage. Births and weddings were occasions for merrymaking, and many festivals surrounded rites of initiation. In Africa and the Americas, for example, numerous rituals were associated with the achieving of manhood, and a boy's rites of initiation could be a time of festivity. Similarly, the arrival of puberty for a young girl, when she became eligible for marriage and able to bear children, was surrounded by festivity. In parts of Africa the circumcision of a boy or a girl was a time of feasting and celebration. Even death could be an occasion for festivities, as people celebrated the passage of a person to a life beyond this one.

AFRICA

BY AMY HACKNEY BLACKWELL

People throughout Africa celebrated festivals to mark rites of passage in peoples' lives. Births, deaths, weddings, and coming-of-age ceremonies all were occasions for music, dancing, feasting, and dressing up. Harvest festivals also were common as people celebrated the fact that they would be able to eat during the coming year. People who lived by hunting held festivals to mark successful hunts. There were also many religious festivals, including ones with Christian, Muslim, and indigenous rites.

Most African festivals featured dancing and drumming. People of all ages participated in the dancing. Traditional African dances told stories or had ritual significance, such as dances by warriors that showed their bravery and strength. Dances were also an occasion for people to show off to one another. Young people might dance to attract the opposite sex. Dancers often wore masks that represented particular animal spirits. The Dogon people of Mali were especially famous for their masks, which they started making during the early medieval period.

Many African festivals centered on age sets, groupings of people within a certain age range. At festivals people would sit and dance with their own age set. Age sets determined who could do what during festival events and afterward. Among the peoples of Uganda, for example, the elders might arrange rituals, set schedules, and find people to donate animals for feasts. The young men would prepare the site for the festival, clearing away branches, setting up seats for the elders, and cooking the meat. Groups would be served by age set, from the oldest to the youngest, and within the age sets the oldest members would be served first.

The members of the Ethiopian Orthodox Church held beliefs that were unique in Christianity and celebrated unique festivals. Ethiopian religious festivals were scheduled according to the Ethiopian calendar, which was based on the Coptic calendar and was slightly different from the Julian calendar then in use in Europe. This meant that even those Christian festivals commonly observed in Europe fell on different dates in Ethiopia. The Ethiopian New Year, for example, was celebrated in September rather than January, and Christmas fell in January instead of December.

At the end of September they celebrated Maskal, a festival marking the finding of the True Cross (the cross upon

which Christ was crucified), by lighting bonfires and dancing around them. In January they celebrated Timkat, the Ethiopian Orthodox version of Epiphany, commemorating the baptism of Christ. This festival included feasting, music, bathing in lakes or rivers, and religious processions carrying replicas of the Ark of the Covenant, said to have held the stone tablets of the Ten Commandments. Easter and Christmas were other important holidays.

Saints' festivals were important to Ethiopians. New Year celebrations were combined with the feast of John the Baptist. At the end of December, Ethiopians celebrated the feast of Saint Gabriel, guardian of homes and churches, by joining pilgrimages. They carried burdens to symbolize Christ's suffering and gave alms to the poor.

The fertility of humans and the land was a common reason to hold festivals. In Nigeria the Yoruba people held a festival called Gelede that celebrated motherhood and womanhood. This festival occurred during the spring rains, a time when the earth's bounty seemed assured for the coming year. In Yoruba mythology people originally lived in a matriarchal society that transformed into a patriarchal society, and the Gelede festival paid homage to mothers as female elders. The people would perform rituals to honor women's work and fertility and would dance wearing animal masks, sing, and play music.

Harvest festivals abounded in medieval Africa. Agriculture was always a chancy way of life, and a good harvest meant that the people could eat for another year. To show their appreciation to the gods and spirits who made the harvest possible, they celebrated with ritual dances and songs that thanked the spirits and ancestors for their help. The Ga people began holding a harvest festival known as Homowo sometime during the medieval period. The name Homowo means "making fun of hunger." The festival arose after a long drought had caused a deadly famine in the region; when the rains returned and the people could once again harvest crops, they invented a festival that mocked hunger with feasting and music. The festival took place in the late summer, around the time when the people harvested yams, the earliest crop and their primary source of sustenance. The people would offer yams to their ancestors and local gods, accompanied by dancing and singing. All people would return to their parents' homes to mourn that year's deaths, celebrate that year's births, eat special foods, and dance in the streets. Festivals were also an opportunity to address problems. If something had gone wrong that year, such as illness among the livestock or lack of rain, the people conducted rituals to attempt to solve the problem for the next year.

Herders celebrated their own festivals around the events of the year. In Mali every winter the herders congregated on

THE FESTIVAL OF MASKAL

The religious basis of the festival Maskal was distinct to Ethiopia. According to legend, in 326 Helena (ca. 248–ca. 328), the mother of the Roman emperor Constantine I (r. 306–337), was looking for the cross upon which Jesus was crucified. She prayed for help and was told to set a bonfire in Jerusalem. She erected a large pile of wood, added frankincense to it, and set it afire. A stream of incense smoke directed her to the spot where the cross was hidden. Centuries later, during the 1400s, the patriarch of Alexandria, Egypt, gave an Ethiopian emperor half of the True Cross. This piece of the cross was placed in the Gishen Marien monastery on Mount Amba. The festival of Maskal evolved out of this story. The bonfires people burned symbolized the fire that Helen had burned to find the cross. Ethiopians added flowers to the pile to decorate it. Because the fire was holy, they would collect pieces of the charcoal left over once the fire finished burning and use this to draw crosses on their foreheads. According to church tradition the True Cross was found in March, but the Ethiopians moved the festival to September to avoid a conflict with Lent.



Ceremonial ring showing sacrificial victims, Nigeria, as early as the 15th century; the Yoruba practiced human sacrifice on important occasions, such as festivals honoring Ogun, the god of iron. (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Museum purchase, 89-17-1)

the banks of a river, meeting with family and friends before heading off to pasture again. Young men and women could meet one another, and the herders held cattle competitions, awarding prizes for the fattest animals. Cattle figured prominently in the festivals of the Masai. Cattle were ritually slaughtered for all major life-stage rituals, including birth, circumcision, marriage, and death. The elders blessed the meat, and the village consumed the meat together. The festivals to initiate young male warriors into adulthood included the ritual consumption of milk and meat.

Festivals celebrating circumcision were common throughout Africa. In Mali, for example, all boys were circumcised between the ages of nine and 12. Once they were healed, they reentered their villages playing musical instruments. Their families and neighbors greeted them with gifts. The new men remained naked for a month so that everyone could see their new status. Female circumcision was also an occasion for festivals. In Kenya girls might be circumcised in a group. Immediately after the operation they would join the guests who had assembled for the event. Among the Masai girls were married to older men on the same day as their circumcision.

African people had other festivals of initiation for men entering new stages of adulthood. The Fulani people of Nigeria conducted a festival in which bare-chested young men beat one another with whips to show their courage. Among

the Masai young men became true adults after 10 years as warriors. For the initiation their mothers would shave the heads of the young men, who then performed various acts of fasting and tests of courage. When the initiation was complete, the village celebrated with music, dancing, and feasting. The newly initiated men were then allowed to marry and become fathers.

Among the small-statured peoples of central Africa, such as the Mbuti, a girl's entering puberty was cause for a celebration known as the Elima festival. When a girl began to menstruate, she entered a special hut, the *elima* hut, and spent a month there with the other women and girls. The women taught the girl ritual dances and took her on forays into the forest to conduct rituals there. The girls made secret trips to bachelor camps to introduce themselves to the young men. The Elima ended gradually and informally, with the girl now assuming adult responsibilities and being recognized as a marriageable woman. The people also celebrated a festival called Molimo in which they invoked the power of a benevolent forest deity to help them in times of suffering, such as a period of bad hunting, illness, or death. During this festival the men sat together and sang all night long every night for a month.

Some African societies celebrated festivals to help young men and women meet one another. In Benin the harvest festival included rituals in which eligible young men and women were displayed to one another and their families in a sort of matchmaking ceremony. The young women wore no clothing, in order to display their beauty, but they did wear jewelry and elaborate hairstyles to showcase their wealth. The young men participated in feats of strength such as tug-of-war. Both sexes painted their bodies.

The hunter-gatherers of the Kalahari Desert did not have formal festivals in the way some other African peoples did. They did, however, occasionally have cause for celebration. If a man killed a large animal such as an ostrich, he would share the meat with a group of relatives. The cutting up and distribution of this meat was one of the more important social occasions for these hunter-gatherers. Because meat was a relative rarity in their diets, people might celebrate by making much of the hunter, dancing and singing around him to praise him. These people also held festivals to mark the advent of puberty in boys and girls. When a boy reached maturity, marked by the first time he killed a large animal, all the men would cook and eat the meat together, out of sight of the women. The boy's father would then cut lines in the boy's forehead to make decorative scars. When a girl reached puberty, she spent the duration of her first period in a special area, and the women and old men of her group would sing and dance around her every day.

Many African peoples held festivals during funerals. In indigenous religions dead ancestors remained an active spiritual presence among the living, so the living honored the newly deceased with elaborate rituals. In Ghana families would bankrupt themselves to hold extensive funerals with decorative coffins and days of feasting. In Nigeria villages would perform dances to drums and singing.

THE AMERICAS

BY PENNY C. MORRILL

Through festivals and performance, shamanic lords and their followers attempted to transcend the present for another time and reality. Such transcendence was also represented in configurations of space or urban plans, architecture, tombs, sculpted reliefs, mural cycles, ceramics, jewelry, costumes, and masks in the Andes and throughout the Americas.

At Tiwanaku on the northern coast of Peru during the period 400 to 800, the sacred precinct was built of stone and encircled by a shallow moat. This site combines platforms and sunken temples on a grand scale that would have allowed for large gatherings. Access to the sunken court at the top of the 600-foot-high Akapana platform was restricted to the shamanic priest-ruler and his attendants. When it rained, water flowed from the top of Akapana down the sides of the platform, replicating the flow of rainwater from the surrounding mountains. This offered a setting in which the priest, in the transcendent guise of a puma, could reveal to his audience his power to provide much-needed rainfall.

Portals at Tiwanaku directed the crowd into the sacred precinct. Carved in relief on the main entrance, the Sun Gate, the priest-ruler stands in the center above the entrance, facing frontally and holding two staffs of office. He is surrounded by smaller images in profile and in lower relief. These figures, with their shamanic costumes and masks, were possibly the priest-attendants who participated in the ceremony in trance-like transcendent flight. One can only imagine the dramatic procession of shamanic priests, dressed as birds and pumas, entering through this portal into the sacred space where the audience awaited them.

The Mississippian communities were chiefdoms that flourished from 700 to 1400 at the crossroads of riverine trade routes. Religious structures in the form of large earthen mounds appear along the banks of rivers from the Atlantic to Arkansas and Oklahoma. Cahokia, a walled city encompassing 5 square miles near present-day Collinsville, Illinois, contained 120 pyramids and mounds. These large-scale structures and open plazas are thought to have provided the ruler with a dramatic setting in which to stage festivals that combined religion and trade.

In central Mexico, Teotihuacán's ceremonial Way of the Dead was the site of religious festivals that probably involved hundreds, even thousands, of participants. At the northern end the Moon Pyramid stands as a replica of the Cerro Gordo, the sacred mountain. The Pyramid of the Sun, built over a cave and springs, marks the center of the world and the locus of creation.

Priests wearing elaborate feather headdresses and rain-god masks are represented in procession in several murals throughout the city. Jaguars are depicted covered in netting, perhaps indicating how they were led along the Way of the Dead. The most significant figure is the Great Goddess, who pours forth from her outstretched hands the gifts of rain and green vegetation. This costumed figure, with her elaborate owl headdress and richly detailed costume, must have been one of the most spectacular participants in the religious ceremonies.

The Teotihuacán government probably carried the expense for the monumental architecture and elaborate costuming, as suggested by the layout of the Ciudadela at the southern end of the Way of the Dead. This large sunken court, featuring the platform Temple of Quetzalcoatl, may have been a large administrative palace complex. Historians speculate that the ruler of Teotihuacán was controlling the vast trade that was coming in and out of the city. Under those circumstances, it would have been most propitious to link market activity with religious ceremony.

The contemporaneous Zapotec site of Monte Albán in Oaxaca (200–650 C.E.) resembles that of Teotihuacán in some aspects but was, in actuality, a different kind of urban center. The architecture replicates its setting, as does the Moon Pyramid at Teotihuacán. The central plaza, surrounded by pyramids and platforms, is a direct reference to the valley of Oaxaca, ringed by mountains.

Unlike Teotihuacán, which was a city of more than 125,000 inhabitants, Monte Albán was the ceremonial gathering place for the people who resided in the valley below and who owed allegiance to the Zapotec ruler. Within palace compounds on the mountaintop at Monte Albán, Zapotec rulers were buried in tombs that were carved out of bedrock, ornamented with mural paintings and sculpture, and filled with offerings.

In Tomb 103 were found a group of ceramic figures elaborately costumed in bird masks and headdresses. They are accompanied by a seated old man and a group of musicians who do not wear costumes. In the center of the group is a carved mask set on a platform, probably an effigy. This scene suggests that the Zapotec ruler and the elite gained legitimacy through their direct connection to the ancestors who had preceded them in positions of power. Mural paintings in Tombs 104 and 105 indicate ceremonial processions related to an ancestor cult.

The worship of ancestors continued among the Mixtec and Zapotec in Oaxaca. After the Spanish conquest a priest discovered several corpses, lavishly dressed and draped with jewels, propped inside a mountain cave. The priest identified some of these as recently deceased local rulers. At Monte Albán, the elaborate costumes worn by male and female figures depicted in ceramic funerary urns and mural paintings imply a costly ceremony that would have taken place in the large plaza before a public audience. However, the actual entry into the tombs was considered a passage into another cosmic realm, a privilege enjoyed only by the elite—the ruler and priests.

The walls of the Zapotec Tomb 5 at Suchilquitongo, Oaxaca (ca. 500), are covered with mural paintings depicting costumed figures in procession, including a group of ballplayers. On the coast of the Gulf of Mexico at Las Higueras, Veracruz (600–800), various ceremonial processions and ritual scenes, some related to the ball game, are represented in mural paintings. At the site of El Tajín (800–1200) are 17 ball courts and carved stone reliefs depicting ballplayer sacrifice. Numerous images of the ballplayers and the ball game appear among the Mayan Jaina figurines, on Mayan vases, and in western Mexican ceramics. Ball courts occur in sacred precincts at Monte Albán, Copán, and Xochicalco.

The ball game was more than a spectator sport. In the scene carved on the wall of the largest ball court in Mesoamerica at Chichén Itzá (900–1200), snakes emerge from the neck of the decapitated ballplayer, along with a flowering vine. It is thought that players impersonated characters from a myth.

In most cases, the display and dispatching of captives took place before an audience. In northern Peru these sacrificial rituals were depicted on Moche pottery and revealed in the tombs at Sipán (ca. 300 C.E.). In Tomb 1, the priest-ruler who accepted the goblet of blood from the sacrifice was buried in extraordinary opulence.

An elaborate and full-scale depiction of an accession ceremony that includes a powerful image of ritual human sacrifice occurs in the mural cycle at the Mayan site of Bonampak (700–900). All activity revolves around the legitimization of the newborn heir to the throne. Days before the presentation ceremony the ruler participates in a successful battle for captives. In preparation for the event, musicians and dancers don wildly imaginative costumes. Dignitaries are assisted as they put on their headdresses and massive frames of feathers resembling wings. The family meets privately in a room to perform a bloodletting ritual. The baby is held up before the elite and presented to the crowd gathered below. At the dramatic moment on the steps of the pyramid, the captives are tortured and killed by decapitation or heart excision.

Ceremony the Americas is the dramatic metaphor for a vision of the cosmos that drew parallels among celestial, earthly, and human cycles. Priestly rulers attempted to control cosmic chaos through human intercession outside the bounds of time and place. The costumes they wore made them living symbols, and their architecture interpreted the movement of heavenly bodies.

ASIA AND THE PACIFIC

BY AMY HACKNEY BLACKWELL

Medieval Asians celebrated a huge assortment of festivals. Festivals marked the new year, planting time, spring, summer, fall, and the harvest. Most festivals had religious significance and evolved out of peoples' wish to ensure good fortunes for themselves and their families. Each festival had unique traditions, but most were occasions for feasting, dressing up, dancing, singing, and visiting family.

Many Asian festivals had their beginnings in China. Most Chinese festivals originated during the Qin Dynasty in the third century B.C.E. During the Tang Dynasty (618–907 C.E.) these festivals had more or less taken the shape that they maintained for the next millennium. The Spring Festival, or Chinese New Year, took place on the first day of the first lunar month of the year, although festivities spread for several weeks on either side of that date. Chinese people journeyed back to their families' homes to make sacrifices to their ancestors. There they cleaned their houses from bottom to top, decorated their houses with poems celebrating the New Year, washed all clothes and bedding, made or bought new clothing, and acquired ample supplies for a feast. On New Year's Eve families ate together and stayed up late. The next day they dressed up, gave gifts to the children, ate special cakes or dumplings, and set off fireworks. Entire towns would dance in the streets.

On the 15th day of the first lunar month people celebrated the Lantern Festival, originally a religious festival to honor Buddha. People hung lanterns in the streets, set off fireworks, danced in the streets, and asked one another riddles. The Qingming Festival in early April celebrated the time for spring plowing and commemorated the deaths of ancestors. People visited cemeteries to clean the graves of their family members, burned incense, and flew kites. During the fifth month Chinese people commemorated the death of the poet Qu Yuan (ca. 340–278 B.C.E.) by holding the Dragon Boat Festival, at which they raced dragon-shaped canoes, ate rice dumplings, and drank wine.

In midsummer, the seventh day of the seventh month, Chinese people celebrated the Double Seventh Festival. This was a romantic festival commemorating the union of two

star-crossed mythical lovers, Niu Lang and Zhi Nu, who were symbolized by two bright stars that appeared in the sky at that time of year. The Mid-Autumn Festival fell in the middle of the eighth month. Chinese people celebrated the full moon by eating moon cakes and holding feasts to celebrate the harvest. On the ninth day of the ninth month people celebrated the Double Ninth Festival. On this day people climbed a mountain or a tower to prevent illness. They also ate special cakes decorated with chrysanthemum blooms and drank chrysanthemum wine. On the Winter Solstice, the shortest day of the year (December 22 or 23), everyone took the day off and offered sacrifices to their ancestors. People ate red beans and sticky rice dumplings to drive away devils. They also made rice cakes in the shapes of lucky animals, such as chickens, ducks, sheep, cows, pigs, or tortoises.

Chinese festival traditions spread throughout Southeast Asia and to Taiwan. The New Year was a particularly important festival throughout the region. In Vietnam the New Year was called Tet. People spent months preparing for it and days traveling home to visit their families for the holiday. There were regional festivals as well. In Korea, for example, people celebrated Daeboreum on the first full moon of the new year; they marked the festival by cracking nuts with their teeth and climbing mountains to see the moon rise.

In Japan people celebrated many festivals, called *matsuri*. Many *matsuri* were strictly local, restricted to a town, village, or even just a neighborhood. The festivals were centered on local Shinto shrines or Buddhist temples. During a local *matsuri* the people of the town or neighborhood might



A Buddhist procession of three musicians and one dancer, stone, Song Dynasty, China, 10th–11th centuries (Freer Gallery of Art, Smithsonian Institution, Purchase, F1924-2)

carry a portable shrine through the streets, bouncing it up and down and chanting. The portable shrine, called a *mikoshi*, would contain the spiritual essence of the local god, or



Spring Festival on the River, hand scroll, ink and color on silk, China, 18th century; copy of a famous work attributed to the painter Zhang Zeduan (fl. early 12th century), which shows the imperial capital Bianliang (modern-day Kaifeng, Henan Province) during the annual spring festival (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1915-2)

kami. In other festivals local people would dress up in costumes and perform ritual dances. All local *matsuri* concluded with feasting and drinking sake.

Some *matsuris* were very large. The Gion Matsuri in Kyoto originated in 869 as a response to an outbreak of plague. It was decreed an annual festival in 970. Kyoto's Aoi Matsuri originated during the Heian Period (737–1185). During this *matsuri* members of the royal family made a pilgrimage to two major shrines in the city and watched competitions of sword fighting and archery.

Japanese people held large-scale festivals on particular dates. During the medieval period they celebrated the New Year on the date of the Chinese New Year. This was a time to clean houses, pay off debts, and eat special lucky foods that were prepared only for the New Year. People visited temples or shrines, and the emperor performed an annual ritual to bring good luck for the coming year. In March, Japanese people celebrated the Hinamatsuri, or girls' doll festival, which had originated during the Heian Period. For the Hinamatsuri girls dressed up, visited friends, and admired their collections of dolls representing the emperor's court. Boys' Day, or Kodomo no hi, marked the beginning of summer. Boys celebrated by flying flags shaped like carp. During the cherry blossom season people all over Japan held flower-viewing parties called *hanami*. They ate picnics under the falling cherry petals and wrote poems about the beautiful flowers. O-bon was a summer festival during which Buddhists prepared to welcome home the spirits of their dead ancestors. On November 15 Japanese nobles celebrated Shichi-go-san, or Seven-five-three, a festival to celebrate the health of three- and seven-year-old girls and three- and five-year-old boys.

Thousands of different festivals were celebrated in India. The New Year was celebrated throughout India, although it fell at different times throughout the subcontinent, depending on which calendar a region used. The Hindu and Muslim calendars were different. In the Deccan region people called the New Year Ugadi and celebrated the event by visiting family and feasting. They ate foods that blended the six tastes (bitter, sweet, salty, sour, spicy, and astringent) to symbolize the mix of fortunes in life and listened to predictions for the coming year.

Diwali, the festival of lights, was celebrated at the end of the Hindu month of Ashwayuja in mid-autumn. It lasted five days. Diwali commemorated the killing of demons by Hindu deities, the triumph of good over evil, and the continuity of life. People celebrated by bathing in the Ganges, wearing new clothes, eating sweets, setting off fireworks, and lighting millions of lamps and candles.

Holi was a Hindu spring festival that took place in February or March. People lit bonfires at night and threw



Stone sculpture of Durga Mahishasuramardini, Orissa, eastern India, 13th century; the sculpture depicts Durga defeating the buffalo-demon Mahisha, an event celebrated each year in Bengal at the festival of Durgapuja. (© The Trustees of the British Museum)

colored powder at one another during the day. The colored powder symbolized medicines used against disease. The festival of Vijayadashami was another occasion to celebrate the victory of good over evil. In southern India this festival celebrated the victory of the goddess Durga over a demon. In northern India it celebrated the god Rama's rescue of his wife, Sita Devi, after her abduction by a former suitor. In both regions this festival was the conclusion of nine days of festivities in honor of the goddesses. In much of India people celebrated a harvest festival. These festivals were an occasion to eat sweet foods, wear new clothes, and watch cockfights.

Australian Aborigines held festivals that came to be known as corroborees by European settlers long after the medieval period. These events were held when different groups

of people encountered one another. They played music with rattles, sticks, boomerangs, and didgeridoos. They also performed traditional dances that told the stories of hunts or battles or imitated the movements of animals.

The people of the Pacific islands had their own festivals. Polynesian people's festival traditions shared some similarities with one another because of their common origin in Asia, but during the medieval period islanders were isolated enough that their traditions took on unique qualities. Every island had its own forms of dance and music. Dance was very important to island festivals, and most island people used dance to celebrate their warrior cultures. In New Zealand the Maori men and women would perform the terrifying *haka* dance at festivals, dancing in a military formation, wielding spears, and showing off their tattoos. In Tahiti people held a festival to honor the god Maui. In Samoa and other islands drummers played a crucial role in keeping festivals moving. During festivals island people danced, played traditional sports such as canoe racing, decorated their homes and themselves with flowers, and prepared and ate huge amounts of food.

EUROPE

BY MICHAEL J. O'NEAL

Medieval Europeans celebrated numerous festivals, and many holiday traditions in the modern world represent vestiges of medieval European traditions. Likewise, some festivals and traditions of the Middle Ages had persisted from the ancient Roman Empire or from local practices. Most festivals marked religious events, both Christian and pagan, but their importance to medieval Europeans was not only in their religiosity but also as opportunities for communities to come together to celebrate important milestones throughout the year, including the arrival of spring and planting time, the autumn harvest, and the winter solstice.

Two good examples of festivals with pagan origins were the Festival of the Madman, which carried on the ancient Roman festival of Saturnalia, and the Feast of the Ass. The chief characteristic of the Festival of the Madman, celebrated either on Christmas Day or on the feast of the Epiphany, was that for one day servants played the role of masters and masters played the role of servants, thus turning the social order upside down. Similarly, the Feast of the Ass was typically held on Christmas Eve. To commemorate the story of the birth of Christ, a young girl, playing the part of Christ's mother, Mary, rode into the church on a donkey, or ass. Churchgoers ended each prayer during the Mass with a "hee-haw." Church authorities, however, frowned on this celebration, which they considered sacrilegious.

More serious were the many other festivals associated with Christmas. In the early Middle Ages, Christmas was a quiet holiday, a time for sober reflection and prayer. In different regions of Christian Europe, Christmas was celebrated on different dates, sometimes in April or May, until 350 when Pope Julius I fixed the date as December 25. But Christmas was not celebrated with as much enthusiasm as was the Feast of the Epiphany, or Twelfth Night, which came 12 days after Christmas. Although some people considered it the day Christ was baptized, most people believed that Epiphany is when the three wise men delivered gifts to the infant Jesus. Thus the Feast of the Epiphany became the time for gift giving.

Some medieval Christmas holiday traditions survived from earlier pagan rituals. One good example is the Yule log, which evolved from the Druid tradition of blessing a log and burning it for 12 days during the winter solstice. The Vikings of Scandinavia also burned Yule logs on which they had carved inscriptions representing unwanted character traits; once the logs burned, the gods would take those traits away, and the people would be free of them. The burning of the Yule log was an important feature of the Scandinavian Julfest, a celebration of the winter solstice.

The modern Christmas tree is also a legacy from medieval festival practices, which themselves reflected ancient Roman beliefs. Because it retains its foliage throughout the year, the evergreen tree was held in high regard by the Romans and was often used in festival processions as a symbol of eternal life. Similarly, the Druids believed that holly and mistletoe are sources of good luck because they contain helpful spirits. Christians came to believe that the holly berry's change from white to red symbolizes the blood from Christ's crown of thorns when he was crucified. The use of ivy in Christian churches emerged when it was believed that ivy provides protection against witches and plagues. An important part of Christmas festivities that emerged during the Middle Ages was the performance of Christian liturgical dramas, particularly those representing the Nativity—a practice that survives in Nativity scenes on the grounds of modern-day Christian churches.

Other Christmas traditions dating back to medieval Europe include wassail, a usually alcoholic beverage served warm in a large bowl; the name comes from the Old English words *waes hael*, meaning "be hale" or "good health." Another traditional Christmas treat is mince pie. A medieval Christmas custom was to bake small mince pies in oblong baking pans. The pans represented Jesus's crib, and the three spices added to the pie—cinnamon, cloves, and nutmeg—represented the gifts of the three wise men. Eating a mince pie on each of the 12 days of Christmas, up to the Feast of the Epiphany, was thought to bring good luck. The modern phrase "eat humble pie" came from the Christmas tradition

of poor people and servants eating the “humbles” of a deer—the heart, brains, and liver—while wealthier people ate the choicer cuts of meat.

The arrival of spring represents a rebirth of the world, and in medieval Europe spring and summer were occasions for numerous festivals. One was Easter, which originated in pagan traditions of fertility and birth. The Easter egg symbolized the creation of the world, which many people believed emerged from an egg, and the Easter bunny reflects pagan notions of fertility and procreation. The Christian Church transformed these traditions into the celebration of Christ’s resurrection, or rebirth, on Easter Sunday.

Festivals surrounding the maypole and the first day of May likewise had their origins in pagan beliefs. The Saxons and Celts celebrated the first of May as Beltane, the day of fire; Bel was the Celtic god of the sun. In time it became common to celebrate the first of May as the end of the winter cold, and the date became associated with numerous planting festivals as well as festivals related to hunting and fertility. Europeans transformed the ancient Roman goddess Diana, the goddess of the hunt, into the Queen of the May; and Robin Goodfellow, who evolved into the legend of Robin Hood, was an adaptation of the English horned god Herne. Robin Goodfellow was the Lord of Misrule and made the nobility the butt of numerous jokes. Eventually the Queen of the May was associated with fertility of the fields, and Robin Goodfellow presided over the woods and forests.

Later in the medieval period trade guilds elected an eligible young woman as Queen of the May, who was thought to rule over the harvest. Out of this medieval tradition emerged modern beauty pageants as well as the tradition in many communities of electing a queen to preside over a festival associated with that community’s important crops. A common practice in medieval European communities was the raising of a maypole, a symbol of male fertility. Young men and women gathered to dance around the maypole, where courting rituals took place. The Christian Church frowned on these rituals, so the Queen of the May evolved into a celebration surrounding Mary, the mother of Christ, who was honored with processions and flowers.

In some areas of central and northern Europe people celebrated the eve of May 1 as Walpurgisnacht, or the night of the witches. A common ritual associated with Walpurgisnacht was the lighting of huge bonfires on the night of April 30. The event was the occasion of much revelry and drinking, feasts, pranks, and rowdy behavior—a celebration of release from the confinement of winter.

Equal in importance to the arrival of spring in the colder climates of Europe was autumn and the harvesting of crops. Many of the traditions of Halloween derive from medieval

autumnal festivals. Halloween has its origins in the ancient Celtic festival of Samhain. Samhain, or the Feast of the Dead, marked the end of autumn and the beginning of winter. Many ancient Celtic communities depended on herding for their living. As winter approached, they would move their herds down from their summer pastures on higher ground, and families would begin to huddle in their homes to work on handicrafts. It was also thought to be a time when fairies were especially active.

With the arrival of Christianity in the late ancient and early medieval periods the festival of Samhain evolved. It retained its origin as the Feast of the Dead but was celebrated by Christians as All Souls’ Day on November 2. Meanwhile Halloween, or Hallow E’en, was the night before the Christian feast of All Saints on November 1. The Celtic fairies were transformed into angels who wandered about the streets.



Pilgrim badge of Saint George and the dragon (ca. 1400s); the cult of Saint George, with its associated festival day, gained popularity in England from 1098, when he was said to have appeared in the sky during the battle of Antioch in the First Crusade, causing the enemy to flee. (© Museum of London)

Later in the medieval period people began to imitate the angels, wandering from house to house demanding treats and performing practical jokes, or “tricks,” on anyone who refused. Additionally, many of these people carried turnips carved to represent faces, the origin of the modern practice of carving Halloween pumpkins. Many modern Halloween traditions came to the United States in the 19th century with Irish immigrants who preserved the traditions in their folk beliefs.

In addition to celebrating the major festivals, medieval Europeans held festivities throughout the year whenever they believed there was something to celebrate. In February, Saint Valentine’s Day was marked by dancing, singing, and courtship rituals. People in the British Isles relived the legend of Saint George and the dragon on Saint George’s Day on April 23, and Midsummer Eve was celebrated in June with bonfires. Bones were burned in many of these fires, hence the word *bonfire*. August 1 was Lammass Day, or “loaf-mass” day, when Britons celebrated the first wheat harvest of the year by decorating their homes with garlands, holding candle-lit processions, and bobbing for apples. In September, Michaelmas Day, or the Feast of Saint Michael, was celebrated with feasting; the traditional food became a chicken or goose. Any of these festivals could feature mummery, tumblers, jugglers, jesters, troubadours, minstrels, acting troupes, bull or bear baiting, fairs, and other forms of entertainment.

THE ISLAMIC WORLD

BY BABAK RAHIMI

The emergence of Islam in the Arabian Peninsula in the early seventh century introduced a body of religious festivals along with a new Islamic calendar, which began with the year Muhammad (ca. 570–632 C.E.) and his followers left the Saudi Arabian town of Mecca to form a new Muslim community in 622. The journey was called the Hegira, and the new calendar began with Year 1 A.H. (After Hegira). Most of these festivals took place to celebrate either a historical event of sacred importance or the end of a ritual performance, such as the month-long fast of Ramadan, which was divinely prescribed for the new Muslim community. During the pre-Islamic era of the Arabian Peninsula religious festivals were carried out to celebrate the birth of various gods, including Allah, the ancient god of the rain and sky who represented the supreme god of pre-Islamic Arabs. The rise of Islam as a new religious movement, however, brought to existence festivals that were chiefly meant to celebrate the accomplishment of pious deeds carried out by the new converts to show God their devotion and faith.

Since Islam recognizes correct conduct as the means to a good life in both this world and the afterlife, most Muslim festivities are performed to celebrate the accomplishment of pious actions through hardship and perseverance. However, Islamic festivals have mostly gained sacred significance not by their importance according to the Koranic laws but because of their popular appeal. Most of the Islamic festivities are collective events that allow the entire community, including the poor, women, and non-Muslims, to participate in the ceremonies. They offer an opportunity for Muslims to spend a festive time with their family and neighbors and to foster a sense of religious identity.

In the medieval period Muslim communities participated in religious festivals in various parts of the Umayyad Empire (661–750) and the Abbasid Empire (749–1258), regions spanning North Africa, the Middle East, and parts of central Asia. These religious festivals were organized primarily by Muslim governments to strengthen the religious identity of the Islamic empire, bringing together people of various ethnic and racial backgrounds. They also became unique cultural events where Muslims of various cults and sects, especially Shiite and Sunni, competed with one another for moral prestige and religious legitimacy.

According to Islamic law (sharia), one of the most significant ritual obligations for Muslims is to fast during the month of Ramadan, the ninth month in the Muslim lunar calendar. Excluding the young and ill and those who travel, Muslims are expected to refrain from eating, drinking, and sexual intercourse each day from sunrise to sunset. Although business can be conducted in the course of the day, the community is required to follow through the pious conduct of fasting as a way to worship God while the sun is out. The night, however, offers an opportunity for celebration, as those who fast the entire day are able to rejoice and feast at sunset for accomplishing a day of self-restraint through pious conduct.

The most important day of festivities begins at the end of Ramadan with the last sighting of the moon at the end of the month, on the first day of the month of Shawwal, marking the final day of fasting. After a light meal and a morning prayer the community begins a gluttonous celebration, a holiday that lasts from morning to night. On this holiday, known as the Id ul-Fitr or “festival of the breaking of the fast,” Muslims are also required to pay their annual religious alms as an expression of their piety and festive sharing that strengthens social solidarity. They also wear their best clothes, visit family and neighbors, and go to cemeteries.

The Id ul-Fitr represented the most communal of all the Muslim ceremonies. It was the most popular in medieval times because of the unique opportunity it provided for the common people, including non-Muslims, to celebrate a holi-

day that brought local people together. Although the type of festive activities performed on this holiday differed from one region to another, medieval Islamic communities celebrated this festival as a way to continue a religious tradition that was first celebrated by Muhammad and his companions in 624 in the town of Medina in Saudi Arabia, where Muhammad had traveled to create the first Muslim community.

According to the Koran, God required Abraham to sacrifice his son as a sign of his submission to God who existed beyond the world. When God offered a ram in place of the child as a sacrifice, Abraham was able to recognize the divinely ordained trial as a sign of God and to reaffirm his faith through the act of animal sacrifice as an expression of human ability to submit to God's will. This Koranic story has served as one of the most important sacred narratives to remind Muslims to celebrate an ideal act of devotion to God in recognizing his total authority and control over life.

During the four days of *Id ul-Adha*, which means "sacrificial festival" and begins on the 10th day of the month of *Dhul-Hijja* of the lunar calendar, communal festivities center on the ritual of animal sacrifice and the festive consumption of the animal's meat, which is believed to embody bliss. From the Umayyad to Abbasid rule and continuing into the Ilkhanid (1256–1353) and Timurid (1370–1506) periods, the provincial rulers organized feasts in various provinces that involved the slaughter of two types of domestic animals, mainly goats and sheep. But in the most festive display of the ceremonies in major urban places, such as Baghdad, the capital of the Abbasid Empire, camels were used as a sacrificial animal. The sacrifice and consumption of camel was important mostly because of the belief that the animal embodied a sacred spirit, which Muhammad first recognized when he followed a camel to choose a spot for the first Muslim mosque in a village outside the town of Medina in 622.

Although the most important Muslim festivities were built around certain ritual obligations, such as fasting or sacrifice, the *Mawlid*, or birthday and death day of Muhammad (occurring on the same day, June 8), is celebrated with great care and importance. The day marks an occasion when the faithful can express their devotion to the messenger of God. Under the Umayyads, when the Islamic empire was ruled under the nondescendants of Muhammad, the *Mawlid* was secondary to other holidays, such as *Id ul-Fitr* or *Id ul-Adha*. Under Abbasid rule, however, the festivities gained greater importance as Abbasid caliphs (leaders), who originally claimed family linkage to Muhammad, used the celebrations to legitimize their political power.

The term *mawlid* also applies to other festivities organized for the birthday of local saints and Sufi mystics who were revered by many Muslims, Christians, and Jews in

North Africa, particularly Morocco, and parts of the Middle East, especially Lebanon and Syria. These celebrations usually took place at the tomb of the saint, which many of the saint's devotees visited as an act of pilgrimage.

The first day of the month of Muharram is the beginning of the Islamic lunar calendar. For this occasion some Sunni Muslims, especially in Morocco, mark the day by organizing a special feast, performing music, and visiting the local cemetery to honor the dead. Shiite Muslims, however, recognize the first 10 days of the month as a period of mourning for the martyrdom of the grandson of Muhammad, Husayn (ca. 629–80), by the caliph Yazid I (r. 680–83) at the battle of Karbala in central Iraq.

During the first 10 days of Muharram, Shiite mourners perform a number of lamentation rituals, including poetic recitation, chest beating, and self-lamentation, which symbolically display the devotees' allegiance to the martyred grandson of Muhammad. On the 10th day of Muharram, known as *Ashura*, Shiite devotees congregate to exhibit the most passionate and bloody ceremonies of Islamic festivals, commemorating the beheading of Husayn by Yazid's army through various sorrowful rituals.

The early Shiite Muharram performers displayed these mourning ceremonies as a way to distinguish themselves from the majority Sunni communities. However, under the Sunni rule of al-Qaidr (991–1031) Muharram rituals were also organized by Sunnis to rival the Shiite ceremonies. In the 12th century, when Shiism and the cults of saints continued to spread in the Mesopotamia and the Plateau of Iran, Muharram festivals were observed by many Sunnis, performed even in the zealot Sunni city of Hamadan in western Iran. The rituals became increasingly violent with the rise of the Sufi brotherhood movements in the Islamic world from the 13th to the 14th centuries. In his famous journals, the Moroccan traveler Ibn Battuta (1304–68 or 69) describes a Sufi brotherhood in Anatolia that celebrated the Muharram ceremonies through acts of self-mutilation by knife and sword. These violent ceremonies were meant to signify a state of trance, which was said to enable the ritual participants to have access to a supernatural world through passionate lamentation for the martyred saint.

These forms of lamentation ceremonies also took place on the 40th day after *Ashura*, known as *Arbain*, when Shiites marked another grand occasion to mourn the martyrdom of Husayn. The most significant feature of *Arbain* festivals is the pilgrimage ceremony to the burial place of Husayn in Karbala, a tradition that came into practice under the Umayyad rule in the late seventh century. Both the Muharram and *Arbain* festivals became hugely popular in Iran in the 16th century when the Safavids (1501–1732) declared Shia the official religion of the state.

See also ADORNMENT; AGRICULTURE; ARCHITECTURE; ART; CALENDARS AND CLOCKS; CHILDREN; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; DEATH AND BURIAL PRACTICES; DRAMA AND THEATER; EMPIRES AND DYNASTIES; FOOD AND DIET; GENDER STRUCTURES AND ROLES; HUNTING, FISHING, AND GATHERING; MILITARY; MUSIC AND MUSICAL INSTRUMENTS; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SACRED SITES; SOCIAL ORGANIZATION; SPORTS AND RECREATION; TOWNS AND VILLAGES.

FURTHER READING

- China Internet Information Center. "Traditional Chinese Festivals." Available online. URL: <http://www.china.org.cn/english/features/Festivals/78131.htm>. Downloaded on June 16, 2007.
- Madeleine Pelter Cosman, *Fabulous Feasts: Medieval Cookery and Ceremony* (New York: George Braziller, 2003).
- Daniel Diehl and Mark Donnelly, *Medieval Celebrations* (Mechanicsburg, Pa.: Stackpole Books, 2001).
- Dale F. Eickelman, *Moroccan Islam: Tradition and Society in a Pilgrimage Center* (Austin: University of Texas Press, 1976).
- Ignác Goldziher, "Veneration of Saints in Islam." In *Muslim Studies*, 2 vols. ed. S. M. Stern, trans. C.R. Barber and S.M. Stern (Chicago: Aldine, 1967–71).
- Gustave E. von Grunebaum, *Muhammadan Festivals* (London: Curzon Press, 1976).

► food and diet

INTRODUCTION

The food and diet of medieval peoples can be viewed as the fuel for the rise of empires. It can also be seen as the stuff that most concerned ordinary people during their lives. Happiness and unhappiness often depended more on the availability of food than on religion, good governments, and victory in war. Indeed, starving a population was a tactic of war, and any government that neglected the dietary needs of its people risked violent termination.

The earliest foodstuffs were wild plants and wild animals, and the earliest humans were almost certainly hunter-gatherers. Hunter-gatherers figured out what was good to eat and what was not good to eat, and there is no telling how many possibly starving people tried poisonous foods, discovering for their survivors which mushrooms or fruits would kill them. There were many hunter-gatherer societies during the medieval era, and to many of the people of agricultural societies, these hunter-gatherers seemed to be wandering the landscape, occasionally happening upon something to eat. In fact, hunter-gatherers, whether in central Africa, Argentina's grasslands, or the middle of Australia, were people who rarely set out not knowing where they were going or what they were

looking for. With the exception of islands in the Pacific, they had lived for thousands of years on their lands and knew what there was to eat at different times of the year and where to find it. Far from just wandering, they went to where they were likeliest to find food.

The vast majority of people lived in agricultural societies, mostly because agriculture allowed for larger populations than did hunting and gathering. Agriculturalists were limited in where they lived by the suitability of land for growing crops or grazing domesticated animals. Thus, places like the North American Arctic remained exclusively the realm of hunter-gatherers. Although agriculture had many advantages, particularly the advantage of being able to provide enough food to store for hard times, its limitations could result in malnourished populations. For instance, millet is not as nourishing as rice or wheat; it was thus possible in places such as northern China for people to eat millet and still suffer from nutritional diseases. The medieval Chinese went far to fix the problem by importing a strain of wheat that could grow in the northern Chinese climate. Other peoples did not have such options. For example, in New Guinea, people mixed the growing of gardens with hunting and gathering, because their domesticated plants could not provide them with the amount of protein they needed. Lacking large domesticated food animals, they could supplement their diet with meat only from spiders, insects, rats, and other small animals.

Meat in much of the medieval world was a luxury that the rich ate regularly and the poor ate only on special occasions. This resulted in one of the most interesting disparities among medieval people. The Khoi of the plains of southern Africa, who herded cattle but raised no crops of their own, instead gathering wild plants or trading with east coast cities for grains and fruits, may have had a richer, perhaps healthier diet than the common people in great cities in Europe, the Near East, and China.

Dietary laws also affected what people ate. Human beings do not eat just what nature or common sense would seem to demand, because they develop preferences, social customs, and religious restrictions that affect what they choose to eat and when they eat it. It is worth considering that many people would violate their preferences or social rules to avoid starving. Indeed, some anthropologists believe cannibalism was a response to diets deficient in protein. In some cases, people seemed willing to starve rather than eat a proscribed food such as pork or vermin such as mice.

Many a war began over food. In some cases, entire cultures depended for food on raiding other people, as happened with nomadic northern Asian tribes attacking China and the cities of the Silk Road, or in North Africa, where nomads attacked farming communities, stealing their food or exacting

tribute in food. A consequence of this behavior in northern China were wars with tens of thousands of casualties, with China trying to keep the products of its farms while outsiders tried to cut through the Chinese armies to take grain and other food. Deficiencies in food may have resulted in armed rebellions. Both the Byzantine Empire and nations of the Islamic world took measures to assure that bread was always available to even the poorest of their people, knowing that starving people had nothing to lose by overthrowing governments or trying to loot royal granaries. Among the theories for why the Maya of Mesoamerica shifted from a highly developed and ancient city-building culture with dense populations to a culture of scattered farming villages is that the Maya destroyed too much of their forest environment, resulting in an ecological catastrophe that severely reduced the protein from the wild animals they depended on to supplement their diet of maize, beans, and squash. Malnutrition may have brought a crash in population and forced the abandonment of a social structure that could no longer feed its people.

AFRICA

BY CARYN E. NEUMANN

Africans in the medieval era ate many of the same foods that their ancient ancestors had dined upon. Bananas, fish, sheep, goat, chickens, cattle, yams, millet, sorghum, and insect larvae were popular meal choices in the sub-Saharan area. Africans supplemented their diets with wild animals. Beer remained a common drink of choice. Africans had not yet been influenced by foods from the American continent, and later dietary staples such as potatoes and tomatoes were unknown during the Middle Ages. Nonetheless, the African diet had already been significantly influenced by trade. Much of the African cuisine, including most of the domesticated animals, initially came from Asia or Egypt.

Sorghum is probably the most notable of the grain cereals native to Africa. It is a good source of carbohydrates and provides some protein. In one form or another, sorghum is grown all over Africa. *Sorghum bicolor*, the most primitive form and probably the first sorghum to be cultivated, formed a major part of African diets in the medieval era. Sorghum varieties are high in bitter-tasting tannin, and some possess more tannin than others. The *bicolor* form is sweet sorghum and was often chewed for its sweet taste. It also was eaten as porridge or used for bread. Some sorghums with a high tannin content are selected for food because birds will be deterred from feeding on the grain, leaving a greater food supply for people. The other sorghums proved better for beer making, since the high tannin levels removed the need to use hops.



Condiment tray, Egypt, ninth century (© The Trustees of the British Museum)

Sorghum beer is a brownish-pink beverage with a fruity, sour taste. Beer is an ancient beverage that probably originated both as a way to use grains before they spoiled and as a healthier drink than other available choices. For much of recorded history water has been a source of parasites that kill or disable. Milk, with pasteurization unknown until the mid-19th century, did not have a noticeably better safety record. Therefore most Africans, including infants and nursing mothers, drank beer in the morning, noon, and night. The boiling necessary to make beer neutralized most of tainted water's ill effects, although no one realized this for centuries; the cereals added protein to the diet. Sorghum beer, the prevalent African form of beer, was produced by women and contains an alcoholic content of 3.4 to 4 percent. It would have spoiled easily because hops were not used. The active ingredient in hops, lupulin, inhibits the growth of certain types of fungi and bacteria.

Millet was second to sorghum as a popular grain cereal in the medieval era. Like sorghum, it was used to make beer and would occasionally be combined with sorghum beer. Pearl millet (*Pennisetum glaucum*) generally was preferred to sorghum because it is a tastier cereal. It also has one of the best nutritional profiles among cereals. Pearl millet is found throughout sub-Saharan Africa. Wild forms of finger millet (*Eleusine coracana*) occur in the highlands of eastern Africa. Teff (*Eragrostis tef*) has the smallest seed of all the domesticated cereals and was used as the chief ingredient in a nutritious bread. Digitaria or fonio millet (*Digitaria exilis* or *fonio*) is a highly palatable grain that was used for ceremonial occasions. It was especially popular for couscous and has the additional advantage of being particularly resistant to drought. When other foods were scarce, Africans could eat fonio millet.

West Africans in the medieval era centered their diet on rice. To a rice-eating people, no meal is complete without rice. Accordingly, rice was the essential element of the medieval western African diet. African rice (*Oryza glaberrima*) is an annual grass of the savanna zone. Rice was combined with oil palm, white yam, or yellow yam for a meal. The preparation of yams is complicated and would commonly entail boiling, peeling, slicing, and pounding. Sometimes yams would be steeped in running water or, preferably, saltwater, a detoxification process that generally requires about three days. Yam tubers can be stored to ensure that yams are available for about six to nine months of the year. When yams were unavailable, people would instead eat African breadfruit (*Treculia Africana*). The oil palm, popular in western Africa, found its way into many meals. The sap of the oil palm formed an important source of wine, the fruit and kernel of the tree were eaten, and the fibers of its stem, palm fronds, and leaves were used as fishing lines and fish traps.

Rice also may have been combined with cowpeas, pigeon peas, sesame seeds, or peppers. Cowpeas, among the most popular African vegetables, grow in areas with considerable rainfall. Pigeon peas thrive on less water and would have been eaten either as green pods or ripe seeds. Sesame seeds and shea nuts were important sources of oil. African beans include lablab beans, sword beans, and locust beans. The pulp of the latter bean is eaten, and the seeds are roasted for a beverage. Leafy greens, frafra potatoes, and okra would add additional nutrition to a meal. Nuts of many kinds, including Bambara groundnuts and shea nuts, also were consumed. Kola seeds were used to make drinks.

Africans relied on wild game such as wildebeest, antelope, guinea fowl, and monkeys as supplementary sources of protein. The remains of the black rat (*Rattus rattus*) have been found at medieval sites in Zambia and the 12th-century site of Pont Drift in the northern Transvaal. While the rats may have been pets, they also may have been part of the diet. Dogs were kept as pets and as scavengers and also eaten for food and in ritual ceremonies. They apparently were introduced to Africa early in the Middle Ages and spread only to western and eastern Africa.

While Europeans have shied away from eating bugs, insects have always formed an integral part of the African diet. High in protein and low in fat, insects have the additional advantages of being numerous and inexpensive to obtain. Insect larvae, particularly caterpillars, have been the preferred form. Larvae were fried in palm oil and smothered with onions. Sesame oil, known to have been used in the medieval era, may have been mixed with insects. Some grubs may have been mixed with herbs and spices, but there has been little research into the use of herbs and spices in medieval Africa.

Some domestic animals were raised for consumption. Chickens were first domesticated in India and gradually spread throughout Africa. The earliest appearance of chickens in western Africa is at the Iron Age site of Jenne-jeno in Mali that dates from 500 to 800. In eastern Africa chicken remains have been found in Mozambique. Chickens also have been found in South Africa at an eighth-century archaeological site in Natal. The greylag goose (*Anser anser*), which is the common domestic goose of the present day, and the white-fronted goose (*Anser albifrons*) were first kept in captivity for consumption in the medieval era.

The history of cattle in Africa is better known than that of any other domestic species. Cattle came to the continent from Eurasia and India in the ancient era. By the medieval era cattle were consumed widely. Africans ate meat and drank blood and milk from cattle. However, lactose intolerance among western Africans and some Bantu-speaking people argues against the drinking of milk throughout the continent.

Goats and sheep were introduced from Asia to ancient Egypt and then spread southward. The Khoikhoi possessed a great number of goats, and goat remains have been found in the fourth-century site of the Happy Rest in the Transvaal and the eighth-century site of Ndongondwane in Natal. While goat was eaten, however, the vast majority of Africans preferred sheep because of the fat that could be obtained from the sheep's tails. The fat was semifluid, like thick oil. It was frequently used for oil and for butter. The meat of the sheep, like goat meat, was roasted or boiled.

Many of the meals that are popular in present-day Africa would not have been eaten by Africans of an earlier era. Sweet potatoes, tomatoes, potatoes, cocoyams (taro), corn (maize), cassava, and groundnuts were all introduced to Africa in the 16th century or later. Much of the African diet in the medieval era is unknown because of a shortage of evidence. Advances in science may eventually change this. The combined use of carbon and nitrogen isotopes permits the differentiation of pastoralists from farmers; eaters of camel from eaters of goats, sheep, and cattle; and grain farmers from nongrain farmers. Research on the biochemical analysis of human and animal bone may well eventually unravel the intricacies of the medieval African diet.

THE AMERICAS

BY BRADLEY SKEEN

The main staple throughout North America and much of South America during the Middle Ages was maize. This cereal grain had been domesticated in central Mexico before 7000 B.C.E. Wild maize is inedible because of the hardness

of the husks surrounding the kernels, so the way in which the plant came to be domesticated has never been clear. One possibility is that it was originally used to produce popcorn, which would naturally discard the husks. Between 1500 B.C.E. and 1000 C.E. the plant spread to every part of North America and to the civilizations of the Andes. Frequently maize came together with beans and squash, since the system of agriculture developed in central Mexico used all three plants in a single field; the maize supported the beans, while the leaves of the squash provided an overall ground cover that discouraged weeds. Maize agriculture is far more efficient, in terms of the range of rainfall it will tolerate and the calories and nutrition produced per acre, than is the cultivation of rice or wheat, the common staples of Europe, Africa, and Asia. Amaranth, or pigweed, was another cereal crop that was part of the staple diet throughout the Americas.

The Aztec culture flourished in the valley of central Mexico in the 15th and 16th centuries until the Spanish conquest in 1521. The staple diet of the Aztec was the so-called three sisters of maize, beans, and squash. The ordinary peasant diet consisted mostly of maize, in the form of either tortillas or gruel. Salt and chilies (rich in vitamins) were widely used as flavorings. Tamales were also common, usually filled with beans. Fish and a kind of algae made into cakes, both harvested from Lake Texcoco (upon which the Aztec capital of Tenochtitlán was built), were additional important sources of protein. More protein was brought into the basic diet from shrimp caught in Texcoco and also from insects, especially crickets, ants, and grubs. The maguey worm, a kind of caterpillar, was a special delicacy and is still eaten today in some parts of Mexico.

Maize was processed to make both gruel and dough through nixtamalization. This process involved boiling the grain in limewater (prepared from calcium carbonate and ashes). It removed the outer husk of the grain to make vitamins and proteins more available in the finished food products.

Agave (a kind of succulent plant) provided a fermented drink, but without distillation the beverage was more like beer than modern-day tequila. Honey was collected from domestic bees and sometimes fermented. Other cacti and fruits were more rarely used to produce alcoholic beverages.

The aristocratic diet was more varied. Aztec warriors and wealthy merchants organized dining around formal banquets. These events usually would begin with smoking tobacco and end with drinking chocolate (a very bitter concoction without the milk and sugar routinely put into the product today). An important difference from ordinary meals would be the presence of meat from domestic and wild animals, including turkeys, dogs, gophers, iguanas, and salamanders. Ritual fasting was part of the aristocratic ethos, but in Aztec concep-

tion fasting merely meant doing without salt and chilies. In a densely populated urban area like Tenochtitlán hunting large wild animals must have been of little importance.

Another element of the aristocratic diet was the practice of cannibalism. The Aztec state religion sacrificed between 10,000 and 80,000 people a year, and their flesh was parceled out to the aristocratic warrior and priestly castes at public banquets. While cannibalism could not have been a staple means of acquiring protein in the Aztec diet in general, it must have been significant for the narrow groups who participated in it. The meat was prepared in only one way—stewed with nothing but salt and eaten on tortillas.

The Mayan diet was similar to that of the Aztec and was based on the “three sisters” of maize, beans, and squash. Although the modern name is derived from the Aztec language of Nahuatl, the process of nixtamalization was developed by the precursors of the Mayan civilization in Central America and continued to be used by the Maya down to modern times.

Dogs and turkeys may have been domesticated in Mayan society (which somewhat predates the Aztec, with its Classic Period ending about 900 C.E.) and used for meat. Since



Lime-paste vessel in the form of a lion, white stoneware with ash glaze; Khmer, Thailand; Angkorian Period; 12th–13th centuries (Arthur M. Sackler Gallery, Smithsonian Institution, Gift of Osborne and Gratia Hauge, S1996.150)

honey was commonly used as a flavoring, the Maya probably also had domesticated bees. However, because the Mayan peasantry was more dispersed and lived throughout the countryside, game from hunting was a more important part of the diet. The main animals hunted were deer, tapirs, and peccaries (a wild relative of the pig). Maya living in coastal areas made extensive use of fishery resources to supplement their diet, not only with fish but especially with crustaceans (shrimp and lobster) and mollusks (the conch).

It was possible to grow maize in some areas of the Inca Empire in the Andes Mountains on the western coast of South America, but not very extensively, so the plant remained a delicacy. The coastal plain of Peru is essentially a desert where no agriculture is possible. Rather, the mountainous character of the Inca Empire meant that farming had to be carried on at higher altitudes. The main plants grown on the mountains were tubers, plants whose edible parts grow underground among the root system. The most important of these plants was the potato, which formed the staple diet of the Inca. The Inca grew hundreds of different varieties of potato suited to the varying altitudes at which cultivation took place. The domestication of the potato goes back long before the Inca, as far as 10,000 B.C.E. and the earliest human habitation of South America. The sweet potato was another important part of the Incan diet. The Inca ate other tubers that have never been cultivated outside Peru, such as the oca, the ullucu, and the arracacha. For peoples living on the coast, seaweed provided considerable nutrition.

Food eaten by the Incan aristocracy was vastly different from that eaten by the common classes. The main meat animal eaten by most Inca was the domestic guinea pig (whose origin goes back to prehistoric times). These animals often were prepared by scooping out the organs and filling the body cavity with heated stones to cook the meat. The organs would then be stewed with potatoes. Coarse fruits, such as the pepino, were part of the common diet as well. The poor frequently were forced to eat preserved rather than fresh food. If ordinary Inca did eat llama or game, it would likely have been freeze-dried into a form like jerky. Another source of protein for commoners, especially the army, was salted fish. The Inca were not great fishers, however, and were mostly able to take only sharks and mullet, bottom-feeding fish like skates, and shellfish. In addition, ordinary Inca would gather whatever wild animals were available in their localities, including penguins, beached dolphins and whales, amphibians, and a wide variety of insects. Wild ducks were eaten too.

The main domestic animal eaten by the elite class was the llama. The elite class, especially the royal household, also engaged in hunting as a pastime. The main animals taken were wild llama and deer, but the viscacha, a kind of chinchilla,

also was hunted with lassos. Large hunts would sometimes be organized in which beaters would drive vast numbers of wild animals into an enclosure, and then every kind of animal, even predators, such as bears and jaguars, would be killed by the elite hunters. The disposition of all meat taken by Incan hunters was at the discretion of the king, and most of it was sent to the royal storehouses. Various kinds of clays native to the Andes were eaten by the Inca. Some, rich in mineral salts, were used as a kind of sauce. Others were used to substitute for other foods altogether by people fasting for religious purposes.

The area of the Inca Empire was subject to wide varieties of rainfall because of the El Niño weather pattern, regularly resulting in famine conditions. Therefore, the government maintained storehouses with enough food to feed the entire population of the empire for several years if necessary. Some of the food was salted fish, but storage of food on this scale was possible only because the high elevations of the Andes enabled the Inca naturally to freeze-dry meat, potatoes, and other plants. The carcasses of llamas that had served as pack animals were contributed to this store when the animals died of natural causes, as were most game animals taken by hunting. Because it was meant to be part of royal patronage, food from the storehouses was doled out in the form of grand public feasts.

Civilization is possible only with the surplus allowed by the farming of domesticated plants and animals. It is no exaggeration to say that civilizations spread north from central Mexico along with domesticated maize. By the end of the medieval period (first contact with Europeans) maize cultivation had spread throughout temperate North America, giving rise to the civilizations of the southwestern United States (such as the Anasazi and the Hopi), the Cahokia and other mound-building (Mississippian) states in the middle of the continent, and the Iroquois Confederacy (the term *three sisters* may come from the Iroquois), among other Indian nations. The very landscape was cleared by the spread of farming as huge tracts of forest were cleared for the first time. Farmers naturally domesticated local North American foods as well, such as wild rice in the northern marshes or cassava on the Caribbean islands. Not all areas were suitable for cultivation, among them, the Great Plains (the thick sods embedded with prairie grass could not be cut with wooden plows), so some tribes retained their older hunter-gather existence. The Sioux, for instance, followed the herds of buffalo across the plains, taking almost all of their food and other necessities of life from these animals.

Maize-based agriculture spread from Mexico through the Caribbean and into the northern territories of South America, along with the cultivation of the cassava tuber that originated

in the Caribbean islands. Very little is known about the interior of the South American continent before contact with Europeans because of the lack of written records and of skeletal or other remains in the acidic soils of the Amazon rain forest. Probably most people lived by hunting and gathering, eating whatever plants or animals they could find, including roots, seeds, monkeys, insects, and fish. One of the few types of remains available is large deposits of seashells in many coastal areas, indicating that mollusks were an important food item where they were available. There are indications that settlements in the Amazon region could have contained thousands of households, a size that could have been supported only by a form of agriculture.

ASIA AND THE PACIFIC

BY AMY HACKNEY BLACKWELL

Asia was home to a plethora of culinary styles. Owing to climate and the influence of China, rice was the principal source of carbohydrates throughout much of Asia, though there were areas where starches such as wheat or sweet potatoes took its place. Most Asian meals were simple affairs composed of rice or another starch, vegetables, and little or no meat. People used a vast array of spices to enliven these otherwise simple dishes.

Rice was the staple grain in southern China. It was served either boiled or as a soupy porridge. In northern China, around and to the north of the Huang River, people ate millet, wheat, and sorghum instead, also boiled into porridge. The Italian explorer Marco Polo (1254–1324) noted that people made porridge by boiling millet in milk. Both rice and millet could be made into dough and cut into noodles, which cooks put in soup or served dressed with sauce. Throughout most of the medieval period Chinese people did not make bread of any kind. Rice, millet, and sorghum all could be fermented into alcoholic beverages.

Many medieval Chinese people were too poor to eat anything besides their staple grains. Those who could afford it supplemented rice, wheat, sorghum, or millet with vegetables and meat. Chicken and pork were the most common meats. Beef and mutton were rarer. People who kept chickens also could eat the eggs.

The most common source of vegetable protein was the soybean, which could be prepared many ways. Tofu, a white, cheeselike substance, was made by coagulating soy milk with gypsum and pressing the moisture out of the curds to form soft blocks. Tofu was invented in China; no one is exactly sure when or where, although it is certain that tofu was widely available by the start of the medieval period. Some historians have suggested that Chinese cooks borrowed

milk-curdling techniques from the Mongols. Others believe that mixing soy milk with sea salt could have created a tofu-like substance.

Chinese cooking featured a great many vegetables, including mushrooms, peanuts, eggplant, and bamboo shoots. Chinese cooks devised stir-frying as a way to conserve fuel. Firewood was in short supply, so they tried to cook using as little fire as possible. To enliven their stir-fries, cooks added various spices, including ginger, garlic, daylily buds, and several kinds of pepper. Tea was a ubiquitous drink by medieval times.

North of China the Mongols ate a much less varied diet. Most of their food came from their livestock. They ate a great deal of mutton, goat, camel, beef, and any other meat they could acquire. Dried meat was essential to surviving harsh winters. Cooks typically prepared meat by boiling it. Mongols also consumed many dairy products. They boiled milk, scraped the cream off the top, and dried curds in the sun on their tents; they also dried cheese and fermented mare's milk to make an alcoholic beverage.

The cooking of Southeast Asia resembled that of China. Rice was the main starch. Cooks followed the same practices as Chinese cooks, cutting vegetables and meats into small pieces and cooking them quickly. Many Southeast Asians were Buddhists and did not eat meat but substituted tofu as a source of protein. During the medieval period food in this region was heavily spiced with ginger, basil, pepper, tamarind, shrimp paste, and coconut milk. The chilies that characterize the region's cuisine in modern times are New World plants and did not exist in the region until the 1600s.

Koreans adopted many of the foodstuffs of China, including rice as a staple starch. Korean cooks sometimes added beans, nuts, or other grains to their rice. They also cooked rice into a porridge flavored with other ingredients, such as mushrooms, pumpkin, ginseng, or abalone. In addition to rice, cooks served soups, stews, and cooked meat, fish, tofu, or vegetables. As was the case throughout most of Asia, meat was an uncommon treat for most households.

One quintessentially Korean dish was kimchi, a fermented vegetable pickle served with nearly every meal. Historians believe Koreans started making kimchi several centuries before the start of the Common Era. In its earliest incarnation kimchi was just salted vegetables. In the 1100s cooks began adding different ingredients to make the kimchi sweet, sour, or spicy. The modern form of kimchi made from cabbage did not appear in Korea until the 1800s.

Ginseng, a root, thrived in Korea. Koreans and Chinese people sliced it thin and boiled it to make a tea. This tea was believed to improve the health by balancing the energy in the body.

Rice was the staple starch in medieval India, although people also ate millet, barley, and wheat. Each of the several different varieties of rice was prepared in a slightly different way. Many people strained the water from rice after it was boiled and then made the rice water into a sauce by adding ground spices to it. Sometimes cooks added spices to the water they used to wash rice before boiling it. Typical spices included cardamom, cumin, cloves, coriander, and pepper.

Many Indians were vegetarian by religion; high-caste Hindus and Jains never ate meat. Others were vegetarian by necessity, because they could not afford to buy meat. Vegetarianism was by no means universal, however. Nobles and members of the royalty were not vegetarian. There are reports that nobles ate meats roasted on spits and baked fish, which was considered very good for people suffering from illness. Depending on the region, people were forbidden to eat certain animals. The meat of cows was often avoided in Hindu regions, and Muslims refused to eat pork.

A typical Indian meal included rice, a soup, and raw and cooked fruits and vegetables. Legumes such as lentils, mung beans, peas, and other pulses were common ingredients in soup. When eaten with rice, they furnished complete protein to the vegetarian Indian diet. People ate many vegetables, including various types of greens, tubers, and radishes. Cooks combined these ingredients in various ways and added spices to enliven them. Indian people also ate a great deal of fresh fruit, including lemons, grapes, pomegranates, jackfruit, plantain, and mangoes, which were considered the king of fruits. Desserts were very popular. Favorite sweets included puddings of buffalo milk mixed with sugar and spices, a rice pudding called *payasam*, and sweet noodles. People often brought *payasam* to temples as an offering to deities.

The staple food in Japan was rice. Many people ate rice at every meal, and for some people rice constituted the entire meal. The word for “meal” in Japanese, *gohan*, means “rice.” Cooks supplemented their rice with vegetables, fish, and a few simple sauces.

Seafood was an essential source of protein for many Japanese people. Japan has a very long coastline, so many Japanese people went fishing or gathered shellfish every day. Raw fish was considered the most delicious and healthful. Japanese cooks sliced their fresh fish thin and served it with bowls of rice. They also cooked seafood over fires, put it in soup, or dried it in the sun. Dried fish provided protein when fresh fish was unavailable. The Japanese dried fish in a variety of shapes, slicing fillets from large fish and drying tiny fish intact; the bones of these small fish were considered good for the health. Meat from mammals and poultry was much less common than fish on Japanese tables. Some farmers raised chickens and other fowl, and people ate eggs in addition to

meat. It was impractical to raise large animals such as cows in Japan’s environment, so beef and dairy products were virtually unknown.

Zen Buddhist philosophy taught that it was wrong to kill any creature, and for this reason many Japanese people were vegetarian. Tofu first appeared in Japan in the late eighth century, around the time Zen Buddhism took root in the area. Japanese Buddhists obtained most of their protein from soybeans and soy products, such as tofu, miso (fermented soybean paste), and *natto* (fermented, steamed soybeans). Soy sauce was the main salty seasoning, and soy products were popular even among people who did eat meat. Most meals included a bowl of miso soup that was served as a drink to wash down solid food.

All Japanese people ate many vegetables. Even the simplest meal of rice would usually include pickles made from daikon radishes, cucumbers, or other vegetables. Other common vegetables included cucumbers, eggplants, bok choy (a leafy vegetable), burdock root, lotus root, and various kinds of cabbage. Tiny pickled plums were a common salty addition to rice. People ate many different types of seaweed, either dried or reconstituted in soup.

Zen Buddhism taught that people should find pleasure and spiritual satisfaction through everyday activities, such as farming and the preparation of food. This led Japanese people to elevate the preparation of simple meals into an art form, with the presentation of dishes in attractive bowls an essential part of the meal.

Pacific islanders were somewhat limited in their available foodstuffs. Those who lived on larger islands in tropical climates could grow or gather a wider variety of plant foods than those in colder climates or more remote regions. Common fruits and nuts included coconut, breadfruit, macadamia nuts, bananas, and pineapple. The staple starches were sweet potato, taro, and cassava. Some islanders raised chickens and pigs for meat and eggs. Fish and shellfish were the primary source of protein for many islanders, though they also hunted wild birds.

The aboriginal people of Australia were very good at finding food in their harsh environment. They ate grubs, moths, honeypot ants, honeybag bees, and other insects, and they gathered eggs from birds’ nests. Men hunted kangaroo, wallaby, echidna, opossum, koala, and any other animal they could catch. Women gathered a variety of plant foods, including yams, fern roots, palm hearts, nuts, seeds, leaves, figs, and berries and other fruits. In coastal areas the people gathered shellfish from the shallows. The nuts of bunya pines were a popular food. Wild honey was their main sweetener.

Australians cooked meat over fires, sometimes wrapping it first in leaves. Preparing plant foods was very time-con-

suming; women had to extract seeds, remove inedible portions, and sometimes pound the foods for hours before they could be eaten.

EUROPE

BY CARYN E. NEUMANN

Most of the surviving written records of medieval food consumption in Europe are accounts of fabulous feasts prepared by court cooks. The accounts emphasize the power of the ruler. Food is secondary. It is assumed that recipes were rarely recorded, because only a few survive. The most numerous people in Europe, the poor, did not use recipes at all. Food preparation techniques were handed down from mother to daughter and changed little through the years.

Political and economic connections often allowed foods to travel from one country to another. This foreign influence is indicated by the names of such medieval French dishes as Saracen Broth, German Broth, Subtle English Broth, and Norse Pasties. The medieval French professional cook appears to have been particularly fond of broths, jellies, deep-fried dough, roasted meat garnished with an assortment of sauces, and strained dishes of meats or vegetables. The bull or ox was far too valuable as a draft animal, while the cow was prized more as a bearer of calves and a producer of milk for cheese than it was for its meat. Only when these animals had aged beyond their useful life were they considered for food, but by this time their meat had lost much of quality. All classes consumed beef, mutton, and pork. Cuts of mutton generally were boiled or salted for later consumption. Suckling animals such as veal, lamb, and kid were quite popular. The upper classes ate venison, but restrictions kept the other classes from legally hunting deer. Similarly the consumption of birds was restricted by custom, law, and expense. Townsfolk and peasants ate few wild birds or chickens. The nobility consumed the most poultry, with many illustrations portraying kings and noblemen carrying hawks for use in falconry. Archaeological remains provide evidence for the relative numbers of the different species that were eaten. Among the favorites were chickens, ducks, guinea fowl, and geese as well as wild game birds such as partridge, pheasants, doves, cranes, and herons.

French cuisine emphasized the appearance of the dish and, most especially, its color. Saffron, extensively used, seems to have been preferred more for its reddish-yellow color than its taste. While the Italians displayed a love for a range of pasta, the French rarely used dough in this form. Omelets, common in Italy, were unusual in France, with eggs rarely used in dishes as either the sole or the main ingredient. Candied foods were rare in medieval France. Fruits, except for

raisins, were not often cooked. Pears, plums, prunes, peaches, quince, cherries, gooseberries, and red currants could be found commonly in markets.

The staple of the French diet, particularly for the poor, was bread. Wheat, semolina, bran, millet, rye, oats, and barley all had a role in various types of French bread, which came in all shapes and sizes. French cooks generally stewed leafy greens such as leeks and cabbages. They boiled and pureed peas, white beans, and other legumes. Bulbs of the onion family (leeks, onions, garlic, scallions, and shallots) were fried to add flavor to dishes. Brussels sprouts, watercress, and turnips were grown in quantity but are rarely mentioned in recipes. Turnips were used as animal fodder, but it is unclear if they were widely consumed by people. While carrots, beets, and parsnips are noted in recipes, they seem to have been consumed only rarely. Honey was the most common sweetener until cane sugar replaced it in the 14th century. The liquid products of the grape—must, verjuice, wine, and vinegar—all played a vital role in prepared dishes. Beer and ale had virtually no place in medieval French cookery, but they were widely consumed in other parts of medieval Europe.

While purees and porridges were common elsewhere in Europe, medieval Italians rarely ate them. However, vegetables were given a prominent place in Italian cuisine. A number of the dishes prepared for the upper classes show an Arabic influence in the use of sugar and cinnamon sprinkled over a dish or in the use of sauces flavored with raisins as well as prunes. Pasta made with rice flour, pizza, polenta, sausages, risotto, and soups were among the common foods. Veal was the most common meat among the wealthy, while everyone ate cheese. Sweet preferences included spiced cakes and biscotti.

The food of peasants was determined by the natural resources that were available locally. In the north of Russia, where the main grain was rye, the peasants generally ate dark rye bread, known as black bread. In the south of the country and in Ukraine, where wheat dominated the crops, white bread was more common. Bread was the main staple and was present at every meal on the tables of the people. Grains were not only baked but also cooked with water into different kinds of kasha, a mixture reminiscent of porridge but with varying consistency. In addition to grains, an important part of the diet came from the woods: gathering mushrooms, wild berries, and nuts was the pastime of children and grandparents, who lacked the strength to toil the land. Fish and meat were highly appreciated but scarce in Russia and reserved for special occasions.

The traditional Russian beverage, *beriozovitsa*, was made from the sap of birch trees, which was kept in large tubs to achieve natural fermentation. A similar drink, *medovukha*,



Copper alloy cauldron for cooking, Britain, 1200s or later (© Museum of London)

was made of honey, hops, and yeast fermented together. These beverages were later replaced by kvass, a fermented wheat drink. Russians did not regularly eat uncooked food. Even fruits and vegetables at harvest time were processed in some way, mainly to be eaten during the long winter. In Slavic countries the stove served as a dryer for all kinds of fresh produce—herbs, mushrooms, fruit, and berries. During the day it kept food warm and provided the requisite temperature to speed up the fermentation of kvass and other drinks.

Religion had a significant impact upon food consumption. During the Middle Ages the church in Poland strictly enforced meatless fast days (Wednesday and Friday) as well as fasts on certain holy days. During Lent, Poles were expected to abstain not only from meat but also from butter. The Orthodox Church heavily influenced the eating habits of Russians. Orthodox believers were required to fast 178 to 200 days of the 365 in the year. Since meat and meat fat were prohibited during all fasting days (in addition to being prohibitively expensive), Russians adopted mushrooms as a meat substitute. Wealthier peasants might eat fish pies and salted herring for Lent.

The *Primary Chronicle*, the major source of information about the eastern Slavic state of Kievan Rus' of the ninth to the 12th centuries, reveals that food and drink as sources of pleasure were to be shunned. Sustenance was a benefit granted by a ruler to demonstrate his power and Christian piety. Banquets for military leaders served to reward past services and to ensure continued loyalty, and providing food and

drink for the poor and sick was the duty of a devout Christian. The Kievan Rus' commonly ate oats, wheat, bran, lentils, chickpeas, and honey, often in the form of the beverage mead. The *Primary Chronicle* does not mention any specific fruit or vegetable, other than *zel'e vareno*, or "boiled greens."

Medieval documents indicate that mead remained quite expensive in Poland. It appeared only at lavish feasts. Some monasteries produced wine, but the beverage was expensive because it was typically imported. A beer made from fermented toasted millet reached Poland in the sixth or seventh century. Beer fermented from a number of grains, typically millet, barley, wheat, rye, and oats, subsequently became the most popular drink among all classes. It even found its way into soup in combination with egg yolks and cheese. Pots from the 12th century containing traces of honey and small crocks of carbonized millet were unearthed from a medieval house at Gniezno. The animal-shaped *redykalki* cheeses from the hill country of Podolia apparently date to the medieval period. Luxury foods, such as almond milk and sugar, were enjoyed only by a privileged few.

The Poles believed that the amount of food was more useful to the body than the particular type of food, although meat was seen as the ultimate source of protein. A dinner for nobility would include not only a large quantity of meat but also huge amounts of bread and rolls. The bread was used to make trenchers on which each person ate. A purchase order for a royal dinner in 1394 itemized fish, lamprey, crayfish, green peas, dried peas, walnuts, pears, plums, cucumbers, parsley, beer, 360 loaves of rye bread, and 60 loaves of white bread. Each person was expected to consume about two quarts of beer. The food was eaten with the fingers. Meat was seasoned with pepper, saffron, parsley, and mustard. Mustard was the most common Polish condiment for flavoring meat sauces. In both western Europe and Poland pork lard was the primary cooking fat. Whereas the French used olive oil, the Poles used hemp or poppy seed oils.

English peasants apparently grew wheat, oats, barley, rye, peas, and beans. While much of the grain was eaten or set aside for sowing the following year, barley often was used to make ale. Women were the major brewers. Barley also formed a popular type of bread. Apples and pears were the major fruits grown for the market, with the large Costard as the most popular apple and the large and very hard Warden as the favorite variety of pear. Cherries could be found at market, but strawberries and vegetables typically were grown only for home use. Very large quantities of almonds were imported for use in almond milk, while pomegranates, oranges, and lemons were among the exotic foods that were often brought to England. All of the ports of England imported wine, although it was also produced locally.

Cattle and sheep, with pigs, were the main meat-providing animals in England. However, cows and sheep had more value as producers of milk, manure, wool, and traction for plowing and pulling. The English preferred beef, although they ate mutton, lamb, chicken, and goose. Rural people ate more mutton than did urban residents. For preservation, the English preferred smoking meat to salting meat. They relied heavily on stews, possibly because boiling counteracted the taste of tainted meat while reducing the salty flavor and leathery texture of preserved beef and mutton. Roasting, which consumes large amounts of fuel and labor, was a sign of wealth. All classes of English society ate chickens and geese. The nobility ate large numbers of doves, bred in dovecotes that held hundreds of pairs of birds. Peasants were forbidden by law to hunt larger animals, but the nobles commonly ate venison and boar. Demand for fish, especially saltwater varieties, remained high throughout England. The English favored herring, smoked, salted, or fresh.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

The concepts of *halal* and *haram* are important to understanding the dietary practices of medieval Muslims. The term *halal* refers to something permitted by Islamic law or by Islamic morality, whereas the term *haram* refers to something not permitted by Islamic law or Islamic morality; each term can be applied to many aspects of life other than food. Any foods or beverages that Muslims were allowed to eat on a regular basis were *halal*. Foods or beverages that were *haram* included not only foods that were forbidden almost all of the time but also foods or beverages that were forbidden at certain times. The most important difference applied to wild game. In general, if a wild animal was killed by a hunter, its meat was *halal*. But when a person was on the hajj, the pilgrimage to Mecca that was required by the Muslim faith, that person was not allowed to eat or hunt any wild game. This restriction did not apply to fish.

Intoxicating beverages were *haram*, but numerous records, stories, and poems from the medieval Islamic world make it clear that many Muslims drank alcoholic beverages, often past the point of intoxication. Punishment for public intoxication involved being whipped with a switch in public, and accounts of such instances make it clear that even aristocrats were not exempt from the punishment, which was usually administered the moment the miscreant was apprehended. Blood was also *haram* because it was thought to be dirty, even toxic. Likewise, bloody meat was forbidden. Meat from an animal killed by another animal was considered carrion (rotting flesh that is unfit for human consumption), and

it was *haram*. Any food over which the name of any god other than Allah had been spoken was considered consecrated to a pagan god, and eating it was an almost unforgivable act.

The best known of the forbidden foods of Islam is meat from pigs. In the arid regions of the Near East, where clean water was scarce, pigs would wallow in mud, often including their own feces, to cool down. Thus, pigs were considered particularly unclean and unhealthy. Some Muslim scholars believed that a Muslim must not touch any part of a pig, not even in transporting preserved pig flesh. Muslims were not supposed to eat meat from any animal that had cloven hooves, and one way to recognize such an animal was by its chewing cud. Pigs have the forbidden hooves but do not chew their cud; hence they became a symbol of hypocrisy and a common image for hypocrites. People who professed to be Muslim but transgressed against laws set forth in the Koran were like pigs: Their appearances were deceptive.

Most medieval Muslim experts on dietary laws seem to have been pragmatists. People who would otherwise starve to death were permitted to eat forbidden foods; likewise, people dying of thirst could break restrictions against intoxicating beverages. Even so, there seem to have been Muslims who would choose to die rather than to consume something that was *haram*. A person who ate or drank an item forbidden by Islamic law or who broke the fast of Ramadan (the ninth and holiest month of the Islamic year) was expected to fast in penance. In the case of breaking the fast of Ramadan a violator was expected to fast two extra days for each offense.

Most people in the medieval Islamic world, whatever their faith, rarely ate meat, which was reserved for special occasions. The wealthy or well connected might have eaten meat more often than others. The meat of gazelles and deer was preferred over that of other game animals, except for birds, such as partridges. Meat from domesticated sheep, wherever it was available, was almost universally preferred over that of any other domesticated animal. There may have been some disagreement among experts on dietary laws about what sorts of fish were preferable to eat, although most agreed that fish in general were acceptable. Most fish came from lakes, from streams, and from the sea near shore.

Meat was supposed to be purified ritually. Ritual purity was called *tahara*. All meat had to be prepared by Muslims or by People of the Book (those who worship the god of Abraham), such as Jews and Christians. The slaughterer of an animal was required to say "In the name of God, God is the greatest" just before slaughter. The animal was not to be slaughtered in front of other animals. An animal had to be killed by an unserrated knife in one motion, slitting its throat so that the arteries, trachea, and esophagus were opened, cutting to the spinal cord without severing it. Then the animal

had to be upended to drain its blood. A wild animal that was killed by hunters usually was also *halal*. *Haram* was the meat from animals that were drowned, strangled, or struck a blow or from animals that had fallen to their deaths or been killed by wild animals. Muslims considered butchering to be dirty and unwholesome, so in much of the medieval Islamic world the butchers were Jews. In some cities the shops of butchers were segregated from the rest of the city, probably because the smell of butcher shops was considered offensive.

Throughout the medieval Islamic world bread was considered an essential food. Unavailability of bread or flour for making bread could lead to riots in cities and towns. Bread was usually made of wheat, although in places where wheat was rare, sorghum or barley was used. Travelers would carry flour and water with them. When camped outdoors, they would build fires that they encircled with stones. When the

stones were hot, they would brush off the cinders from the stones, mix flour and water, and place dollops of dough on each stone, then covering the dough with ashes. The dough would bake into a flat bread, which would be brushed off and eaten. This bread could be especially important during the hajj, when hunting wild game was forbidden. In the countryside homes usually had ovens in which bread could be baked; in cities houses often had no ovens, but bread could be purchased from bakers. A common meal would consist of bread covered with olive oil, eggplant, garlic, onions, or other vegetables. The other important grain of the medieval Islamic world was rice, which was common along the Nile and in parts of India. In many places rice was an expensive import eaten primarily by the rich.

Most medieval Islamic cities had two important areas of activity, mosques and markets. Outside of cities farmers often chose an unused spot to set up markets, which sometimes grew into towns. Except for privation caused by warfare or natural disasters, such as droughts, the markets were filled with the colorful bounty of gardens and farms. A city usually had gardens and orchards around it, from which fruits and vegetables were brought to city markets daily. Further, fruits and vegetables were imported from faraway places, preserved by cooling with snow, drying, salting, pickling in vinegar and salt, or cooking. Dates, oranges, raisins, apricots, and peaches were commonly available fresh, except to the north in central Asia, where they sometimes had to be imported. Nuts, molasses, honey, sugar, olive oil, mustard, and spices were found in markets. From India and North Africa came sugarcane, watermelons, mangos, bananas, and eggplants.

Pure water was esteemed in the medieval Islamic world. At markets were peddlers who carried on their backs jugs of water, from which they would pour water for their customers. In some places unadulterated water was rare and affordable only for the wealthy. The people of the medieval Islamic world were fond of fruit-flavored drinks. These were mixtures of water and juices from such fruits as dates, pomegranates, tamarinds, apples, oranges, lemons, and grapes. Muhammad was said to have been fond of drinking milk, but it was hard to keep fresh, so milk was usually made into yogurt or cheese, which would keep longer.

What drinks were *halal* or *haram* was debated by Muslim scholars. Some thought that soft beverages were acceptable; hence near beers were available. Slightly fermented fruit drinks were common throughout the Islamic world and were thought by some people to be *halal*. Wine and heavily alcoholic beverages were almost universally considered *haram* but were found almost everywhere too. Many vineyards that had produced grapes for wine in the Byzantine Empire were either abandoned or turned to producing grapes for raisins



Flask, rock crystal with enameled gold mount, Egypt, Fatimid Dynasty, mid-10th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1949-14)

and molasses after being taken over by Muslims. Even so, some Christians made wine, which was necessary for various Jewish and Christian rituals and which was also sold to Muslims. Wine and other alcoholic beverages were also imported from Europe.

Muhammad was supposed to have had a fondness for a dish called *tharid*, and as a consequence it was eaten throughout the Islamic world. It consisted of strips of meat stewed in broth and covered with crumbled bread near the end of the cooking time. The meat was chicken, goat, beef, or lamb, and the dish was prepared for lords as well as ordinary folk. Meat was cooked in spiced sesame oil or olive oil. Although many people could not afford meat, most other foods were available in nearly all places at most times during the medieval era in the Islamic world. Women usually prepared the dishes; a member of the household would take the dishes to a bakery to have them cooked, because few homes in cities had ovens.

In the majority of towns and cities shops carried a variety of breads and pastries as well as candy. In many cities there were restaurants. These establishments varied in quality and in clientele. Restaurants would likely have *tharid* available. According to what meats, fruits, and vegetables were on hand, the restaurants would serve a variety of foods, from meatless dishes to dishes with stewed or roasted meat.

See also AGRICULTURE; CITIES; CLIMATE AND GEOGRAPHY; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; INVENTIONS; MILLS AND MILLING; NOMADIC AND PASTORAL SOCIETIES; RELIGION AND COSMOLOGY; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE.

FURTHER READING

- K. T. Achaya, *Indian Food: A Historical Companion* (Oxford, U.K.: Oxford University Press, 1994).
- Melitta Weiss Adamson, ed., *Regional Cuisines of Medieval Europe: A Book of Essays* (New York: Routledge, 2002).
- Sophie D. Coe, *America's First Cuisines* (Austin: University of Texas Press, 1994).
- Maria Dembinska and William Woys Weaver, *Food and Drink of Medieval Poland: Rediscovering a Cuisine of the Past* (Philadelphia: University of Pennsylvania Press, 1999).
- Thomas S. Githens and Carroll E. Wood, Jr., *The Food Resources of Africa* (State College: University of Pennsylvania Press, 1943).
- Musya Glants and Joyce Toomre, eds., *Food in Russian History and Culture* (Bloomington: Indiana University Press, 1997).
- Peter Hammond, *Food and Feast in Medieval England* (Stroud, U.K.: Sutton, 2005).
- Naomichi Ishige, *The History and Culture of Japanese Food* (London: Kegan Paul, 2001).
- Bernard R. Ortiz de Montellano, *Aztec Medicine, Health, and Nutrition* (New Brunswick, N.J.: Rutgers University Press, 1990).

Thurstan Shaw, Paul Sinclair, Bassey Andah, and Alex Okpoko, eds., *The Archaeology of Africa: Food, Metals, and Towns* (London: Routledge, 1993).

Christopher M. Woolgar, Dale Sergeantson, and Tony Waldron, eds., *Food in Medieval England: Diet and Nutrition* (Oxford, U.K.: Oxford University Press, 2006).

► foreigners and barbarians

INTRODUCTION

Most people in traditional cultures lived in small, relatively isolated farming communities or closely knit tribal groups and never saw strangers. Based on this experience, they reacted to the idea of the foreign with xenophobia, that is, suspicion and hostility toward any stranger or outside influence. Violence was a common reaction to meeting foreigners. A more cosmopolitan attitude accepting the foreign could develop only as trade and urbanization made contact with foreigners and familiarity with their cultures a more common experience.

Chinese culture, for example, was notably xenophobic in the Middle Ages. Exceptionally, the Tang Dynasty (618–907) was the most cosmopolitan in Chinese history, allowing foreign religions to enter China and developing trade along the Silk Road (the capital was moved to Xi'an in western China) and across the Indian Ocean as far as Cairo, and founding the Pearl River estuary port of Guangzhou for foreign merchants. But Chinese culture later reverted to older policies of isolation and a belief that China, particularly the Han Chinese ethnic group, was inherently superior to all foreign or barbarian cultures. The Chinese emperors thought that they were the rightful rulers of the entire world, and during the Ming Dynasty (1368–1644) they went so far as to send one of the greatest fleets of wooden sailing vessels ever assembled on a tour of the Indian Ocean to exact tribute from the local rulers. Foreigners were poorly treated in India as well because they were deemed inferior as having no caste in the Indian social system.

Because of the general attitude of xenophobia among traditional peoples, many words for foreigners are based on negative stereotypes. The normal Indian word for foreigner was *mleccha*, while the normal European term was *barbarian*. In both cases the word is an attempt to capture the supposed gibbering sounds of people who speak only foreign languages. The Aztec similarly referred to a foreign people with whom they were in conflict not by their own names but as *chichimecs*, “sons of dogs.”

One common response to the proximity of foreigners in medieval cultures was isolation. When the Arian Germanic

tribes conquered the western province of the Roman Empire in the fifth century, they generally lived apart from their Catholic subjects. The process of assimilation took a century. The same is true in the first generation of the Islamic Empire. Muslim Arab garrisons kept themselves strictly segregated from their Christian and Zoroastrian subjects, and there was not initially a rush to proselytize for Islam among the newly conquered peoples. But this policy of isolationism broke down in favor of assimilation. Even in more cosmopolitan centers that favored international trade, foreign merchants usually were governed and restricted by special laws to control and limit their influence.

Jews were outsiders in both the Christian and Islamic world, and their own traditions made conversion or assimilation unlikely. Islamic law made provision to give limited acceptance to the Jewish community along with Christians as “peoples of the Book” who were fellow monotheists; at some times and places they were well tolerated and could rise to professional and social prominence. The situation for Jews in the Christian world was conditioned by the increasing hostility of medieval Christianity to any outside group, whether eastern or heterodox Christians, “pagan” Baltic tribes, or Muslims. Jews were systematically isolated and eventually either expelled from entire kingdoms (as from England in 1290 or Spain in 1492) or segregated into ghettos. Ironically, Jews initially welcomed this segregation because they believed it would help protect them from the sectarian violence their communities frequently suffered in medieval Christian cities.

A quite different way that medieval people encountered foreigners was through international travel. This most often took the form of religious pilgrimage. Muslims, if they were otherwise able, were required to make the hajj to Medina and Mecca at least once in their lifetime, and pilgrimage to Jerusalem was if not obligatory then at least highly desirable in the Christian world. Indeed, one of the contributory causes of the Crusades was the interference of Islamic governments with the right of pilgrimage to Jerusalem.

Other journeys were taken as a sort of reconnaissance for trade, such as the trip of the Venetian Marco Polo to China (if indeed that journey was not a fictionalized account of other travelers’ memoirs). The Moroccan legal scholar Ibn Battuta (1304–ca. 1370), however, was the greatest traveler in the Middle Ages. He made the hajj as soon as he finished his education and continued traveling throughout Asia, Africa, and Europe for the next 30 years, covering an estimated 75,000 miles back and forth between Timbuktu in western Africa and Guangzhou in China. This kind of contact with foreign culture promoted a more cosmopolitan acceptance of the alien.

AFRICA

BY KIRK H. BEETZ

The history of foreigners in medieval Africa is as varied as the cultures of Africa, with some cultures having social mechanisms for coping with outsiders and some seemingly lacking ways to deal with outsiders. More is known about the attitudes of those people on the fringes of the continent, and less is known farther toward the interior of medieval Africa. Much of what is known of medieval African cultures comes from the writings of foreign visitors; therefore, the point of view is that of outsiders rather than that of the Africans themselves. Further, the foreigners often recorded hearsay. For instance, the explorer Ibn Battuta notes that in the city of Yufi (perhaps known today as Nupe) white people were unwelcome, but he only heard this, not having actually visited the city, where he presumably would have been unwelcome. Indeed, as a foreigner he could not explain the origins of the attitude or why it was held.

There were Christian nations in Nubia as well as in Ethiopia for most of the medieval era. For centuries there was a powerful trading nation, Axum, with a great seaport, Adulis, about an eight-day trek from the capital city, also called Axum. This nation prospered as a way station for the exchange of goods from the interior of Africa for goods from Asia, North Africa, and Europe. Not much is yet known about their laws governing foreigners, but there seem to have been rules of conduct for foreign visitors, and all had to be inspected by government agents. Adulis may have had quarters in which foreigners could stay. There also may have been a local industry based on providing for the needs of visitors. It was apparently easy to find local people who spoke Greek or Arabic, major trading languages for the region.

Nubia had been receptive to Christian missionaries from the Byzantine Empire beginning in 543, resulting in long-term relations with the Byzantine Empire even after the Arab conquest of Egypt about a hundred years later. Visitors to the Nubian nations of Nobatia, Makuria, and Alodia noted that there were hundreds of churches. In general, foreigners were tolerated. The Nubians long had peaceful relations with Muslim Egypt, and Arab traders would have been seen frequently. It is hard to be certain what the Nubians thought of visitors, but they seem to have been comfortable with them. The invasion of Nubia from Egypt in the 1200s may have been a shock after centuries of peaceful relations. In 1276 the Saracens put their own candidate on the throne of Nobatia, in the 1300s Makuria fell, and in the 1400s Alodia fell. Although many local people converted to Islam, many did not, and many fled. For the rest of the medieval era there was enmity toward Muslims among those who did not convert.

Axum suffered from the hostility of its Muslim neighbors, and eventually its people withdrew to the Ethiopian highlands. Ethiopia and Egypt had a treaty that allowed Ethiopians to travel through Egypt on pilgrimages to Jerusalem in exchange for an annual tribute of slaves. Much of Ethiopia's contact with the outside world came through Egypt, and Egyptian traders visited frequently. People from Europe also visited and found Ethiopia to be an enigmatic place with strange social rules. Ethiopians were eager to show off their churches to visitors, but they were a society bound by complex rules of kinship, and foreigners who had no kin in Ethiopia were almost nonpersons. Foreigners could elevate their status by incurring obligations from Ethiopians, perhaps by doing favors or presenting gifts, and by accepting favors, because any kind of relationship in which there were obligations gave a person a place in society.

Before the beginning of the medieval era there were already trading communities along the coast of East Africa. Historians originally thought that cities were established by Arabs and Indians for trading with the interior of Africa, but recent archaeological discoveries show that the cities were founded by Africans. Moreover, rather than being controlled by foreigners, the cities were only influenced by foreigners.

These cities of East Africa grew in size and wealth while their people learned to deal with foreign traders. Egyptians, Arabians, Greeks, Indians, Sri Lankans, Indonesians, and Chinese thronged to their ports and mixed with the locals on city streets. Hotels and inns serviced foreign visitors, and the foreigners often would stay for months, waiting for the trade winds to shift with the seasons to enable them to sail north and east. Many foreigners chose to become permanent residents, indicating a welcoming atmosphere and increasing the cosmopolitan attitudes of local people.

The exact relationship of Arabs to the African peoples of the cities of East Africa is unclear. At one time it may have been easy to say that the Arabs founded the cities, but they did not, and it was possible that they used force to convert local people to Islam. At present the likeliest explanation is that people peacefully converted to Islam. Despite the conversions to Islam, there were still many pagans and Christians in the cities, and foreigners of many religious affiliations were welcome guests. The openness to foreigners of East African societies may have contributed to their downfall. When the Portuguese arrived in the 1440s, they were able to sail their ships into port and were met by government inspectors, like all other visitors, for the assessing of tariffs and taxes. Later, in the early 1500s, Portuguese ships were able to slip into East African ports by day, and at night the Portuguese attacked the cities, taking the trusting residents completely by sur-

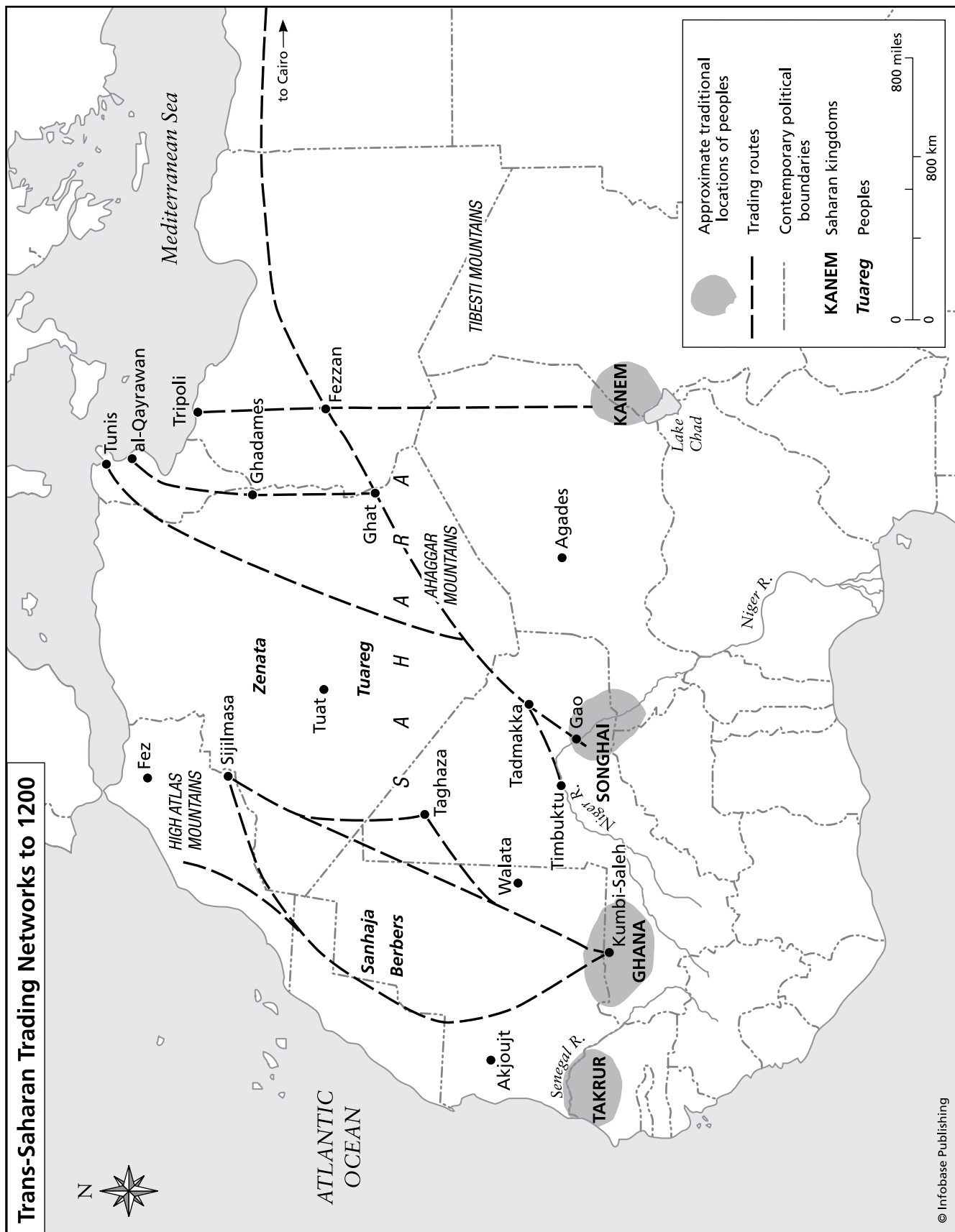
prise. Thousands were murdered, thousands more were taken as slaves, and some cities were burned.

In the rain forests of Africa there was a migration, begun in ancient times, of Bantu-speaking peoples from western Africa. They were farmers moving to find new land to cultivate or were bands of raiders seeking to conquer and loot. What the indigenous hunter-gatherers thought of this situation is unclear. They had traded with outsiders for centuries, but they lived nomadic lives, often without fixed villages. On occasion they tried to keep foreigners out of their lands, and their poisoned arrows killed many attackers. Their attitudes probably were not entirely hostile because they sometimes took up the ways of their settled neighbors and blended into the farming culture.

The San of southwestern Africa were also hunter-gatherers, occasionally living as nomads and occasionally in very small settlements. Much of the information about their attitudes comes from after the medieval era, but some aspects of their medieval responses to foreigners can be inferred. For example, they had strong views about what was their territory, and they resisted farmers and herders who tried to take the lands as their own. They formed small war parties and attacked people who moved into what they believed were their traditional lands. On the other hand, they often formed relationships with foreign cultures. When they were not fighting the Hausa, who were pastoralists, they worked for the Hausa and learned the Hausa language to help with trade between the San and the Hausa.

Between the southern East African coastal cities and the lands of the San were vast grasslands. The Khoi herded cattle across the lands and traded with the East African cities and with kingdoms in the interior, such as Great Zimbabwe. Archaeological research has shown that the Khoi and the settled states of the Zimbabwe plateau interacted. They traded goods and also fought over territory or more often over the Khoi's paying tribute. Foreign coins and beads found in Great Zimbabwe show that its people traded with the east coast, but whether foreigners actually visited Great Zimbabwe has yet to be established.

Among the farming peoples of western Africa and central Africa, attitudes toward foreigners varied greatly. For those living in the Sahel steppes, which stretch west to east across the southern edge of the Sahara, foreigners were probably common sights. Berbers, Arabs, and others made long treks south through the Sahara to reach several trading cities in the grasslands and the forests to the south. Some historians think that this situation changed some traditional western African societies, which had been stateless—with no kings, no chiefs, and indeed almost no one who could be called a leader. Some foreigners came not to trade but to steal and to



(opposite page) *Berbers, Arabs, and others made long treks south through the Sahara to reach several trading cities in the grasslands and the forests to the south. Thus, for the people living in the Sahel steppes foreigners were probably a common sight. The main purpose of the medieval trans-Saharan trade was an exchange of salt from the desert regions of the Sahara for gold from the sub-Saharan kingdoms of the Sudan. The trade linked the successive Sudan empires of Ghana, Mali, and Songhai with the Saharan states as well as with Middle Eastern and European merchants. In addition to providing foodstuffs and salt, the trade exposed the traditionally oral Sudan cultures to the Koran and the written language of Arabic. The leaders and businessmen of the Sudan kingdoms valued extensive trans-Saharan trade and often converted to Islam in order to ingratiate themselves with the Arab merchants.*

capture people to sell as slaves. The development of chiefs and then of governments may have been a way of trying to control the behavior of foreigners. Chiefs were people who could speak for several villages, and governments allowed for raising armies as well as for regulating trade and foreigners.

Many western and central African cultures remained stateless. These stateless societies organized themselves on the basis of obligations. The richest person in a village was the one who was owed the most favors by other people, not the person with the biggest house or the most luxuries. When a foreigner came to a village, there was rarely any organized greeting. There probably would have been women eager to sell foreigners millet or rice; women often set up near well-traveled roads to sell food to travelers. If foreigners indicated that they needed a place to live, even if they did not speak the local language, they could be assigned a piece of land to work. This assignment was a step toward acceptance, because the foreigners now had a debt of obligation to whoever previously had had the right to farm the land. Helping others weed their crops, repair their homes, and so on could turn them from foreigners into members of the village. Marrying a local person would help settle the issue.

Another kind of social organization was by gender and age. The Nyakyusa of the region of Tanzania were an example. Their culture could be called a society of strangers. In their culture an unmarried young man was believed to be a sexual threat to women, even to his sisters. To prevent his harming a woman, the boy was forced to leave his village and seek out other boys his age. Several boys, otherwise unknown to each other, would form a new village only for boys of about the same age. Boys of the right age, seeking new homes, were welcomed into the new village. When the boys became old enough to marry, no more outsiders would be allowed into their village, and they would change their village from a haven for homeless boys their own age to a place for wives and children.

THE AMERICAS

BY PENELOPE OJEDA DE HUALA

Shortly after the arrival of the Spanish in the New World, stories of the foreign beings circulated throughout the region. In

the Aztec capital of Tenochtitlán, Montezuma II (r. 1502–20) heard descriptions of floating temples on the sea. In North America the Spanish presence was felt before the foreigners set foot on land, because disease traveled faster than they did. By the mid-16th century disease had practically wiped out all the indigenous people of the Caribbean. Farther south in the rugged Andes, time was also running out for the great empire of the Inca.

Around 1000 a Norse ship sailing from Iceland with Leif Eriksson at the helm landed on the shores of a land called Vinland. In 1960 a Norse settlement in L'Anse aux Meadows, Newfoundland, was discovered, confirming the Norse presence in North America. Nordic records report of their meeting and battling with an indigenous people, whom they refer to as *skraelingy*, meaning "native" or "barbarian." Evidence suggests that the settlement survived until the 15th century, when it was abandoned abruptly, possibly as a result of the plague and several economic factors. However, at about the same time the Inuit people arrived in the area.

The Inuit, a nomadic people who populated the area of present-day Greenland as well as parts of Alaska and Canada, arrived in Canada around the 15th century. Living in the predominantly Arctic regions, they depended on various fish and land animals for food, shelter, and tools. Oral traditions of the various Inuit groups tell of violence against outsiders. The harsh Arctic environment created tension between neighboring groups, and raids were common. Oral tradition is filled with tales of supernatural creatures and ancestral spirits; sea creatures especially are central to Inuit mythology. Norse objects also have been found in Inuit settlements. A 14th-century account tells of a Norse settlement taken over by the *skraelingy* and describes a race of small people who battle with the Norse. However, no proof exists of direct interaction or warfare.

The most insightful information on Native American attitudes toward strangers is found in the various oral traditions and early colonial accounts that have been passed down and documented. Most reports of foreigners or strangers focus on warfare and migration. One such account was given to a Moravian missionary named John Heckewelder (1743–1823) by the Lenni Lenape, a tribe that at the time of contact (ca. 1600) occupied the areas around the Delaware River, the

lower Hudson River, and Long Island Sound. The story tells of the Lenape's great migration eastward to the land inhabited by the Allegewi, whom the migrants describe as giants. The Lenape conquer the powerful strangers and settle into their new homeland.

According to the Lenape language, foreigners are those who speak a different language, not necessarily those who are ethnically unrelated. For example, the Iroquois were called the Minqua, a name that means "treacherous" and reflects the bitter animosity between the two peoples. Likewise, the language of the Huron, who originally occupied present-day Quebec, distinguishes between natives and foreigners, calling the tribes that spoke their language or a similar one Attiouan-daronk and those that spoke another tongue Akouanake.

Many Native American myths and legends, especially tales of migration, speak of confrontations with supernatural strangers. For example, the Algonquian, a people who occupied lands from the eastern coast of North America to the Rocky Mountains, have legends filled with assorted supernatural beings like giants, magicians, and witches. Similarly, the Seneca, an Iroquois group from the Northeast, have a myth about a powerful boy who conquers supernatural strangers from various foreign lands. In all these myths strangers have both malevolent and benevolent characteristics and may reflect actual interactions with foreign tribes.

The Kwakiutl of the coastal region of present-day British Columbia created a division between the two major constructs in their society: the civilized crest imagery of the chiefs' genealogy and the uncivilized cannibal imagery with its roots in a warrior society. The imagery of the chiefs' lineage appears on totem poles and house fronts, at the center of the civilized village. The imagery of the cannibal focuses on supernatural creatures. Birdlike composite forms appear on masks and dishes, depicting the inhabitants of the dangerous outside world, the forest where the spirits, the animals, and the enemy lurk.

Teotihuacán (ca. 1–ca. 650) at its apogee was the largest city in the Western Hemisphere. Located in central Mexico, its influence would be felt throughout Mesoamerica in the Early Classic Period (ca. 150–ca. 650). Also dominant at this time was the Maya culture (ca. 1000 B.C.E.–1521 C.E.), which dominated parts of Guatemala, southern Mexico, Belize, and Honduras.

The influence of Teotihuacán is evident at various Maya sites, including Kaminaljuyu (Guatemala City), Altun Ha (Petén, Guatemala), Becan (Yucatán, Mexico), Dzibilchaltun (Yucatán), Chichén Itzá (Yucatán), and Tikal (Petén). Many theories have been proposed for this foreign incursion, including the possibility of Teotihuacán hegemony and occupation of several Maya areas and the appropriation by

individual local elite of Teotihuacán style as a form of legitimization or acquiring prestige. In the site of Tikal—the dominant Maya city of the Early Classic Period, located in the lowland region of present-day Petén, Guatemala—various forms of foreign penetration have been found. Teotihuacán-style ceramics were interred in burial sites and Teotihuacán and central Mexican motifs are present on stelae. Moreover, talud-tablero, a prominent Teotihuacán-style architectural element consisting of a sloping wall and a horizontal tablelike section, was used in several building structures.

However, evidence also points to a reverse interaction. In the Tetitla, an apartment compound in Teotihuacán, a Maya-influenced mural and various ceramics were found. Further, the use of central Mexican motifs served a very specific purpose: Rulers depicted themselves in the guise of Teotihuacáños as a form of emulation, appropriating the warrior mystic of the powerful and militaristic foreigners. The interaction between the Tikal and Teotihuacán cultures was many sided, bringing together divergent belief systems and several cities from central Mexico and the Maya lowlands. Later dominant cultures would use the same takeover techniques, including the Aztecs, who appropriated the people of Teotihuacán and Tula as their ancestors to legitimize their own dreams of domination.

The Maya also used propaganda to claim dominance and legitimacy. Maya dynastic histories were inscribed in stone and were featured prominently on monumental sculptures. These works emphasized the role of the lord or king and his political, divine, and cosmic purposes. Carvings on the monuments depicted the dynastic lines of the individual polities, the succession of one king by another, the conquest of one state over another, and ultimately the divine right of the king's rule. The Maya portrayed conquest of various foreign states until the Late Classic Period (ca. 600–ca. 900). Captives were depicted naked, a sign of the utmost humiliation and defeat, and some works even include the names of captives and neighboring rulers.

The Aztec (ca. 1200–1521) were the last of the long line of cultures to flourish in Mesoamerica. The empire, centered in the Mexico Basin (present-day Mexico City), was cut short by the ultimate barbarian invaders, the Spanish. Before that notorious meeting, however, the Aztec had another foe, the Chichimecs, a nomadic Nahuatl-speaking people who lived in the north and west of the basin of Mexico. The word *chichimec* means "son of dogs" and was later adopted by the Spanish to address all the people living north of Mexico, whom they considered barbarians.

In October 1492 Columbus landed in Hispaniola, an island in the Caribbean encompassing present-day Dominican Republic and Haiti. He first encountered the Taíno (ca.

1200–ca. 1500), an Arawak people who had originated in South America. This meeting would mark a decisive change of fortune for the people of the Caribbean. The inhabitants of the island were a sophisticated culture that spread across the whole of the Greater Antilles, including present-day Dominican Republic, Haiti, Puerto Rico, Cuba, Jamaica, and the Bahamas. Within a generation the Taíno would be decimated by disease, slavery, and warfare. The estimated loss of life hovers close to 1 million people. The destruction of the Taíno culture did not end its impact on the future of the Caribbean. A rich cultural legacy remains, including words such as *barbecue*, *hammock*, *canoe*, *tobacco*, and *hurricane*. The bloodlines of the Taíno people freely mixed with the African, Spanish, and other indigenous groups of the region.

According to Spanish sources, the Taíno believed the Spanish to be gods. These foreigners with long beards and strange clothing were so exotic that the indigenous people first believed the Spanish ships to have come from heaven. A later account, however, describes a vision that foretold of a foreign invasion by clothed cannibals who would kill their children and enslave them.

The Taíno had a vast network of related communities under the leadership of a select group of chieftains called *caciques*. The various communities of the culture were united by a common ceremonial and recreational ball game that involved large gatherings of many groups. During the game an assortment of interactions would take place, including the exchange of goods, gift giving, dispute resolution, and community consolidations through marriage alliances. Despite the ceremonial meetings and possibly a common cultural ancestry, warfare did exist among rival groups, especially between the Taíno and the Caribs, who resided in the Lesser Antilles.

The Moche civilization flourished during the first 700 years of the Common Era on the northern coast of Peru. In this arid environment the Moche developed a distinct naturalistic and narrative style quite unusual in the Andean artistic canon. In ceramic slip paintings, metalwork, and textiles the Moche depict prisoners of war in scenes of battle and sacrificial rituals. Captives usually are shown being held by the hair, a symbol of dominance, or ritually bled as a form of offering. Unlike their predecessors from the Chavín culture (ca. 900–ca. 200 B.C.E.), Moche artists relied heavily on narrative realism to represent their world and disseminate their beliefs. Individuals' rank, actions, and moods are conveyed through certain artistic modifiers such as regalia, pose, positioning, and physical appearance. Moche artists used these conventional modes to relay and possibly maintain social and political norms.

The Inca (ca. 1450–1532) were an ethnic minority of approximately 40,000 individuals who ruled a territory ex-

tending over 350,000 square miles and subjected more than 10 million people. The Inca capital at Cuzco, in the heart of the Peruvian Andes, was a sacred site and the center of their empire, which they called Tahuantinsuyu, "Land of the Four Quarters," because it consisted of four territories: Chinchasuyu to the east, Antisuyu to the north, Collasuyu to the south, and Contisuyu to the west. From the center of Tahuantinsuyu, at the Temple of the Sun, known as the Coricancha, 40 imaginary lines radiated out and connected more than 400 sacred sites, or *huacas*. Central to the Incan system of control, the *huacas* were places of ritual practices that culturally connected the vast territories under Inca control. One ritual performed at the Coricancha was the sacrifice ritual of *capac huacha*, where young children from the four quarters of the Incan territory were offered for sacrifice. The sacrifice ritual procession followed the same path of the sun from east to west where offerings were made at the *huacas*. The offering ensured the health of the king, the land, and the people. The symbiotic relationship required for the *capac huacha* enabled the Inca to unify the provincial territories and made Cuzco the main site for pilgrimages.

Much like the Roman Empire, the Inca conquered the vast lands and various barbarian tribes and societies of the Andean region. From northern Ecuador to the tip of Chile and into the Amazonian basin, the Inca united diverse groups through ritual practice. The landscape was intrinsic to the Inca cosmic worldview. Architecture and landscape were at the very heart of their domination.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

By the end of the Han Dynasty in 220, the Chinese had a very strong sense of nationhood that they maintained despite civil wars, invasions, and division among rival kingdoms. Part of that sense of nationhood was the abiding belief that to be Chinese was to be better than anyone else and that Chinese culture was the most advanced and most civilized in the world. During the medieval era the Chinese viewed all other peoples as barbarians. That perception may have been condescending, but it was often benevolent as well. Other nations were forced to send tribute to the Chinese emperor, and foreign leaders were required to acknowledge him as their leader. But whatever the tribute sent to him, the emperor sent gifts of greater value back to show his benevolence and wealth, and foreign leaders were almost always left to run their countries without China's interference.

During the Tang Dynasty (618–907) China welcomed foreigners. Learned foreigners were especially welcome and often earned high places in China's government. For exam-

ple, Indian mathematicians, astronomers, and physicians were sought after, and Indians ran the national government's astronomical observatory. For tax purposes foreigners who took up residence in China were divided into three classes based on their wealth, with the wealthiest paying 10 silver coins per year, the middle-income group paying five silver coins, and the poor paying no taxes.

The city of Guangzhou was China's main trading port, and south of the Zhu River was an area for foreign settlers. Foreign settlements were allowed to manage their own affairs and were usually run by elders within the settlements. When people of the same nationality committed crimes against each other, a Chinese magistrate tried to determine the merits of the legal case and the punishment on the basis of the laws of their nation of origin. When crimes involving more than one nationality occurred, or when lawsuits involving more than one nationality were filed, Chinese law applied.

Until the 840s foreign religions prospered. The most successful was Buddhism, which had great wealth. Other popular foreign religions were Christianity, Zoroastrianism, Manichaenism, and Judaism. These were brought to China by missionaries, traders, and skilled workers. In 842 China's emperor Wuzong (r. 840–46) began persecuting the foreign religions, claiming they were undermining the government, but the actual motive was greed. The emperor wanted the wealth of the religious groups, especially of the Buddhists, and their foreign origins were only a pretext for taking their money and property. In 845 the government closed more than 4,600 Buddhist monasteries and 40,000 Buddhist shrines, leaving only 49 monasteries. The government also ordered that monks under age 50, and those over 50 who did not have documents proving they had been ordained, must be defrocked. As a result, more than 250,000 monks could no longer conduct religious services and only 800 practicing monks remained in China.

By the time the Venetian traveler Marco Polo reached China in the late 1200s, the Mongols had conquered much of the nation and were pressing southward to finish off the Song Dynasty (960–1279). At that time China was a nation of many ethnic groups. The Han Chinese, by far the largest ethnic group, regarded other groups as inferior or even not truly Chinese. This resulted in occasional unrest in parts of the empire when minority groups thought the imperial government was treating them unfairly because of their ethnicity. The Mongols believed they should rule over all foreigners, and they slaughtered entire populations of foreigners in some cities, yet strangers often were met with hospitality by the nomadic peoples north of China. Polo was an honored guest at many meals. In northwestern China some local cultures regarded all foreign visitors as being superior in hardiness or

knowledge, and women would try to entice foreign men into their beds so that the foreigners' bloodlines could be added to theirs. Other regions also welcomed foreigners and called them *se mu*, meaning "colored eyes."

During its early history the Ming Dynasty (1368–1644) had a somewhat similar attitude toward foreigners. Great fleets of huge vessels sailed as far as the city-states of East Africa, seeking trade and knowledge. But there were signs of another attitude that came to dominate dealings with outsiders. The Great Wall was rebuilt, sturdier than ever before, to separate the farmlands south of the wall from the grazing lands north of it. In 1433 the truly amazing voyages of discovery were ended and the great ships destroyed. Foreigners came to be regarded as having no value for China.

Throughout the medieval era Koreans had very mixed reactions to foreigners, partly because for much of the period they were divided into separate nations with separate policies toward outsiders, and partly because foreigners often brought misery and ruin to the land. The Chinese were simultaneously admired and loathed. In the early medieval era Korea imported Chinese scholars and Chinese Buddhist priests, and Korean governments were modeled after Chinese examples. They may have regarded the Chinese as superior to themselves, but they considered the Japanese inferior. After all, when the Japanese wanted teachers they asked Korea to supply them.

Invasions by Chinese groups that the Koreans considered barbaric, the Mongols and Manchurians, led to insularity. Koreans might greet an individual foreigner respectfully and provide hospitality, but groups of foreigners were associated with violence and usually unwelcome. In the 1400s Korea strove to establish secure borders and began the process of withdrawal from the world that peaked in the 1600s, although Koreans retained trade relations with Japan.

For almost all the medieval era the Japanese were eager for foreigners to visit. The Japanese government sent embassies to its allies in Korea and to the emperor of China primarily to have teachers and craftspeople sent to Japan. A Korean scholar headed Japan's first university, and Japan's earliest blacksmiths probably came from Korea. The shores of the islands of Honshu and Kyushu were frequented by Malaysians, Koreans, and Chinese as well as being occasionally visited by traders from Indonesia, India, and Sri Lanka. They were usually welcomed for the experiences they could relate, the merchandise they could sell or trade, and the skills they could teach.

Japan's attitude toward foreigners began to change when the Mongols began invading Kyushu in the 1200s. The Mongol emperors had sent emissaries to Japan's shogun, demanding that the shogun and Japan submit to the authority of China.

The shogun reacted to each successive set of emissaries with contempt. Twice the Mongol army invaded Kyushu to enforce the emperor's will, and each time the stubborn defense of the outnumbered Japanese and stormy weather thwarted them. The last attempt was in 1281, but for decades thereafter the Japanese maintained their defensive walls and remained watchful.

In medieval India foreigners were called *mleccha*, meaning "jabberers." Meant to be contemptuous, the word is of unknown origin, but it may have come from an ancient Sumerian word for the people of the Harappan culture (ca. 2600–ca. 1500 B.C.E.). In medieval Indian art foreigners often were depicted in the garb of people from northwest India, where the Harappans once lived.

The word *mleccha* was also representative of medieval Indians' attitudes toward non-Indians in general. Muslim visitors to India recorded that the Indians believed their land to be the only worthwhile land in the world and that all culture, all knowledge, and all civilization originated in India. Thus foreigners tended to be treated as inferior to Indians. Foreign scholars were welcomed at Indian universities as visitors or lecturers, and merchants were valued for the wealth they brought to India. Still, every foreigner was regarded as having no caste. Indians of high caste might allow foreigners into their homes, but they would not dine with foreigners or allow foreigners to dine in their homes. Foreigners were even banned from attending theatrical performances.

On the other hand, Indian kings enjoyed playing host to foreigners. Foreigners would be invited to entertain the court with stories of their travels. Once a year medieval Indians held a feast day for foreigners. That many foreigners were in India, at least in cities, is suggested by the feast day held once a year for foreigners. On that day foreigners and Indians would come together to eat and dance.

The picture of foreigners' lives in Southeast Asia is unclear. The peaceful spread of Indian culture through most of Southeast Asia suggests that foreigners could safely visit the region. The Chinese established many colonies in Southeast Asia, mostly as trading posts. People in the regions of modern-day Burma and northern Thailand showed hostility toward outsiders and deeply resented the Chinese, probably in response to China's occasional efforts to absorb the region within China's borders.

In the Philippines the Chinese seem to have been feared. Chinese visitors may have been avoided except for trading. In contrast, Polynesians seem to have been welcomed, and Polynesian settlers were absorbed into the Philippine cultures. The treatment foreigners received in Indonesia depended on what culture they visited. Like the Philippine peoples, Polynesians appear to have struck up good relations with Indonesians,

and many Polynesians settled in Indonesia and became part of the everyday fabric of the local cultures. Nonetheless, in parts of Sumatra foreigners found by local people were likely to lose their lives. Constant wars made local people hostile toward any outsider.

The peoples of Oceania were separated by dangerous open water. Many islanders in Micronesia were suspicious of people even from nearby islands, and trade required following strict rules to avoid bloodshed. A person washed ashore after experiencing an accident at sea or losing course often enjoyed a kind reception among the Polynesians of the central and western Pacific. Among the islands associated with Tahiti were cultures that were xenophobic, killing foreigners who strayed within reach. On New Guinea some peoples attacked and took prisoner or killed anyone not of their particular group. Outsiders were forbidden to tread on lands claimed by a group, and when two groups claimed the same land, each would persecute members of the other group.

The peoples of medieval Australia usually kept to themselves, but they had rules about how foreigners were to conduct themselves. These rules applied even when the foreigners and hosts did not speak the same language. Getting permission was important. In general, if outsiders asked in the right way under the right circumstances, they could gain authorization to pass through lands other than their own and even to use local natural resources. For instance, strangers could be given permission to hunt on local territory. It was implicitly understood that the strangers had to do something good for their hosts in return. If there was a drought, people who controlled a watering place might allow strangers to use it.

EUROPE

BY BAILEY K. YOUNG

The Roman Empire included within its still-intact borders in 400 C.E. a multitude of peoples whose ethnic particularism overlapped with their common, or cosmopolitan, identity as imperial citizens (*Romani*). A merchant living at Lyon in Gaul might be from a Greek family whose main branch was in Syria; he was thus a foreigner of sorts to his customer, a Gallic gentleman whose ancestral language was Celtic but whose career in the emperor's bureaucracy was conducted in Latin. But to a Germanic warrior from the Rhineland both men were Romans while to them he was a *Barbari*, or barbarian, a term the Romans had borrowed from the Greek to designate an outsider. Although this term might, and often did, convey disrespect, it did not necessarily do so; already many high-ranking officers in the Roman army were *Barbari*, including the commander in chief that year, Stilicho (ca. 365–408), whose son married into the imperial family.

Over the next century the Western Roman Empire fragmented into pieces ruled by barbarian kings such as the Ostrogoth king Theodoric (r. 474–526) in Italy and Clovis, king of the Salian Franks (r. 481–511), in Gaul. During this time a paradoxical process of distinction and blurring was taking place. The successful barbarian groups sought to consolidate and enhance their sense of ethnic identity by such stratagems as turning their oral customs into written law codes (still written in Latin) to be applied in place of Roman law. They maintained ethnic styles of dress and adornment, and some, most notably the Franks, invented an ostentatious form of burial with weapons and jewelry that proclaimed their difference from the Romans or the other barbarians they ruled.

There was a profound ambiguity in this ethnic assertion, however, as shown by a detailed analysis of the burial of Childeric I, king of the Salian Franks (r. ca. 457–82), at Tournai. His bejeweled weapons, the sacrifice of his royal stable, and the imposing earthen mound built over his grave stress his “barbarian” identity. At the same time, objects like the gold signet ring inscribed with his name and the golden bow brooch, which had long been a badge of high rank in the Roman administration, seem to express what the written historical record also does: that he was a loyal and highly regarded player on the Roman side. When his son Clovis was baptized a Catholic, he was seen by the leading Gallo-Romans as chosen by God to be the leader of their side.

Recent scholarship has shown that it was under the Merovingian Dynasty (447–751) that the Frankish identity was really constructed and that it was a complex and composite identity, incorporating Roman as well as Germanic features. The foremost writer from the period, Gregory, bishop of Tours (538–94), who proudly describes his impeccably aristocratic Gallo-Roman family history reaching back generations, lays no stress on ethnic difference from the Franks. Instead he writes of the two groups intermarrying, giving their children names from the other tradition, and competing with one another for high positions in the king’s service or in the church.

Archaeological research confirms this picture of cultural synthesis. Around 550 Frankish-style burials appear in the cemetery of Frénouville, near Caen in Normandy, but careful analysis of the skeletons shows they were not newcomers but leaders of the native Gallic community who had adopted the new burial style. By the time the Carolingian Dynasty had seized control from the Merovingians, their realm was most frequently called Francia instead of the old name, Gaul, and the term *Franks* might equally signify merchants in the old Gallic town of Tours speaking the Romance dialect or a village of farmers by the upper Rhine speaking Germanic. It was highly unlikely, of course, that such people would ever meet.

The horizons of most people had shrunk to their local world, and anyone beyond it was a foreigner, to be feared and distrusted. But for the few who did travel about—warriors, landowners, churchmen, and a few merchants—the distinction that now mattered was between “us,” Franks and Christians, and “them,” dangerous outsiders, often pagans.

The great achievement of Charlemagne, king of the Franks (r. 768–814) and emperor of the West (r. 800–14), and of the educated churchmen who shaped the European worldview over the next centuries was to consolidate this new identity. “Pagans are wrong and Christians right!” proclaims the poet of the *Song of Roland*, using a legend set in Charlemagne’s time to convey a message that both expresses the strong conviction of his own time (the First Crusade, 1096–1099) and creates a template for attitudes toward dangerous foreigners. Thus the knights who captured Jerusalem in 1099 remorselessly massacred the population—men, women, children—considering them all pagans, even though many were Jews or Eastern Orthodox Christians. Their attitude toward the Byzantine Greeks, who were, for them, Christians of the wrong sort (not acknowledging the claims of the Roman pope to universal authority), was also marked by suspicion, negative stereotypes (the Greeks were unmanly and treacherous), and outright hostility.

In 1204 crusaders sacked and plundered Istanbul (then called Constantinople) itself. Other crusaders waged relentless war against the Muslims in Spain, the pagan Slavs in the Baltic region, or even dissenting Christians in southern France (the Cathari), unconcerned with differences among them: What mattered was that they were impediments to the ideal of the unified, doctrinally correct Christendom proclaimed by the clerical elite to be God’s will. By 1100 non-Catholics had come to be seen in much the same negative light as barbarians during the Roman Empire.

The dynamic growth from the Crusades to the Black Death, roughly 1100 through the 1300s, meant that increasingly more Europeans were encountering foreigners in a different, not hostile sense, more like that of the present day. Mostly these were other Europeans, different in speech and in customs from one’s own cultural group. The bustling towns and cities offered many opportunities to encounter others as expanded trade led to much more nonmilitary travel. By 1200 London was the great trading hub of northern Europe, and a community of Flemish and German merchants lived there under its own laws and customs. The rue des Lombards, in the heart of Paris, preserves the memory of the merchants and bankers from northern Italy who did brisk business there. Great lords eager to develop profitable new towns deliberately invited skilled foreigners to settle there. In 1257 a Polish duke, Boleslaw, founded Kraków, inviting Germans to

come and live there under a charter based on that of Magdeburg, Germany; he even forbade Slavic peasants from nearby villages to become burgesses.

Many eastern European cities developed German-speaking communities, with their own schools, churches, and sometimes law courts, that lasted right into modern times. Mediterranean port cities, like Venice and Genoa in Italy, Marseille in France, and Barcelona in Spain, were accustomed to foreigners of all sorts passing through, and business ventures frequently took their own citizens to foreign cities, such as Istanbul in Turkey (where the Italians lived in a separate quarter in the later Middle Ages), Alexandria in Egypt, and Damascus in Syria. Despite the official hostility of the church to Islam, these merchants did business with Muslims and others, and this interchange encouraged new, more open attitudes. In the 1270s the Venetian explorer Marco Polo (1254–1324) traveled across Asia and wrote a book on his return describing the wonders of the cultures he encountered, especially praising the China of the Mongol conqueror Kublai Khan (1215–94). Although many thought he was exaggerating, the book was very popular and showed a new European curiosity about the wider world.

Two other factors made later medieval Europe a more cosmopolitan place and encouraged a positive attitude toward foreigners. In the early 1200s Saint Francis of Assisi (1181 or 1182–1226) from Italy and Saint Dominic (ca. 1170–1221) from Spain founded a new kind of religious order whose vocation was not to stay in one place and pray (like the older Benedictine monks) but to travel about preaching and teaching. Both branches of the order, the Franciscans and the Dominicans, grew at phenomenal rates and were international in scope. Francis started with a handful of disciples from his hometown; before he died there were thousands of Franciscans throughout Europe, especially in the towns where huge new churches were built for the crowds who came to hear the preaching. Friars traveled widely and lived in communities of mixed nationalities.

The same was true of the other great institution that was reshaping society, the university. From the time universities first emerged around 1200 in Paris (France), Bologna (Italy), and Oxford (England), students flocked from all over to study theology or law and thus qualify for high positions in the church or state. They formed associations based on their native language to negotiate conditions of work and study with the authorities (for example, English students in Paris), but all shared Latin as a common language of learning. They also played and drank together in this universal language of educated Christendom, for some of their drinking songs have been preserved. The faculty of medieval universities was also international in character; leading philosophy professors at

Paris in the later 1200s were Albertus Magnus (ca. 1200–80) of Germany and Thomas Aquinas (1225–74) of Italy. Small towns and villages, in the later Middle Ages and long after, tended to be closed communities with limited exposure to foreigners (which could mean people from 20 miles away) and often kept a wary attitude toward them, but the larger towns and cities were cosmopolitan places where residents recognized the value of attracting foreigners.

THE ISLAMIC WORLD

BY JUSTIN CORFIELD

As the Islamic world expanded from Arabia to Egypt, the Holy Land, North Africa, and Asia Minor, large numbers of Christians, Jews, and others came under Islamic rule. Despite numerous wars, pilgrims continued to travel to the Holy Land and other places connected with Christian saints, and some traders and craftspeople from Christian Europe visited the Islamic world.

For roughly four centuries after the Muslim Arabs captured Jerusalem in 638, Christians continued to visit the Holy Land, as they had since the fourth century. The Arabs also allowed Jews to enter the city, lifting the ban imposed during Byzantine rule. There are many accounts of foreigners visiting Jerusalem on pilgrimages during the period of Arab rule, and the large number that did so suggests that they were not put off by the long journey and were received by relatively tolerant or even welcoming Muslims.

Of the various pilgrims described in historical accounts, an Anglo-Saxon, Willibald, descended from the king of Kent, managed a pilgrimage to Jerusalem in the 720s, and about 300 years later Sweyn Godwinson (d. 1052), the eldest son of Earl Godwin of Wessex and brother of Harold II (later king of England), also went to Jerusalem, apparently completing much of the journey in bare feet. Two English clerics, Alured, the bishop of Worcester, and Ingulphus, the abbot of Croyland Abbey, went to Jerusalem in 1058 and 1064, respectively.

A major change in access to Jerusalem occurred in 1071, when the city was captured by Seljuk Turks. Descended from the Turkoman people of central Asia, the Seljuk Turks rejected foreign rule of any lands under their control. They opposed anyone who was not Muslim and immediately began a process of discrimination against Christians. In this atmosphere of heightened tensions Pope Urban II called for the First Crusade in 1095. The crusaders captured Jerusalem in 1099 and began establishing crusader kingdoms in the Holy Land.

The behavior of the crusaders—usually identified by Arab writers as Franks—led many in the Islamic world to despise European Christians and the crusader kingdoms. How-

THE TRAVELS OF WILLIBALD

Willibald was born in about 700 in Wessex, England, and was probably the grandson of Hlothere, the king of Kent (r. 673–85). When he was about 20, Willibald decided to go on a pilgrimage, initially to Rome; on arriving there, he decided to press on to Jerusalem and then to the lands of the Arabs. To do so, he proceeded to Syria in 722, where he seems to have been treated well initially. But many people were suspicious of his activities, and it was not long before he and his traveling companions were in trouble. At the town of Emesa (modern-day Homs, Syria) they were taken prisoner by the Saracens, who claimed that Willibald was a spy. They were released soon afterward, and Willibald himself spent four years traveling around the Christian religious sites of the Holy Land, visiting Jerusalem many times. It was during one of these visits that Willibald was arrested and accused of smuggling balsam from Jerusalem. It is likely that he had indeed been smuggling, but nonetheless he was released. Returning to Europe, Willibald settled at Monte Cassino and was later sent to Germany, where he worked with Boniface (later Saint Boniface), a missionary to the Frankish Empire. He died in 781 or 787 in Eichstatt, Bavaria, Germany.

The account of Willibald's travels was recorded by Hygeburg (also called Huneberg), an Anglo-Saxon nun who was living at Heidenheim. Written between 767 and 778, probably based on stories told by Willibald himself, it provides an insight into the treatment of Christian pilgrims nearly 300 years before the Crusades and shows a remarkable level of tolerance by the Arabs for genuine Christian pilgrims. Although the account of Willibald's time in the Holy Land has been recorded, it seems probable that he was only one of many who made pilgrimages during the eighth century.

ever, soon after the founding of the kingdom of Jerusalem, pilgrimages from Europe started again. Edgar, the grandson of King Edmund II of England (r. 1016) reached Jerusalem in 1102, and Godericus, another Englishman, is recorded as being a pirate who sailed to the Holy Land in 1103 and attacked Muslims.

Fighting in the Holy Land took place at the same time as fighting between the Normans and the Muslims in Sicily and the battles that the Spanish and Portuguese fought with

the Moors in the Iberian Peninsula. Some rulers of Christian Spain managed to cement ties with some Muslim rulers, and even the Spanish warrior Rodrigo Díaz de Bivar ("El Cid") formed alliances with many Muslims to remain in control of Valencia.

As a result of the many wars between Muslims and Christians fought during most of the medieval period, tens of thousands of European Christians were held as slaves in many Islamic regions but mainly in North Africa, where pirates from the Barbary States (Morocco, Algiers, Tunis, and Tripoli) captured hundreds of European trading vessels and made occasional attacks on some European ports. In addition, the failure of the Children's Crusade in 1212 led to the capture of large numbers of European children, who became slaves of the Seljuk Turks. The enslavement of European Christians—of whom some were treated well but others were forced to work in galleys or mines—overshadowed any possibility of good relations between the kingdoms of Europe and



"Challenging the Iranians," from a *Shahnameh* (*Book of Kings*) by Firdawsi, opaque watercolor, ink, and gold on paper; early 15th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1930-48)

the rulers of the Barbary States. Ironically, another impediment was that during the later medieval period North African slaves were being exported to the Americas.

However, despite the general view in the Islamic world that the people of Christian Europe were hostile, Muslims made some important contacts with European artisans. Certainly houses around the Kasbah in Algiers show evidence of Venetian architecture and glassmaking. It is also clear that the Genoese were involved in trade with parts of North Africa, with an increase in the European demand for luxury goods from the East. The Islamic world also showed renewed interest in European weaponry, some of which likely originated in China (such as crossbows and gunpowder) and had earlier reached Europe through the Arabs.

Evidence of foreigners being accepted into the courts of Islamic kingdoms came when fighting took place in Austria in 1242 and soldiers serving the duke of Dalmatia (a region of the Balkan Peninsula) captured an Englishman working as an emissary of Batu Khan (d. 1255), grandson of Genghis Khan, who controlled the Mongol armies in southern Russia. The man was put on trial and executed in July 1242. One historian suggests that he could have been Master Robert, a Roman Catholic priest from England who had accompanied two knights on a mission from King John to Morocco in 1213. On completing the mission, Master Robert returned to England but, disenchanted with King John, decided to go back to the Islamic world and ended up in the crusader city of Acre. He subsequently embraced Islam and was appointed to a senior position at the court of Batu Khan. His skills were so highly valued that he was sent twice to talk with the king of Hungary on behalf of the Mongols.

The Genoese traveler Marco Polo (1254–1324) provided more details about the acceptance of foreign traders in Islamic lands. In 1271 Polo accompanied his father and uncle, prosperous merchants and traders from Venice, on their second visit to China, a journey of about 25,000 miles that took them through much of the Islamic world. In his account of the trip, titled *The Travels*, Marco Polo describes his dealings with Christians, Armenians, and other peoples in the region, but most of the information he provides on the Muslim population is general, implying that he found out about them and often had business dealings with them but was not invited into their houses.

Some years after Marco Polo, Ibn Battuta (1304–77), from Tangier, Morocco, started traveling throughout the Islamic world in 1325. Trained as a scholar, he explored regions of the Byzantine Empire and traveled to parts of the Mali Empire and sub-Saharan Africa. During his voyages, which covered about 75,000 miles, he traveled to India and the Far East, including China. His attitude toward people in the re-

gion was fairly relaxed, reflecting the extensive contacts that had already occurred, through trans-Saharan trade routes, between the Arabs of North Africa and the people of the Sahara and sub-Saharan Africa. While Marco Polo found some of the people he met in the Islamic world to be extremely fearful of Westerners, Ibn Battuta, with a greater degree of openness and religious and cultural affinity, seemed to have received a better reception. That the Polos were chiefly traders and Ibn Battuta was a traveler-explorer was probably another important factor in the differing attitudes encountered by each among the local people. This is evident from the intent of Ibn Battuta's book, suggested by its title, often translated as *A Gift to Those Who Contemplate the Wonders of Cities and the Marvels of Traveling*.

As early as 1099, during the siege of Valencia, Spain, a Spanish chronicler noted that the Moorish soldiers included 300 black female warriors led by Nugaymath Turquia, a Tuareg woman who had joined the Moorish Almoravid army to fight the Spanish army led by El Cid. This acceptance of black Africans could be viewed as an indication that the attitude of the Islamic world toward people of different races was more open than that of Christian Europe, but during some periods in parts of North Africa, most black Africans were slaves. Indeed, Arabs were prominent slave traders in western Africa as well as along the east coast of Africa.

Some people of the Islamic world were also in contact with Chinese merchants and traders. Many medieval artifacts of Chinese origin have been found in Arabia and other parts of the Middle East, indicating a major trade in the works of Chinese artisans. In 1421 the Chinese admiral Zheng He led a massive naval expedition around the Indian Ocean. Zheng was well received in much of the Islamic world because he was a Muslim.

The Islamic world conducted a flourishing trade in spices as well as sandalwood and tin from Southeast Asia, and the Silk Road was the historic route of east–west trade not only in silk but also in gold and other metals. As a result of the extensive trade between Muslims and Southeast Asians, many of the merchants of modern Malaysia, Indonesia, and Vietnam embraced Islam.

With the emergence of the Ottoman Empire in the 14th century a single entity gradually took over much of Asia Minor and later controlled much of the Middle East. Although the leaders of the Ottoman Empire were Muslim, they did not discriminate against Christians and others as much as the Seljuk Turks had. At the heart of the Ottoman army was the Janissary Corps, recruited from Christian youth from the Balkans who converted to Islam and after training became the troops often fighting battles with armies from Christian Europe.

See also ADORNMENT; ARCHITECTURE; ART; BORDERS AND FRONTIERS; CHILDREN; CITIES; CLIMATE AND GEOGRAPHY; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; EXPLORATION; FAMILY; GOVERNMENT ORGANIZATION; LANGUAGE; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; MILI-

TARY; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SCIENCE; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; SPORTS AND RECREATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; WAR AND CONQUEST.

Europe

~ Fulcher of Chartres: The Capture of Jerusalem (ca. 1100) ~

CHAPTER 27: THE SIEGE OF THE CITY OF JERUSALEM

On the seventh of June the Franks besieged Jerusalem. The city is located in a mountainous region, which is lacking in rivers, woods, and springs, except the Fountain of Siloam, where there is plenty of water, but it empties forth only at certain intervals. This fountain empties into the valley, at the foot of Mount Zion, and flows into the course of the brook of Kedron, which, during the winter, flows through the valley of Jehosaphat. There are many cisterns, which furnish abundant water within the city. When filled by the winter rains and well cared for, they offer both men and beasts an unfailing supply at all times. Moreover, the city is laid out most beautifully, and cannot be criticized for too great length or as being disproportionately narrow. On the west is the tower of David, which is flanked on both sides by the broad wall of the city. The lower half of the wall is solid masonry, of square stones and mortar, sealed with molten lead. So strong is this wall that, if fifteen or twenty men should be well supplied with provisions, they would never be taken by any army. . . .

When the Franks saw how difficult it would be to take the city, the leaders ordered scaling ladders to be made, hoping that by a brave assault it might be possible to surmount the walls by means of ladders and thus take the city, God helping. So the ladders were made, and on the day following the seventh, in the early morning, the leaders ordered the attack, and, with the trumpets sounding, a splendid assault was made on the city from all sides. The attack lasted till the sixth hour, but it was discovered that the city could not be entered by the use of ladders, which were few in number, and sadly we ceased the attack.

Then a council was held, and it was ordered that siege machines should be constructed by the artisans, so that by moving them close to the wall we might accomplish our purpose, with the aid of God. This was done. . . .

When the tower had been put together and had been covered with hides, it was moved nearer to the wall. Then knights, few in number, but brave, at the sound of the trumpet, took their places in the tower and began to shoot stones and arrows. The Saracens defended themselves vigorously, and, with slings, very skillfully hurled back burning firebrands, which had been dipped in oil and fresh fat. Many on both sides, fighting in this manner, often found themselves in the presence of death. . . .

On the following day the work again began at the sound of the trumpet, and to such purpose that the rams, by continual pounding, made a hole through one part of the wall. The Saracens suspended two beams before the opening, supporting them by ropes, so that by piling stones behind them they would make an obstacle to the rams. However, what they did for their own protection became, through the providence of God, the cause of their own destruction. For, when the tower was moved nearer to the wall, the ropes that supported the beams were cut; from these same beams the Franks constructed a bridge, which they cleverly extended from the tower to the wall. About this time one of the towers in the stone wall began to burn, for the men who worked our machines had been hurling firebrands upon it until the wooden beams within it caught fire. The flames and smoke soon became so bad that none of the defenders of this part of the wall were able to remain near this place. At the noon hour on Friday, with trumpets sounding, amid great commotion and shouting "God help us," the Franks entered the city. When the pagans saw one

standard planted on the wall, they were completely demoralized, and all their former boldness vanished, and they turned to flee through the narrow streets of the city. Those who were already in rapid flight began to flee more rapidly.

Count Raymond and his men, who were attacking the wall on the other side, did not yet know of all this, until they saw the Saracens leap from the wall in front of them. Forthwith, they joyfully rushed into the city to pursue and kill the nefarious enemies, as their comrades were already doing. Some Saracens, Arabs, and Ethiopians took refuge in the tower of David, others fled to the temples of the Lord and of Solomon. A great fight took place in the court and porch of

the temples, where they were unable to escape from our gladiators. Many fled to the roof of the temple of Solomon, and were shot with arrows, so that they fell to the ground dead. In this temple almost ten thousand were killed. Indeed, if you had been there you would have seen our feet colored to our ankles with the blood of the slain. But what more shall I relate? None of them were left alive; neither women nor children were spared.

From: Fulcher of Chartres, *Gesta Francorum Jerusalem expugnantium*.
In *Parallel Source Problems in Medieval History*, ed. Frederick Duncan and August C. Krey (New York: Harper and Brothers, 1912).

The Islamic World

~ Abraham Ibn Daud: "On Samuel Ha-Nagid, Vizier of Granada," from *Sefer Seder ha-Kabbalah* (1161) ~

One of the great disciples of Rabbi Enoch was Rabbi Samuel HaLevi, the Prince, the son of Joseph, who was known as Ibn Nagrela, of the community of Cordova. He was an unusually fine Talmudic scholar and was also well versed in Arabic literature and language. He was of the type that could occupy a high position in the royal palace.

Samuel was a merchant, supporting himself with great difficulty until the devastating days in Spain which followed the fall of the Amirid kingdom when the Berbers secured the power.

It was then that the land of Cordova began to decline and its inhabitants fled. Some of them ran away to Saragossa, where their descendants are even now; some fled to Toledo and their descendants are known there even to this day.

This Rabbi Samuel HaLevi fled to Malaga. There he had a shop and was a petty merchant. His shop happened to be near the palace of Ibn alArif, the vizier of King Habbus, the son of Maksan, the King of the Berbers, in Granada. At the request of a maid servant of the vizier, Samuel used to write letters for her to her master the vizier, Abu alKasim ibn alArif. This latter saw his letters and was amazed at his wisdom.

Some time later this vizier, Ibn alArif, got permission of his king, Habbus, to return to his home in Malaga. There he asked the people of his house: "Who used to write those letters that came to me from you?" "A certain Jew," they answered, "who comes from the community of Cordova and lives near your palace—he used to write them for us." Immediately the secretary issued a command and they rushed Rabbi Samuel HaLevi to him. "It is unbecoming for you to sit in a shop," he said to him. "Stay here with me." He did so and became his secretary and adviser.

The vizier used to advise the King according to the advice given by Rabbi Samuel HaLevi, of blessed memory. All his advice was as though it came from God, and the King Habbus prospered through it very much. After some time the vizier, Ibn alArif, became mortally ill, and King Habbus, who came to visit him, said to him: "What shall I do? Who will advise me in the wars which encompass me?" "I have never advised you," he answered him, "out of my own mind, but at the suggestion of this Jew, my secretary. Take care of him, and he will be as a father and a minister to you. Do whatever he advises you, and God will help you." So

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after the death of the vizier, King Habbus took Rabbi Samuel HaLevi and brought him to his palace and he became his vizier and councilor.

In the year 4780 [1020] he was in the palace of the King Habbus. The king had two sons: the name of the elder was Badis, and the younger, Bulukkin. All the Berber princes favored Bulukkin, the younger son, as the successor, but all the rest of the people favored Badis. The Jews, too, and among them Rabbi Joseph ibn Migas, Rabbi Isaac ben Leon, and Rabbi Nehemiah, who was called Escafa, three Granada notables, favored Bulukkin, but Rabbi Samuel HaLevi favored Badis.

On the day that King Habbus died, the Berber princes and their distinguished men rose in the morning to crown his son Bulukkin. Bulukkin, however, immediately went and kissed the hand of his elder

brother Badis. Thus Badis was crowned in the year 4787 [1027] and the face of his enemies turned black like the bottom of a pot; and against their will they had to crown Badis.

After this Bulukkin regretted that he had made his brother king and kept on getting the upper hand over his brother Badis, with the result that King Badis was unable to do a thing, big or small, without his brother's interference. But after this his brother Bulukkin became sick, and the King gave orders to the physician not to cure him. The physician obeyed, and Bulukkin died. Thus was the kingdom established in the hands of Badis. These three distinguished Jews of the city, whom we have mentioned, fled to the land of Seville.

From: Jacob Marcus, *The Jew in the Medieval World: A Source Book, 315–1791* (New York: Jewish Publication Society, 1938).

FURTHER READING

- Ibn Battuta, *Travels in Asia and Africa*, trans. H. A. R. Gibb (New Delhi, India: Manohar, 2001).
 Mike Edwards, "Marco Polo in China: Part II," *National Geographic* 199 (June 2001): 20–45.
 Richard Humble, *Marco Polo* (London, Weidenfeld and Nicolson, 1975).
 Gavin Menzies, *1421: The Year China Discovered the World* (London: Transworld, 2003).
 Douglas Bullis, "The Longest Hajj: The Journeys of Ibn Battuta," *Saudi Aramco World* 51, no. 4 (July–August 2000): 2–39.
 Gabriel Ronay, *The Tartar Khan's Englishman* (London: Cassell, 1978).

► forests and forestry

INTRODUCTION

Paleontologists believe that the first human beings appeared on open grassy plains in East Africa. Perhaps from that time to the present forests have been mysterious and somewhat alien to people, who are built to move swiftly over open ground. Much of the story of forests during medieval times is one of people trying to control them, either by destroying them or by managing their growth.

In western Europe people sometimes abandoned unwanted children in forests, in the hope that people there would take in the youngsters. In China and Southeast Asia young orphans starved, were made slaves, or found sanctuary in for-

ests, often becoming bandits who preyed on rural villages and unwary travelers. In India forests were feared because of the ruthless bandits they sometimes sheltered. Forests sheltered other people as well. Even during the medieval era India's forests harbored hunter-gatherer cultures—people who worshiped forest gods and would fight to drive away those who would build roads among the trees. For many years historians and anthropologists believed that such forest dwellers lived in perfect harmony with their environments, finding food and game without altering the pristine natural environments. It is unlikely that medieval peoples harbored any such illusions, and modern research has shown the idea to be nonsense. Wherever people and forests came together, people altered the forest environment for their own purposes.

For instance, on forested Pacific islands, many people lived in clearings among the trees, venturing into what would seem at first glance to be unaltered forests. But they planted taro roots among the trees, and to do so they cleared spaces between trees, moved dirt into heaps, and kept their plots clear even though the forest canopy was unbroken overhead. In the forests of the Amazon people made mounds of dirt and planted trees that produced nuts or fruit, altering the forest environment in favor of trees directly beneficial to them. Further, people changed forest environments through hunting. In Oceania people sometimes wiped out wild animals on an island and then moved to another and did the same.

People also tried to control forest growth. In North America people of the central plains set dry grass on fire to clear the land for new growth of forage for their staple food: bison. Without their actions over thousands of years the great eastern forests of North America would likely have extended much farther westward than they did. In many parts of the world people burned forests to make room for farming. In western Africa this was part of a system of rotation. A plot would be farmed for a few years and then would be left alone for about 10 years, allowing the soil to recover while other plots were farmed. People would again burn away growth on the plot when the time came to replant it. Elsewhere, as in Central America, people burned without thought to renewing the land, resulting in ecological catastrophes such as that which befell the Maya. The Maya were not unique in this—even in faraway southern Africa, the Great Zimbabwe civilization met with a similar fate in the late 1400s.

Among some medieval peoples, managing forests was institutionalized. In Europe laws were created to govern who could use a forest and how the forest was to be used. In India foresters were craftsmen charged with managing forests. They determined which trees would be felled at what time, and they took care that animals were not overhunted. Further, they were required to replant with trees any areas that had been logged, creating forests that appeared primeval but actually were filled with trees chosen by people because the trees were useful.

Thus, there were competing needs for the civilizations that arose in and near forests. People needed forests to remain intact yet also needed to remove forests to use the wood and to make room for people to settle. This conflict sometimes led to outright destruction of forests, but there were examples of the ways in which a culture could manage its forests to preserve them. By late medieval times China had nearly eradicated its northern forests and was losing its southern forests all the way to its southern mountains, where logging was difficult, but in much of India forests remained thick upon the land. In Europe, even while great swaths of forest were cleared for farms, large tracts were protected by law from destruction. In Japan, where wood was used to build almost everything, continuous replanting of forest kept its islands covered by trees. Many of the forests that exist today are the result of the efforts of medieval cultures to conserve them and even to nurture them.

AFRICA

BY LEAH A. J. COHEN

In modern times the definition of *forest* varies depending upon the criteria used. Definitions can be related to canopy cover, biomass, tree type and size, or land use. Forests can

be classified as old growth or secondary/fallow and also are classified based on ecological characteristics, such as species, rainfall, and elevation. Defining forests has become increasingly complex owing in part to the impact that humans have on forests. People can clear forests, selectively harvest species and thereby alter the composition of a forest, replant forests with different species, and plant specific species of trees for a multitude of uses, such as conservation or agriculture. These varied uses of forests and forest resources increased dramatically just before and during the medieval period as humans' activities affected and altered forests more extensively than ever before.

Reconstructing a picture of forest cover during medieval times is based on archaeological evidence of the human use of forest resources and research on climate and ecological characteristics. In general, forest ecology is supported in areas of Africa that receive more than 55 inches of rainfall annually. Rainfall of between 15 and 55 inches annually supports savanna or grassland ecology with interspersed trees and woodland areas. Furthermore, forests tend to occupy riversides in many areas. During the medieval period there were equatorial rain forests in central Africa, forests in the higher elevations of eastern and southern Africa and the Atlas Mountains of northwestern Africa, and coastal forests in western Africa and eastern and southeastern Africa. Woodland ecology extended in a band from present-day Cameroon toward the southeast into present-day Mozambique.

The exact boundaries and expanse of these forests and woodlands varied during the medieval period based on climate changes. The changes in the boundaries of these ecosystems have been detected in the archaeological record by the movements of pastoralists. Herders avoided forested areas because these were the natural habitat for tsetse flies, which carried the disease trypanosomiasis that infected and killed large livestock. At the start of the medieval period forests and woodlands still extensively occupied the mountainous regions extending from Ethiopia into southern Africa. Land use during this period reduced the forest cover in this area. Furthermore, the climatological and archaeological records from the medieval period show that forests lay farther to the north during the Medieval Warm Period (800–950 C.E. through 1300 C.E.) as the result of the northerly route of the seasonal rains. As the temperatures dropped during the 1300s and the seasonal rains began to move across a more southerly route, the forest boundaries moved with them.

Before and during the medieval period the use of forest resources changed forests and human life dramatically. Rainfall was no longer the most important factor that determined whether forests thrived. The spread of iron-smelting technologies, the Bantu expansion (the third phase of which oc-

curred in the first millennium C.E.), and general population growth led to the clearing of forests and increased use of forest resources. An enormous number of trees were needed for the growing number of iron-smelting furnaces that turned natural iron ore into iron tools. As the population grew, more land was cleared for growing food. With the expansion of iron smelting and agriculture, the forests and woodlands of the highland areas of eastern and southern Africa, in particular, were transformed into grassland.

The areas that remained forested in central Africa tended to be the home of groups of people who continued to live primarily by hunting and gathering. One exception was the forested kingdom of Benin, which was located in present-day Nigeria (no geographical relation to the present-day country of Benin). The kingdom of Benin reached its peak of power during the late medieval period (ca. 1400). It differed from the medieval kingdoms that developed elsewhere in Africa because the forest served as a barrier to Muslim travelers, who did not reach Benin until much later than other medieval kingdoms, sometime after 1600.

People had many other uses of forest resources in addition to iron smelting during medieval times. Wood from trees was used for cooking and building homes. Plants and trees were used for medicine. The seeds and fruits of trees were used as a food source, and some were traded through the trans-Saharan trade routes. People living in forested areas traded forest resources with people outside the forests. For example, the forest dwellers of western Africa during the medieval period used dugout canoes to travel the Niger, Senegal, Volta, Cross, and Gambia river systems toward the coasts to trade with communities that specialized in fishing and salt production. In addition, ivory from the forested regions of Africa became an important item of trade during this period. The great empires of Ghana, Mali, and Songhai, although not located within the forests, benefited from the gold mines of the Guinea forests during the medieval period.

For many cultures the forests held a certain amount of spiritual and cultural significance. The African baobab trees, in particular, have been a focus of colonial and modern explorers and scientists. The Wolof of western Africa had a custom of burying deceased members of the bard caste (of poet-singers) at the base of baobab trees, which they thought would prevent drought. In a well-known African creation myth in which each animal is given a tree, the Great Spirit assigns the baobab to the hyena. The hyena is so disappointed that he throws the tree down, and it lands upside down, giving the baobab its unique appearance.

In the regions of present-day Burkina Faso, Senegal, and Ethiopia certain cultures believed that the forests and specific trees were homes and meeting places of important spirits

and ancestors. The people who lived in Burkina Faso believed that the baobab tree was a resting spot of gods and a refuge for ancestors; when a tree that was particularly important in the community died, the people conducted a funeral service. Since there are limited written records of the mythologies of people before the travel documents of the Arabs from medieval times and Europeans after the 15th century, it is not known how old these myths are, but they were probably present in medieval cultures.

Deforestation as the result of human activities during medieval times became a pattern seen in many regions of Africa, even though the time frame varied slightly. In eastern Africa substantial deforestation from iron smelting and the expansion of agriculture began in the Great Lakes region of eastern Africa just before and during the first millennium of the Common Era and by the start of the medieval period in about 500. The forested landscape in this region had already changed to grassland, secondary forests, and agriculture; by 1000 the area included a notable population of domesticated cattle. Examination of archaeological remains indicates that initially the wood used in iron-smelting furnaces was from old-growth, mixed and mature forests in the area. Over time iron smelters had to use younger trees and those from areas that were less convenient, such as swamps. After stripping the forests and causing serious erosion, people left the area for a better resource base in the late first millennium. People moved back during the 13th and 14th centuries after the forests had partially recovered.

All over Africa iron-smelting activities resulted in the massive clearing of forests and exposed the fragile forest soil to the elements; this may have contributed to the collapse of great civilizations. This pattern of deforestation often led to an adaptation of livelihoods, and in some places it prompted people to turn to pastoralism when the forests were gone. As the forests lands were cleared, the natural habitat for the disease-carrying tsetse fly shrank, but the more open habitat of the malaria-carrying mosquito replaced the forests. The detriments and advantages to the transformation of the forested regions of Africa were widespread.

THE AMERICAS

BY MICHAEL J. O'NEAL

At the time of Christopher Columbus's arrival in the Americas, roughly 80 percent of North America's forests were located on the eastern half of the continent. Heavily forested areas extended from modern-day eastern Canada down through New England to the upper American South, then across the Great Lakes states to the eastern edge of the mid-western plains. The other 20 percent were located primarily

in the American and Canadian Northwest and parts of the Rocky Mountain regions.

The presence—or absence—of forests in many ways shaped the cultures of the people who inhabited these regions. Forest dwellers were able to feed themselves with game animals that lived in forests and fish from the rivers that watered the forests. The forests were a source not only of lumber and firewood but also of such food items as nuts and fruits. In contrast, people who lived in more barren areas, such as the American Southwest, had to rely more on agriculture aided by extensive irrigation systems to grow most of their food. Those who lived on the plains led a more nomadic existence as they followed herds of game animals, such as buffalo.

Historians disagree about the nature of forestry management practices among pre-Columbian Native Americans. Some argue that the impact of Native American communities on forests was minimal. This view is based in part on low population estimates, perhaps 8 to 15 million for North, Central, and South America. According to this view, much of pre-Columbian North America was covered by vast expanses of forests that were in many places cut down only after the arrival of European settlers.

Other historians, though, believe that this view is romantic, driven more by the politics of modern environmentalism than by hard science. These historians refer to this belief as the “myth of the pristine wilderness,” the idea that forests remained virgin and in their natural state, undisturbed by humans. They note recent evidence that shows that the population of the Americas was probably at least 43 to 63 million and possibly up to double that number, making it inevitable that human populations affected the forests. They point to evidence that this much larger population engaged in practices that resulted in extensive modification of forests, creating some 30 to 40 newly treeless acres per person during the centuries before the arrival of Europeans.

One of these practices was the use of fire to create open areas for two purposes. One purpose was to clear fields, making it easier to hunt game, especially larger animals, such as deer, antelope, and elk. This practice was especially widespread at the margins of the Great Plains. Native Americans set large fires to prevent forests from spreading and even to push them back. Some historians even believe that the open grasslands of the plains were essentially a creation of Native Americans, who deforested parts of the region to form what in effect were “buffalo farms,” or large, open game preserves. In many places fires also were used to open up living spaces. In particular, fire eliminated the low brush that provided habitat for snakes, rodents, and other undesirable species.

Fire was used to clear agricultural land as well. Many Native American communities relied on slash-and-burn farm-

ing techniques. They cut down trees in forested areas to clear fields of 20 to perhaps 200 acres. After they cut the trees, they burned off the rubble and stumps and planted such crops as maize (corn), squash, and beans. Often conditions for a community deteriorated because of deforestation. Demand for firewood was constant, so land was deforested in an ever-widening radius around a village. Further, maize consumes a large amount of essential nitrogen in the soil, so soil conditions in maize fields quickly degraded. When these conditions arose, the people simply picked up and moved, engaging in the same forest-clearing practices elsewhere.

Some Native American communities consumed large tracts of forestland for building purposes. For instance, the Cahokian culture, which occupied land at the confluence of the Mississippi, Missouri, and Illinois rivers, built an extensive defensive stockade around the community’s central hub. This stockade consumed up to 20,000 trees, and it frequently had to be rebuilt as the wood deteriorated. Progressive deforestation in the area led to extensive soil erosion, reducing the amount of tillable land in the fertile river bottoms and driving forest-dwelling game animals farther and farther away. Interestingly, after such cultures as the Cahokia collapsed in the centuries before the arrival of the Europeans, forests began to rejuvenate and creep back into the grasslands in such places as Nebraska, Kansas, Wisconsin, and parts of Texas. This phenomenon has led some historians to assert, controversially, that Native Americans may have had a greater impact on forests than European settlers later had.

These kinds of problems were by no means restricted to North America. Mesoamerica—the region encompassing central and southern Mexico, the Yucatán peninsula, and such modern nations as Belize, Guatemala, parts of Honduras, and El Salvador—faced similar problems, particularly in the more arid regions. Mesoamerica encompassed a number of zones with marked differences in terrain and flora. These areas included dense tropical rain forests, sparser highland forests, savannas (grasslands), and arid regions. Forestry management, of course, was not an issue where there were no forests or in the rain forests, where the sheer immensity of the forests muted the impact of human activities. But forestry management was a particular concern in nontropical forest areas and the regions at their margins, not only in Mesoamerica but in South America as well.

In these regions, too, slash-and-burn farming was often the norm. Many historians believe that the decline of the Mayan civilization beginning in about the ninth century is attributable to deforestation and soil erosion, at least in part. The Maya had the same problem that North Americans had. They cleared more and more land for agricultural purposes, and maize cultivation depleted the soil. There are no domes-

FORESTRY AND CULTURE

Despite modifications in the forests that medieval Americans might have made, the fact remains that when the first European settlers arrived, they were met by two continents that in many places were densely forested, particularly in the eastern regions where the first Europeans put down roots.

Forestry practices at this point in history came into conflict with one another. In North America, for instance, several factors influenced the way Native Americans managed the forests that surrounded them. One factor was technology. Without the iron tools that were the product of European manufacture, Native Americans were limited in the types of forests they could clear and the extent to which they could clear them. Simply put, they were unable to clear large old-growth trees that in many instances were hundreds of years old, because their stone tools were unequal to the task. In contrast, the first European settlers brought with them iron tools that enabled them to cut such trees.

A second factor was the sheer immensity of the Americas. During the medieval period Europe was beginning to get crowded, and in many places old-growth forests had long been cleared. This was particularly the case in England, where old-growth oak forests were essentially gone by late in the medieval period. The English, occupying a relatively small island, had developed a long tradition of modifying their restricted environment to create farms, pastures, and gardens. Water wheels and windmills were common sights. When these settlers arrived in the Americas, they saw vast forests that appeared to them to be inexhaustible. It is little wonder, then, that they used wood for every conceivable purpose: to build plank roads, homes, and wagons; as firewood; to make tools; and to produce charcoal for iron production. In contrast, while Native Americans modified the forests, it is also the case that they allowed forests to regenerate over periods of hundreds of years. They cleared an area for farming and when the soil became depleted, they moved on to another area, allowing the earlier area to return to its natural state.

A third factor was philosophical and religious. Native Americans tended to regard the forests as sacred. The forests were home to animals and plants that provided them with sustenance. They saw themselves as just one of many species that occupied the forests. In contrast, the first European settlers were frightened of the forests. Forests in the popular imagination were occupied by spirits, witches, and demons as well as by various predatory species—bears, cougars, wolves, and similar animals that turned the forests into what the English called a “howling wilderness.” It was a place where a person could easily become lost—the English word *bewildered* literally means “lost in the woods” or “lost in the wild.” One reason that the first settlers distrusted Native Americans was that the natives seemed comfortable living and moving about in the forests. To medieval Native Americans, forests were home. To the first settlers, forests were something that had to be tamed.

tic herds in the Mayan area. Progressively less productive land was available, leading to population decline and, along with other factors, the eventual fall of the Maya as a major power in the area.

In the Peruvian Andes more than 1.5 million acres of terraced fields can still be seen, and historians believe that many millions more were under slash-and-burn cultivation. Historians, archaeologists, and botanists differ sharply about pre-Columbian forests and forest-management practices, particularly in the Amazon basin, which is home to an immense rain forest. The region has come to the attention of the public as scientists have learned more about the role of rain forests in absorbing carbon dioxide and releasing oxygen into the atmosphere. Many contemporary environmentalists vigorously oppose cutting down rain forests for agriculture. They regard the shrinking of the Amazon rain forests as symbolic of human degradation of the environment.

The traditional view is that pre-Columbian Amazonians lived in harmony with the rain forest and that human activities had only a very limited impact on it—again, the myth of the pristine wilderness. Other scientists, however, dispute this viewpoint, and some even contend that the rain forest as it is known today is in many respects a human creation. These scientists note that the soil in much of the Amazonian rain forest has always been poor, primarily because nutrients leech away in the persistent rain. The conventional belief is that for this reason, populations were limited to small bands who cleared relatively small areas of forest and then left when the soil was no longer able to produce crops. The forest reasserted itself until a new group came in and began the process all over again. However, some historians are revising this conventional view. They note that clearing rain forest without the benefit of modern machinery is an immensely difficult process—so difficult that few people during the pre-Colum-

bian period tried it. Instead, they planted trees, often on top of immense earthen mounds they constructed. These trees, unlike annual crops, such as maize or squash, were perennial crops, providing nuts, fruits, and other resources for a period of many years.

Thus, rather than being a pristine wilderness, parts of the Amazon rain forest are actually what some historians call “built environments.” These historians believe that at least 12 percent of the rain forest, and possibly much more, was actually created by humans. This point of view is the subject of controversy because in the eyes of some environmentalists it suggests that continued cutting of rain forests for agriculture is acceptable; environmentalists who oppose this view want to preserve the “pristine wilderness” view to justify making the forests off limits to any kind of development.

While much South American rain forest soil is poor, scientists have located areas where quite the opposite is true. They refer to these soils as *terra preta*, meaning something like “prepared earth.” Here the soil is thick, dark, and rich with microorganisms and nutrients. Some scientists believe that *terra preta* makes up about 10 percent of the Amazon rain forest, possibly more. What is astonishing about this soil is that it seems to be in effect self-regenerating. Scientists believe that during the pre-Columbian centuries these regions were, in effect, huge compost heaps, where people scraped off soil for use in agriculture and landscaped gardens, leaving a layer of it behind. This layer continued to “brew,” turning debris and the soil under it into new, rich topsoil. Again, this effect was the result of human forestry management.

Other Amazonian cultures took a different tack on forestry management, particularly in areas subject to annual flooding. In these areas people constructed immense earthen mounds to provide elevated areas for habitation. To keep water out of their fields, they built extensive networks of earthen dams, weirs, and canals. They then stocked these bodies of water with fish that could be caught for food. To maintain this system, people regularly burned away immense areas of trees and undergrowth. The result over time was a complex ecosystem of plant species that depended for their survival on human burning.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The range of forests in medieval Asia and the Pacific was immense, as was the number of species that lived in them. But few forested areas were left untouched by humans. Forests stretched from the Himalayas across southern China to the sea, much of eastern Siberia was blanketed in pine forests, and India was covered from north to south by forests that

were interrupted but not dominated by human settlements. Tropical and temperate forests extended from Indonesia to Hawaii, and even Australia, now famous for its wide open lands, had vast areas of both types of forests. The story of the medieval forests is also the story of how people saw themselves in relation to the awesome mysteries of wooded lands and how they exploited those lands.

The trees in medieval Tibetan forests were well adapted to high altitudes and uneven terrain. Junipers, pines, firs, spruces, birches, and cherry trees were common. But perhaps the best-known and most highly valued Himalayan tree was the deodar, a cedar found throughout the central mountains and westward. Its timber was valued for building because of its durability. Above 8,000 feet were tough Bhutan pines. At even higher altitudes, up to 14,000 feet, were found the Himalayan birch, a tree that grew from Tibet into the mountains of southern China. Among forests of pines and other trees, from the Himalayas into central Asia, was the Indian cherry tree, whose wood was valued for furniture and decoration. Its acidic cherries were used in local medicines.

More than 30,000 plants were native to the territories of China. By the medieval era most of the forests of the north had been felled for fires or building. Vast oak forests near the Yellow River were cut during the period and used for building or fuel or cleared to make way for agricultural development. The forests farther south harbored alligators, monkeys, wildcats, and pandas. The pandas lived in vast bamboo forests, where people ventured to harvest bamboo shoots for food and mature bamboo for use in construction. Often found in these southern forests and the forests of Manchuria were tigers, leopards, bears, wild pigs, deer, pheasants, and chickens. Before the medieval era China had a long-standing custom that hunters should not kill every game animal they found but leave at least 50 percent. During the Han Dynasty (202 B.C.E.–220 C.E.) nobles had violated this custom, sometimes killing wantonly. The destruction continued in the medieval era, and forests resources were further depleted by a burgeoning rural population that supplemented its diet with wild game.

China's forests had many trees that were important to people. The Yulan magnolia, from southeastern China, had white, cupped flowers that symbolized purity; it was grown in the gardens of Buddhist temples during the Tang Dynasty (618–907). The common walnut grew naturally from the Near East to Japan and thrived particularly in Korea. Its nuts were valued everywhere. The camphor tree grew throughout China, except in the far north. Fast growing and tolerant of almost any kind of soil, the camphor persisted despite people's extracting oil from every part of it—roots, wood, and leaves—to use in medicines and to repel insects. The lychee



Painting of a stream flowing through a bamboo forest by Wang Fu, China, 1410 (Freer Gallery of Art, Smithsonian Institution, Purchase, F1952-7)

tree produced a very sweet fruit that was considered a delicacy raw or cooked. The timber of the lychee was valued for its decorative beauty.

Korea had bountiful forests, the fruits and nuts of which were abundant. There were oaks, willows, elms, spruces, pines, and poplars as well as forests of bamboo. Within Korea's forests lived tigers, leopards, bears, wild pigs, deer, pheasants, ducks, quails, herons, and cranes. Common fruits were apples, pears, and persimmons. Tangerines and grapes were found in southern Korea. Frequent wars and invasions made management of the forests difficult, and invading armies sometimes lived off the food of the forests. The Korean pine grew not only in Korea but also in Japan and Manchuria. The seeds of its cones were eaten as food, and its timber was widely used for construction.

Eastern Siberia and Manchuria had huge forests. As China depleted its northern forests, Chinese lumbermen turned to harvesting the trees of Manchuria and Korea. The forest regions of eastern Siberia were very cold and remote from population centers. In them lived huge brown bears and Siberian tigers as well as wolves and deer. The forests included larches, osiers, crab apples, and pines. The fruit of the Siberian crab apple tree was fermented into wine.

In medieval Japan reforestation was considered a sacred duty. The practice of replanting where trees had been harvested probably began with a Buddhist priest named Gyogi (668–749). Reforestation became a requirement for students attending Buddhist schools, and shoguns and lords made laws requiring the practice. Most Japanese chose to live on the coastal plains or in mountain valleys rather than the mountains most prevalent in Japan's landscape. On those mountains grew vast forests. Even in the 1600s, when foreign mariners approached the island of Kyoshu, they saw dense forests rising up and out of sight, with the homes of people being low, near the seashore.

In medieval Japan wood was abundant and used for almost any sort of construction as well as for heat. Japanese homes typically had little furniture except for tables and cabinets. Among the multitude of tree species originating in Japan, many were valued for timber, including the red cedar, umbrella pine, magnolia, and keyaki (used extensively for temples). Trees valued for their decorative woods included the Hinoki cypress. The nut of the Japanese walnut was commonly eaten, although the husk was poisonous. Another significant food source was the Japanese chestnut; this tree produced nuts in enough quantity to make it worth growing in orchards. The inner bark of the paper mulberry was used to make paper.

The forests of Southeast Asia, Indonesia, and the Philippines were among the most varied in the medieval world. For instance, the lowland forests of Malaysia had more than 800 species of trees, and Sumatra's lowland forests had more than 100 species. River valleys had swamps filled with peat, which was used for fuel. The forests in these regions were very dark, and the lack of light on the floor limited the amount of undergrowth, enabling people to move through them quickly. Activity among the forests' wildlife was primarily in the branches of the trees. The systematic destruction of these forests probably did not begin until the 1400s, when Chinese lumbermen began harvesting trees on Borneo for export to China.

On mountainsides of Southeast Asia, Indonesia, and the Philippines grew forests of oak, myrtle, and laurel. Along the shores grew nipa palms, casuarina, and mangroves, all cut for timber used in construction. The tree with perhaps the highest cash value was the nutmeg, originally from the Moluccas islands in Indonesia. It was valued for its scent and as a spice, and oil from the seeds was used in local medicines. Also from the Moluccas came the clove tree. Its immature flower buds were dried and used for medicine and perfume and as a spice.

Also of great value was teak, found in Southeast Asia and India. Its hardwood was used for furniture and decorations.

The breadfruit tree grew on many Indonesian islands and in southern Malaysia. Its seeds were eaten, and its starchy fruit was baked for food. Having much the same range as the breadfruit tree, the golden apple tree produced edible but sour fruit year-round. On the Southeast Asian mainland, Borneo, and a few other islands grew the durian, the fruit of which smelled putrid but tasted delicious. The elephant apple found throughout Southeast Asia produced a fruit that was used to make drinks and jellies. The fruit of the rambutan was popular in Southeast Asia and as an export to China for its sweetness and juiciness.

India and Sri Lanka had longstanding traditions of forestry. Foresters were a class of craftspeople charged with managing forests. Everything in the forest technically belonged to the king, although he was expected to grant people permission to harvest timber for building and to hunt for food. The foresters also saw to the replanting of land where trees had been harvested. Usually the foresters felled the trees for carpenters. Cut trees would be rolled or carried by elephants, either to rivers, where they would be floated downstream to areas where carpenters would cut them into planks, or onto carts for transport to villages, towns, and cities.

India was famed for its spices, and among the most in demand was cinnamon from a tree native to southern India. The spice was made from young bark. The black, hard wood of India's ebony tree was used to make furniture. Found in the northern and eastern areas of India, ebony was heavily harvested to satisfy a large export market as well as a local one. Mangoes were found throughout India and provided a popular juicy fruit. The curry leaf tree of India and Sri Lanka had edible, peppery berries, and its bark and roots were used to produce tonics. Its leaves were added as flavoring to curry dishes.

The variety of cultures in medieval Oceania was so vast that it is difficult to generalize about their forestry practices. In much of Polynesia people used forests for gardens. For example, taro root would be grown among the trees of a forest, in the shade provided by the forest canopy. In most areas trees were harvested for their wood for building shelters. Although most people found reasons to keep their forests intact, not all did. For instance, the people of Easter Island denuded their island of trees, leaving themselves stranded for lack of wood for boats.

Perhaps the best known of all Oceanic trees is the coconut. Oceanic peoples used the tree's trunk for timber, its leaves for roofing, its flower for brewing a drink, and its tips for food. The fruit itself was eaten, and its milk was a popular beverage. The husk of the fruit was used as fuel and for mat-

ting. Another valuable tree found in Indonesia, New Guinea, and Australia was the *Leichhardt* tree, which grew in swamps and along rivers. Medieval Australians used its trunks for canoes and the bark for a yellow dye and for pain relief. Its fruit was edible. One of the world's most popular nuts, macadamia, originated in northeastern Australia but did not become of worldwide interest until the late 1800s.

EUROPE

BY DOLLY JØRGENSEN

In the Middle Ages the word *forest* (or its Latin equivalent, *foresta*) designated a legal entity consisting of extensive land, including both woodland and pasture, within which the right of hunting was reserved for the king or his designees and subject to a special code of laws administered by local officials. The first known forest was documented in a charter for the monasteries of Stavelot and Malmédy in the Ardennes in Belgium in 648. From that humble beginning, forests were designed throughout the former Merovingian and Carolingian lands. After the conquest of England by William the Conqueror (r. 1066–87) the term *forest* took on the same legal character as on the continent.

The medieval forest did not imply continuous tree cover, although many forests were well wooded. In England, for example, designated forests such as those of Dean and Hants encompassed wooded lands, but others like Dartmoor and Exmoor were moorland; still others, like Sherwood, were heath. Not all wooded areas were designated as forests. For example, few forests were established in the two biggest concentrations of woodlands in England in the Anglo-Norman period, the Weald and Chiltern Hills.

Forests that were wooded operated as multipurpose areas for wood collection, pasturage, and hunting. Woodland played such a central role in medieval agriculture that the economy of the time is often referred to as "silvi-pastoral." Rather than extensive wilderness areas, woodland thus consisted of tamed, tracked areas where animals could graze and wood could be gathered. These areas were consciously managed in the Middle Ages through physical and legal means.

Wood was critical to any medieval settlement for maintaining buildings, mending fences, firing baking ovens, and creating fires for warmth. The construction of bridges, water mills, windmills, and ships compelled the use of large timbers. Early industries relied on wood for fuel; charcoal, made by burning wood slowly with insufficient oxygen for complete combustion, fueled the early iron, salt, and glass industries. Trees also provided edible fruits and household items. As a result of these needs, every community depended on woodlands located close to the settlement.

The Germanic tribal peoples who settled in western Europe established laws about wood resources. The Visigothic Laws of the Judges included penalties for cutting down large and small oaks as well as other trees and allowed for the seizure of the oxen and vehicle of anyone entering another's forest with a cart to carry away wood. The Burgundian Code of the late fifth and early sixth centuries required that anyone felling a fruit, pine, or fir tree had to pay the tree owner 1 solidus. The law, however, also recognized the need for wood even if one did not own wooded land: "If any Burgundian or Roman does not have forested land, let him have the right to cut wood for his own use from fallen trees or trees without fruit in anyone's forest, and let him not be driven away by the owner of the forest." The Laws of the Salian Franks had the following restriction: "He who takes a tree after the year that it was marked for cutting shall bear no blame. If he cuts it down during that year, he shall be liable to pay 3 solidi." This particular law shows that the early Franks managed their woodland by designating trees of sufficient size for their needs each year and did not indiscriminately cut down forested areas.

In the ninth-century code of King Alfred of Wessex (r. 871–99) the act of burning or felling trees carried a fine per tree based on size: 5 shillings for a big tree and 5 pence for a small one. The Danish king Canute, ruler of Denmark and England (r. 1016–35), supposedly issued a law code specific to English forests, *Constitutiones de Foresta*. Although the law code was altered by a Norman scribe to agree with post-conquest practices, it probably contains the general concept of Anglo-Danish forest law. Capitulary 28 stated that anyone who disturbs the wood or undergrowth without the permis-

sion of the minister of the forest is considered to have violated the laws of royal chase.

Wood collection relied on the practices of coppicing and pollarding. Trees could be cut approximately 3 feet above ground level to create a sprouting stump that yielded a significant number of smaller branches (coppiced) or higher on the trunk so that young sprouts were out of the reach of grazing animals (pollarded). Ash and field maple were used for poles, hazel for fences, and others such as oak and birch for firewood and fodder. Coppice stands usually consisted of one species growing from regularly spaced stumps and, scattered among them, larger trees, called standards, grown for construction timber. The practice of coppicing dramatically increases the life span of a tree as well as its wood yield, so less clear-cutting is required.

Woodland in forests also provided fodder for livestock. To integrate wood collection and pasturage, two practices became common. First, the practice of pollarding the trees allowed livestock such as cattle to graze on grasses without reaching the trees' new growth. Second, lords permitted swine in the woods during the time of *pannage*, or, in medieval Latin, *pasnagio*, when the pigs were allowed to gorge on the fallen acorns and beech mast, typically from mid-September through mid-November. This period was followed by the slaughtering season in preparation for the winter months. Despite the variability of the crop, feeding pigs on fallen acorns in the fall was a common practice, to make them plump before the slaughtering season. These fattened pigs were a necessity over the slim winter months; hence their common inclusion in "occupation of the months" illustrations on medieval calendars, called "books of hours." These "occupations of the months" pages became common in later 14th-century manuscripts, such as *Le livre d'heures* of Jeanne d'Évreux (1310–71), the third wife of Charles IV of France, in which a swineherd knocks down acorns to feed his pigs, and *Les petites heures* of Jean of Valois (1340–1416), duke of Berry and Auvergne, in which pigs forage in October and are slaughtered in December.

While royal forests acted as sources of pasture, timber, and wood, their primary legal purpose was as hunting reserves. Medieval chroniclers stress the creation of royal forests as reserves for the privilege of hunting game for the king. These hunting areas were not always densely wooded; many of them were open glades with some tree cover. This tradition in England dated back at least to the Saxon days (early fifth century to the conquest), when the right of the chase was reserved in areas close to royal residences. Examples of Anglo-Saxon hunting grounds (*haia*) afforested by William the Conqueror (r. 1066–87) were the Forest of Galtres in the center of Yorkshire and the Forest of Peak. Southern Europe had hunt-



The Savernake Horn, ivory, England or Scotland, 1325–50. Various forest scenes are depicted, among them a king seemingly in conversation with a bishop, with a forester alongside; the scene is thought to portray the forming of a forestry agreement. (© The Trustees of the British Museum)

ing grounds in forests as well. Alfonso XI, king of Spain (r. 1312–50), compiled *El libro de la montería* (Book of Hunting), listing hundreds of *montes* in Spain. *Montes* were not necessarily mountains or forests but rather hunting grounds. Often hunting occurred in a park, which was a man-made, fenced enclosure to keep deer contained within an area. Some forests had parks, but not all parks were connected to forests.

“Beasts of the chase,” including red deer, fallow deer, roe deer, and wild boar, were reserved for the king and nobles within hunting grounds in forests and in parks. The red deer was the largest British deer and primary beast of the chase. The fallow deer, a species introduced from the European continent, was found more typically within parks. The roe deer was the smallest deer species in England, measuring only 26 inches high at the shoulder. The wild boar was common throughout woodland areas. Huntsmen frequently used dogs to drive deer into hedges or nets placed to ensnare them, and the use of dogs in the forest was restricted to these hunters.

The king and other lords employed men to control access to forests. Royal foresters acted as the king’s servants to keep the peace in the forest, enforce forest law, and present violators at the forest courts. Local lords and abbeys also retained the service of foresters. The *Domesday Book*, a countrywide survey completed for William the Conqueror, records that great landholders such as Hugh d’Avranches (d. 1101), the earl of Chester, established their own forests and parks and had foresters to manage them. Forester responsibilities included protection of the game, protection of the trees, regulation of grazing, distribution of the hunting tithe, and financial accounting for forest resources. By the 1300s business account books were being used by large manorial estates to keep track of income and expenses, and the account books for forests were handled by foresters. For example, the Champagne region of France had numerous detailed forestry accounts revealing complex management practices.

Designating land as royal forest was often a contentious affair because it involved the restriction of land use, tax payments, and a separate court system. The magnates who forced King John of England (r. 1199–1216) to approve the Magna Carta made several statements decrying the forestry practices as of 1215 and included the requirements that all lands named as forests by King John be “disafforested” and that an inquiry into bad forest customs take place within 40 days. The nobles demanded the restoration of the forest boundaries to their extent at the end of the Anglo-Norman reign and the beginning of the kingship of Henry II (r. 1154–89). In the issuance of the Second Great Charter of Liberties on November 6, 1217, all mention of the forest was removed because the forest clauses of the Magna Carta were deemed to be so important

that they deserved their own treatment; they were handled in a separate document, the First Forest Charter.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Most of the medieval Islamic world encompassed dry regions with vast open lands devoid of forests. Muslims had the disadvantage of sweeping out of Arabia and through the Near East and North Africa after other cultures had stripped the land of much of its forests. Thus, for a long time forests were either out of reach or on the edges of the Islamic world. As the Islamic world extended its reach into India, sub-Saharan Africa, and the Iberian Peninsula, forests became more accessible, but in general the conquerors left forestry to local peoples. Even so, forests were important to medieval Islamic culture. Wood from forests was traded throughout the Islamic world for use in mosques and palaces as well as for furniture and window screens. Forest products, such as fruit harvested from wild trees, animal skins, and exotic oils for perfumes, found their way into markets far and wide.

Rainfall in Arabia was usually too little to support a forest. In southern Arabia people made good use of rainfall by creating cultivated terraces on mountainsides, which absorbed and retained rainfall well enough to allow for crops sufficient to support towns. In most of the rest of Arabia there was not enough rain even for terrace farming. Trees appeared at oases and in northwestern Arabia, where there were orchards of date palms; some orchards had thousands of trees.

The first significant forests encountered by the Islamic world probably were composed mostly of cedars, which grew from the Levant to what is now southern Turkey. The once-dense cedar forests had become patchy after centuries of the trees being felled for use in buildings and ships. The cedars of Lebanon were considered important by Muslims because they may have been used in the building of Solomon’s Temple in ancient Jerusalem, and successive Islamic governments seem to have tried to conserve the trees.

The best source of wood in the Near East may have come from the region that is now Turkey but was part of the Byzantine Empire until the 1400s. Pine and oak were harvested in Turkey and for centuries were exported as far away as Egypt. The stone pine grew throughout the northern Mediterranean as well as Turkey, and the Scots pine grew throughout Europe and well into central Asia. The seeds of the stone pine were eaten as nuts. The wood of Turkish pines was used in the making of the *mushrabiya*, a latticework consisting of a multitude of small oval balls connected by straight pieces, all without the benefit of glue. In many parts of the Islamic world the temperature changes during night and day could split

wood, but the dowels of a *mushrabiya* were set loosely in holes in the oval balls so that they could expand and contract freely. The *mushrabiya* was used to filter light through windows and often decorated balconies, from which the latticework gets its name. (*Mushrabiya* means “balcony.”)

The mountain ranges in the far north of Africa had forests because the ground was too steep and rocky for herding cattle, sheep, or goats. Although the ancient Romans had much depleted the wildlife of the Atlas Mountains, those mountains retained enough game to be a favorite hunting spot for Islam’s social elite. The Atlas cedar (also known as the Atlantic cedar) was the fastest growing of cedars, and it seems to have been quick to take advantage of any open spaces in the mountains. The Syrian juniper was found all along the northern mountains of North Africa.

Trade had existed for centuries between the northern reaches of North Africa and the peoples of western Africa and central Africa. Islam found its way into two notable kingdoms south of the Sahara: Ghana, which existed from about 700 to 1200, and Mali, which existed from about 1200 to 1500. Recent research indicates that Ghana was mostly Muslim among its aristocrats and royalty but not among commoners. On the other hand, Mali’s population probably was mostly Muslim. Both kingdoms occupied grasslands and parts of forests. The people who lived in the forests seem to have been fiercely independent, and they guarded the mysteries of their lives even from government officials.

Most secretive of all were the gold miners. The gold miners hid themselves from outsiders as much as they could, and they took such great care in hiding the locations of their mines that it seems no outsiders ever figured out where they were; even today archaeologists are uncertain of their exact locations. Sometimes intrepid Muslim traders or explorers ventured into the forests around Ghana and Mali, with some choosing to remain in forest villages. Many Muslims could read and write, and many societies in the forest regarded being able to write as a source of spiritual power. Muslims could become oracles in forest villages, free to propagate their faith. There seems to have been constant friction between those who made their livings exploiting the bounty of the forest and those who wished to burn it down in order to create grazing or farming land.

There were several hundred species of trees and plants in those forests at the edge of the western African Islamic world. The kola nut tree, the baobab, the Portia tree, the tamarind, the ackee, the Meru oak, the dita bark, the sausage tree, the Senegal date palm, and the African oil palm were some of the useful trees of the forest. Of these, the kola nut, the baobab, the Senegal date palm, and the tamarind were the most important. Growing in the humid lowlands along the shore of

western Africa, the kola nut produced a seed that was chewed for the stimulation its caffeine provided, and chewing it was considered medicinal. The baobab grew all the way from the west coast to the east coast of Africa. Its fruit was edible, and its bark was used to make rope. The Senegal date palm grew in open woodlands and along streams, making it accessible to people coming from the outside into the forest. Its orange fruit was eaten, made into wine, and used in cooking. The tamarind grew throughout the forests south of the Sahara. The wood of the tamarind was used as timber, and its fruit was used for juice as well as in cooking.

Although much of the old forest had been eliminated during classical times, there were mountains where trees thrived but with terrain that was difficult for people to exploit. There were the common yew tree, the wych elm, the cork oak, the English oak, the hawthorn, and the common ash. Yew wood was used for furniture; the wych elm’s dense wood was used for shipbuilding; the English oak grew in lowlands, and its wood was used for building, furniture, and decoration; the hawthorn was dense and hardy and was used to form windbreaks and enclosures for animals; the common ash provided durable white wood that was used for anything that had to endure rough handling. Of particular importance was the cork oak, the bark of which yielded cork. These trees lived for more than 300 years and appeared not only in mountain forests but in orchards as well.

In India, Muslim conquerors found a forest-management system already in existence, and differences in how Muslims and Hindus believed forests should be treated were a steady source of friction between the two groups. As Muslims fought their way through northwest India into the heart of India, they encountered vast forests of many different species of tree. For about 2,000 years a caste of foresters had tended the forests, charged by tradition with managing the harvesting of trees and the hunting of game. The Hindus believed that trees could be inhabited by usually benevolent spirits who could tell people the future. Thus, the spirit of each tree had to be given an apology before harvesting because moving to a new tree was a tremendous inconvenience for the spirit. Moreover, it was an important part of Hindu ritual to replant places where trees had been cut down. By and large such beliefs and activities were nonsense to Muslims, for whom apologizing to tree spirits was paganism. The process of accommodation between the two faiths on the matter of caring for forests took well beyond the medieval era to reach a state where both Muslims and Hindus believed they were in agreement.

In Muslim-governed lands of India the forests provided numerous products. As had been the case under Hindu governments, most of the products were controlled by the government. Timber was harvested for use in local building and

for export. The cutting of trees usually was done by Hindus, who used elephants to pick up and carry felled trees, which were set in a place nearby for carpenters to cut into boards; on carts for taking to villages, towns, or cities; or in rivers to float downstream for export. Some of the wood was made into charcoal. Other forest products included coconuts, resin, honey, and ivory from elephants.

Huge banyan trees grew through much of India. A single tree could cover several acres, with aerial roots growing down from branches. These roots could be fatal for other trees because the other trees were deprived of the sunshine they needed. Thus, the banyan tree was thought to be the enemy of the spirits that inhabited trees. The cinnamon tree grew in the southern half of India. Its bark that made the famous spice had to be young when harvested, so foresters took care that young trees were always available, leading to the creation of cinnamon plantations. The bo tree grew throughout India, and it was considered sacred by Buddhists because the Buddha had attained enlightenment while sitting in the shade of a bo tree.

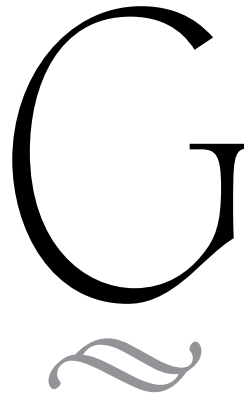
In the far north of India were forests dominated by the sal tree. It produced a wide variety of products, such as resin used in inks and varnishes, resin for incense, and resin for burning in torches. Its seeds were made into butter. Also in the north was henna, the leaves of which were crushed and then mixed into a paste that temporarily dyed hair, nails, and skin orange. Among the most valuable of India's trees was the ebony, with its heavy, jet-black wood valued for furniture and decorative carving. Found in forests of the southern and eastern reaches of medieval Muslim India, teak was extensively harvested for its wood, which was used to make furniture. Growing in semiarid parts of India, the neem tree provided timber, medicinal oil from its fruit, and insecticide from grinding its leaves and bark. The mango tree grew throughout India, where its fruit was eaten. Its fruit was a valuable export to other parts of the medieval Islamic world.

See also ADORNMENT; AGRICULTURE; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CLIMATE AND GEOGRAPHY; CRAFTS; EMPIRES AND DYNASTIES; FOOD AND DIET; HEALTH AND DISEASE; HOUSEHOLD GOODS; HUNTING,

FISHING, AND GATHERING; LAWS AND LEGAL CODES; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; TRADE AND EXCHANGE.

FURTHER READING

- Martyn Bramwell, ed., *The International Book of Wood* (New York: Crescent Books, 1987).
- William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983).
- Albert Hourani, "The Countryside," in his *History of the Arab Peoples* (New York: Warner Books, 1992).
- Russell Warren Howe, "A Life at the Crossroads." In his *Koreans: Passion and Grace* (San Diego, Calif.: Harcourt Brace Jovanovich, 1988).
- Frank Leeming, "The Wild Environments." In *The Cambridge Encyclopedia of China*, ed. Brian Hook (New York: Cambridge University Press, 1991).
- Oliver Rackham, *Trees and Woodland in the British Landscape: The Complete History of Britain's Trees, Woods and Hedgerows*, rev. ed. (London: Phoenix Press, 2001).
- Tony Russell and Catherine Cutler, *Trees: An Illustrated Identifier and Encyclopedia* (London: Hermes House, 2004).
- Tony Russell, Catherine Cutler, and Martin Walters, *The Illustrated Encyclopedia of Trees of the World* (London: Lorenz Books, 2007).
- Charles Watkins, ed., *European Woods and Forests: Studies in Cultural History* (New York: CAB International, 1998).
- William Weber, Lee J. T. White, Amy Vedder, and Lisa Naughton-Treves, *African Rain Forest Ecology and Conservation: An Interdisciplinary Perspective* (New Haven, Conn.: Yale University Press, 2001).
- Michael Williams, *Deforesting the Earth: From Prehistory to Global Crisis* (Chicago: University of Chicago Press, 2006).
- Dolores Wilson, "Multi-Use Management of the Medieval Anglo-Norman Forest," *Journal of the Oxford University History Society* 1, no. 1 (2004). Available online. URL: <http://users.ox.ac.uk/~jouhs/hilary2004/wilson01.pdf>. Downloaded on May 30, 2007.
- Charles R. Young, "Conservation Policies in the Royal Forests of Medieval England," *Albion* 10, no. 2 (1978): 95–103.
- Charles R. Young, *The Royal Forests of Medieval England* (Philadelphia: University of Pennsylvania Press, 1979).



► gender structures and roles

INTRODUCTION

Gender roles informed almost every aspect of medieval life. People dressed, worked, socialized, married, and held property on the basis of sex. Indoctrination in gender roles began early. Adults taught children how the genders should behave, whether it was through Aztec rituals, Islamic schools that taught only boys, or simply example. In many societies people expressed their gender and marital status by means of clothing or hairstyles. In parts of Europe, for example, married women covered their hair, while girls left their hair uncovered. In North America unmarried men and women wore their hair long and loose, and married people of both sexes wore theirs pinned up or bound in some way. Many Islamic women veiled themselves from the time they reached puberty.

In most of the medieval world men had higher social status than women. This did not mean that there were not powerful women and that women could not make decisions for themselves, but as a rule women were subordinate to men. Islamic law, for instance, stated that women had no power and that men controlled the actions of women. Women could inherit only half what men could, and in court it took the testimony of two women to equal that of one man. In Europe, men had far more rights to own property than women did.

Throughout the medieval world people divided jobs on the basis of sex. The fact that women were often pregnant

or tending small children made it difficult for them to leave home for extended periods. Consequently, in most places women were responsible for the domestic sphere, cooking, tending children, making clothing, keeping house, and cultivating kitchen gardens. Men typically did heavier labor, such as heavy plowing, planting, and herding livestock. Men also did any tasks that required extensive travel, such as hunting, long-distance commerce, and waging war. In parts of Africa, for example, cultivated lands were considered the province of women and wilderness the province of men. Women tended gardens and men hunted in the forests. In eastern North America men traded with distant communities while women traded locally. Both sexes worked together in some endeavors, particularly agricultural tasks such as planting and harvesting, which required large numbers of laborers for a short time. Gender associations with jobs varied by society; weaving and pottery, for example, were considered female jobs in some places and male jobs in others.

In much of the world, marriage was considered an alliance between two families, not a romantic tie between two individuals. Families chose spouses for their young people. Women typically married at a young age to men much older than themselves. A bride would often move in with her husband's family, where she was expected to care for his mother and produce children. In much of the world, families considered sons more valuable than daughters. It was not unusual for wives to be punished for their failure to produce sons or for infractions such as adultery; this was especially common

in societies such as that of China, where Confucianism set rules for family behavior. Chinese wives had to obey their husbands and mothers-in-law, though a wife who survived until her eldest son married could then take on the powerful role of mother-in-law herself. Men were typically expected to provide for their families and to defend their women and children from external threats. In Islamic society, men had to defend their family honor, a practice that could lead to extended feuds with other families. Men were considered the guardians of the women in their families. Widows were a problem in many societies. In India, for example, widows were discouraged from remarrying but also excluded from their dead husbands' families; they were instead encouraged to burn themselves to death at their husbands' funerals.

Many medieval societies regulated sexuality quite strictly. Throughout the world, people valued female virginity, though in most cases they did not place nearly so much importance on male virginity. In Europe, the Islamic world, and much of Asia a woman was expected to be a virgin when she married for the first time; a bride who was believed not to be a virgin could be punished severely. Polygyny, the marriage of one man to more than one woman, was allowed in much of the world. Muslims, Chinese people, and many African cultures allowed men to take more than one wife. Christians, however, did not allow multiple simultaneous marriages. In most places pre-marital sex was forbidden or at least discouraged, though this was not always the case; in many African societies, for example, pre-marital sex was common. Islam made some provision for sexuality outside permanent marriage by allowing short term temporary marriages. Homosexuality was considered either sinful or odd in most of the world, though it did exist.

AFRICA

BY KIRK H. BEETZ

Entire books could be devoted to the gender structures and roles of medieval Africa and still not cover all the complexities of the issues, because each African culture had its own way of organizing genders. However, a few generalizations can be made. Many historians agree that medieval African women were the subjects of widespread discrimination by men and that generally men dominated economic and social life, even in matrilineal societies. Other valid generalizations are that sexual intercourse was rarely the objective of gender structures and that medieval Africans were well familiar with the concept of being in love.

Most medieval African societies clearly distinguished the roles of the genders. For instance, in farming communities in western and central Africa and much of East Africa,

men were the heads of families, and they often held exclusive rights to important crafts such as blacksmithing, which was believed to confer supernatural powers on its practitioners. In farming communities men organized the fields and decided who was allowed to work them. Hunting was usually a male province because wild lands were considered male. The earth was considered female, which often meant that women were the ones who quarried clay and used it to make pottery and build houses. In general, women tended the gardens that produced green vegetables, did most of the trading in goods, and cared for children. Yet the "woman" tending the garden could be a man, and the "man" ruling a family could be a woman. This seeming incongruity stemmed from a distinction Africans made between gender roles and actual genders.

In general, the gender role of a woman was considered inferior to the gender role of the man, but a man could be in the gender role of a woman, and a woman could be in the gender role of a man. For example, a wealthy man with a large household and a few wives might have no male heirs. The man would want his family's accumulated wealth and power to continue after his death, maintaining his family's heritage, rather than allowing it to be divided. This could be an urgent matter for him, because to have a good afterlife, he needed many descendants who collectively remembered and honored him. If his goods were divided, so would be his family, and he and his revered ancestors would be forgotten. The solution to his problem would be to declare a wife or daughter the heir to all his wealth; any wife or daughter could be designated, because none of the women in the family had a legal priority in the matter. Thus, the man would pick whomever he loved best.

The catch was that a woman could not be the head of a household and could not inherit his wealth and power. He solved this problem by declaring that the wife or the daughter was a son. A ritual was usually required, such as inviting all his male relatives together, serving them palm wine, and formally declaring the woman to be his son. At that moment the woman became male by gender. In some societies she would even have to wear men's garments. Her former responsibilities as a woman would fall to another wife or a daughter. She would take up men's tasks, and after the man's death she would be recognized as the head of her family. This would not be without controversy, because other males in the family may have greedily anticipated looting the family coffers after the man's death. Yet women could and did hold together their family holdings, which would likely be inherited on their deaths by a grandson born of a daughter. Further, as the head of the household, a woman could take a man as a wife, who would assume the role of a woman within the family.

In most medieval African societies women could accumulate wealth. Although a woman was expected to contrib-

ute much of what she produced to her family, she could own cattle or employ other women to work her gardens. Owning cattle, sheep, or goats would enhance her prestige within her family and within her village, but men often had an advantage over her, because a man could have more than one wife at one time, with each wife working for him and contributing to his family and his personal wealth and status. In some cultures an ambitious woman could purchase a woman slave and declare that woman to be no longer a slave but her wife, making herself a female husband. A woman with adequate means could have several wives. Further, it was possible for a woman to have grandchildren by inviting a man into her home to live as a surrogate son and obtain the status of that role in the family.

This shifting of gender roles, often giving women a degree of power not immediately evident to outside observation, is only one aspect of the complexity of medieval African gender structures. In addition, men could become priestesses and garb themselves as women. Sometimes kings were considered wives of the elder statesmen of their lands and would be required to dress as women and wear women's jewelry and cosmetics, symbolizing that they could take no important actions without their husbands' consent. With men being sisters and women being brothers, relationships between families that intermarried could be extremely complicated.

The practice of polygyny allows one man to have several wives. Although this custom occurred in many medieval African societies, it did not necessarily dominate. Whether the society was agricultural or pastoral, most husbands had just one wife. The ability to have more than one wife was limited by the wealth of the husband and by his concern about the peace of his household. In many cultures social wealth was more important than material goods. In a system that anthropologists call social banking, people accumulated social wealth by having other people obligated to them by favors. The more favors owed to a person, the more social wealth that person had, which brought prestige and power within a community. The more wives a husband had, the more connections he had with other families, which created mutual obligations between him and the birth families of his wives, increasing his social wealth.

Often a wife was expected to return frequently to her birth family's home to care for a tree that had been given to her by her father or brother or to participate in meetings of the daughters of the family, which meant that she maintained strong ties between her old and new families that further increased her father's prestige. Having more than one wife and several children from each wife not only enhanced a husband's prestige but also brought him material wealth, because he and his sons could clear and work more land and his wives

and daughters could produce more food in their gardens and do more trading that would bring in more luxuries. A luxury item usually was not so much for using as for showing off, a visible sign of success; for example, a finely ornamented pot might sit unused where visitors could see it.

A possible downside of polygyny was that the family could become a political unit, with its members jostling each other for preeminence. Apparently jealousy over the sexual attentions of the husband was uncommon. Instead, wives bickered, fought, or even killed over perceived slights to their children or when a particular family member received more affection from the rest of the family. Moreover, having many sons meant having many heirs, each vying for his father's esteem. Rivalries among heirs could result in murder, as the sons and their mothers and wives schemed for control of the estate. Add to this the complication of wives having wives of their own, and the polygynous family could be more than a husband, or his first wife, could bear.

On the other hand, a polygynous relationship had certain advantages for women. Often a husband would marry sisters. The sisters could confide in and share activities with each other. Just as the husband could increase his leisure time by having several sons to work his land, each wife could take life a bit easier if several other wives were on hand to share the tasks of gardening, cooking, and raising children.

The terms *patriarchal* and *matriarchal* do not apply well to medieval African cultures. Each implies a rigid dominance by one gender or the other that did not apply to everyday medieval African life. Labeling a society patriarchal cannot properly explain why many women held dominant, powerful roles, and calling a society matriarchal creates a similar problem. One apparent trend was that in all African societies men contrived to have the dominant social position.

The terms *patrilineal* and *matrilineal* better explain the patterns of gender structures in medieval African cultures. In a patrilineal culture people trace their lines of descent through males, sometimes including women who were social males. People in a matrilineal culture trace their lines of descent through women. In either case the men or the women were not necessarily supposed to dominate society, although some matrilineal societies incorporated social freedoms for women that some men resented. For instance, in various matrilineal cultures the heir to a man's property was not his son but the son of one of the man's sisters. This applied even to kings and even after some kingdoms adopted Islam. When a king died, the line of descent had to be traced through the women of his family, making the son of his eldest sister the new king. If he had named the nephew as his heir, a peaceful transition of power could take place; otherwise, if the eldest sister had more than one son, murder or even civil war could occur.

THE AMERICAS

BY ARDEN DECKER

Gender and sexuality are areas that must be addressed when studying the society of any culture. Gender plays a fundamental role in shaping and defining religious practice, labor, rulership, and social status in society. Archaeologists, anthropologists, and art historians seek to understand gender in the medieval period through analysis of burial caches, household excavations, and depictions of gender in the arts. Such analysis provides a more complete understanding of the daily lives of members of these cultures as well as the sociopolitical systems as a whole. While gender was consciously constructed throughout the Americas, it is important to note that most, if not all, medieval period societies in this area viewed male and female genders as complementary opposites. This suggests that men and women were both considered to be necessary for the growth and survival of any given community.

Division of labor is one social function that is heavily affected by gender roles. For medieval American cultures, labor tasks often fell along gender lines and assumed the model that most Western cultures have exhibited. This model suggests that women took on labor tasks associated with the domestic sphere, such as sweeping the house, maintaining crops, preparing food, or producing textiles, whereas men were primarily responsible for hunting large game.

Although labor assigned to women was often tied to the home, among the Mississippian cultures of North America (ca. 750–1500) it was acceptable for women to roam outside the confines of the home, suggesting that women had some degree of independence. Moreover, there are examples of both genders working together to perform labor tasks. In fact, it is perhaps more accurate to describe labor division as malleable, in that gender lines shifted depending upon the specific outside forces that might affect a community. For instance, in many of the Pueblo cultures (ca. 900–ca. 1300) both men and women were responsible for trading goods such as food, pottery, or ceremonial tools. Men typically took on the task of trading with distant communities, while both men and women would trade locally. This seems to have been the case also for Mesoamerican and Andean cultures. Similarly, among the pre-Inca cultures of South America, men and women had equal access to land and labor, and it appears that socioeconomic factors, rather than gender, affected this distribution. For all intents and purposes, labor was viewed as something that required the equal participation of both sexes working together for the greater good. One example of this equal participation can be found in Andean cultures, where men and women worked together in agricultural production. Frequently the men prepared the



Clay figurine of woman seated at a loom, Maya culture, Mexico, ca. 500–900 (Courtesy, National Museum of the American Indian, Smithsonian Institution (catalog number 232865))

soil, and the women planted the seeds; both would harvest the crops.

However, certain types of labor were clearly divided along gender lines. Weaving and textile production was an essential economic and political endeavor that was primarily controlled by women in the Andes as well as in the Mayan (ca. 200–ca. 1200) and Aztec (ca. 1300–1521) regions of Mesoamerica. Textiles were essential for establishing and continuing trade lines and political alliances because cloth was often given as a gift or worn as a symbol of power. This suggests that women were considered to be an essential component in maintaining the political, economic, and ritual power of the community. Cloth production was so important to the Inca that the state set up training centers called *acllas* where selected women were sent to learn weaving techniques and to produce textiles in the service of the ruler. It has been suggested by some scholars that the women of the *aclla* served as models of womanhood for the rest of the empire. Weaving, spinning, and embroidery were tasks to be performed by all Aztec women, regardless of their social status. Andean women were also responsible for producing *chichi*, a beer made from corn that was an essential component of Incan ritual practices. Aztec and Mayan women were trained to use

plants for healing and medicinal uses. Some of the tasks that were associated only with men were armed combat, large-game hunting, and the holding of government or high-status positions. This appears to have been common to the Incan, Mayan, and Aztec cultures as well as many cultures of North America.

While it is doubtful that medieval American communities were completely egalitarian in nature, there is substantial evidence to support the notion that women's roles were becoming increasingly visible and important during this period. Unlike those of the ancient period, life expectancy and health rates for males and females were similar, suggesting that quality of life was more dependent on economic status than gender.

In North, Central, and South America gender and social status were most often distinguished through clothing, hairstyle, and ornamentation. This is supported by the existence of artworks (including figurines, effigies, ritual objects, and monumental art) in which gender is explicitly apparent. Among the Aztec of central Mexico gender was not assumed to be an innate characteristic. Rather, children were taught gender roles through various rituals designed to allow for the formation of a gender identity. Through alterations in appearance and behavior, gender differentiation would become more and more specific as the child matured. One such ritual involved the burial of a baby boy's umbilical cord on a battlefield, while that of a baby girl would be buried by the hearth. Clearly, the Aztec associated the male gender with battle and the female with the domestic sphere. The association of specific objects with each gender further emphasized this difference. The Aztec associated shields and weapons with males and weaving tools with females.

In the case of North American cultures, depictions of women and men include specific hairstyles that indicate not only gender but also marital status. For example, married men would wear their hair in a ponytail or bun, as would married women, because this bound hairstyle signified marriage. Younger, unmarried men and women wore their hair long and loose. Hairstyle also served as an important gender marker for the Aztec. Men would begin wearing a bound hairstyle (such as a bun or ponytail) after they had taken their first captive of war, while women would adopt the bound hairstyle once they were married. It also seems that in Aztec society a bound hairstyle connoted controlled, adult sexual activity. Piercing and intentional scarring were also used to communicate the sexual status of a person.

In Andean society the state's official policy on female premarital sex was that it was strictly forbidden, but this was not the case among local communities, where premarital sex was accepted, as were trial marriages. The Aztec strictly for-

bade any sexual misconduct, including premarital sex and same-sex behaviors. Women who engaged in such behaviors were particularly frowned upon. Those who engaged in homosexual acts often were ridiculed or even physically punished. All members of Aztec society were expected to follow these moral codes, but they were more rigorously applied to members of the elite or noble class.

Males were the primary holders of power throughout the medieval Americas. This is not to suggest that women did not play a significant role in sociopolitical matters. Since many societies of the medieval Americas followed a matrilineal social organization, it is not surprising that women were highly valued for their roles as child bearers and wives. Among the Mississippian cultures of the present-day United States it has been suggested that women exercised a great deal of control over when and how often they reproduced, depending on their desires and personal beliefs. Marriage was one of the most significant aspects of social organization across medieval American cultures. It was the primary method for establishing alliances among high-ranking, powerful families that would then affect the economic, political, and ritual success of the community at large. It appears, at least among North American cultures, that it was acceptable for men to take several wives, but there is no evidence that women could take more than one husband.

While elite women undoubtedly enjoyed many privileges not extended to those in the greater community, they were never given the opportunity to hold positions of power exactly equal to those of men. However, there were some exceptions to this rule. Images of female warriors and chiefs in North American art suggest that some women did indeed hold positions of great power in society. Similarly, at several Mayan sites, images of female rulers and important female ancestors have appeared in monumental works of art. There is also significant evidence to support the participation of women in ritual ceremonies across the Americas when they often acted as shamans, witches, or sorcerers.

ASIA AND THE PACIFIC

BY BRET HINSCH

The millennium between 500 and 1500 saw enormous changes in the fundamental character of Asian societies that inevitably affected relations between the sexes. Although each society underwent different transformations, in general each became more complex. In simple societies, labor and social roles tend to be allocated primarily by gender. As interactions become more complicated, society becomes increasingly stratified, and identities other than gender gain importance. In a complex society people assume varied professions and

ways of life. One example can show how social change altered gender relations. In sixth-century China, most weaving was done by women at home. But by the 15th century, textile production was becoming a specialized profession undertaken by men in commercial settings. This instance of changing work roles shows how gender relations were realigned because of increasing social and economic complexity.

Many historians and anthropologists have observed that as a social organization becomes more complex, the women within it often become less prominent. During China's ancient Shang Dynasty (ca. 1500–ca. 1045 B.C.E.), for example, royal consorts played key roles at court, even leading armies. But as China developed a centralized bureaucracy, women were officially excluded from affairs of state. When Wu Chao (625–705) dared to reign over China as “emperor” rather than empress, the sight of a woman wielding overt political authority was widely criticized as a freakish and destabilizing aberration. The same phenomenon played out in many places and across a wide range of institutions. Originally the Buddha (after repeated requests) allowed women to become nuns. But in many areas where Theravada Buddhism was practiced, the custom of female monasticism disappeared around the 11th century.

Some medieval Chinese thinkers argued that widows should not remarry. Although widow chastity might seem like a serious restriction of female autonomy, some widows came to see chastity as a positive condition, because it allowed them to act as head of their own household. A resourceful widow could control the family property, manage her children's affairs, and perform many stereotypically male tasks. In this way, an oppressive custom was manipulated to become a source of self-liberation.

Scholars have become less interested in ascertaining the “position” of women in a given era, as this term simplistically implies that all women in a particular society had a similar social status. Of course, the lives of an empress and a female slave would have been extremely different, and scholars have come to admit that any search for a single, easily defined position of women is doomed to frustration. Instead, it is more fruitful to think of gender as a series of intertwined roles that evolve over the course of each person's life. Thus the roles expected of a young girl, new wife, mother, and elderly matriarch are extremely different. As a result, the relations between men and women change throughout the life cycle. A medieval Indian girl might start out life with little autonomy, but if she lived to be a mother and a grandmother, she could expect a degree of respect and deference from her progeny in the name of filial piety. Likewise, Hinduism also envisioned a man's life journey as a series of roles, each with unique duties and privileges. He begins life as a filial son, marries and

becomes a householder, and in old age might renounce the world to devote himself to spiritual practice.

In each part of Asia the rise and decline of major ideologies also had an enormous impact on gender interaction. Ideas taken from religions, elite philosophies, and popular beliefs were often used to justify changing traditional patterns of life. The introduction of Confucianism to Japan, Korea, and Vietnam from China allowed men to justify female subservience by asserting that unequal gender relations mirror the hierarchy of ideal heaven over earth. Most important, the export of Hinduism and Buddhism from India saw an enormous impact on societies across Asia and spurred the reconsideration of ideal relations between women and men. For instance, the introduction of Buddhism into the Thai kingdom of Ayutthaya was used to justify polygyny (the custom of having more than one wife) and other practices favoring male interests.

The content of religious beliefs provided templates for ideal male and female behavior. Indian religion had an unusually large number of prominent female deities, although the worship of female deities did not necessarily translate into greater gender equality. In fact, many depictions of women in the Hindu epics tend to relegate them to passive roles. Most famously, the *Ramayana* describes the kidnap of Rama's wife, Sita, by the evil demon Ravana. This epic reinforces stereotypical ideas about the importance of female chastity and depicts men as strong and decisive, while women are shown as weak victims. In contrast, native traditions such as shamanism often allowed more active participation of women. Khmer women in medieval Cambodia were believed to have special powers that allowed them to communicate with the spirit world. This power imbued them with potent magic that they could use in healing and in controlling weather.

The native customs of some places were far more amenable to gender equality than others. Where land was more plentiful and the population sparser, patrimonial customs were usually less intense. These conditions predominated in Southeast Asia and tended to provide more opportunities to women. Khmer women were the primary domestic merchants of the Angkor kingdom. Chinese visitors expressed surprise at the predominance of women in the thriving local markets of this prosperous empire. Medieval temple sculpture depicts women as active participants in the full array of Khmer life, including warfare, politics, and literature. In this society, kinship descended equally through male and female lines. Women also could readily initiate divorce. The equality of Southeast Asian gender customs contrasts starkly with the more restrictive elite ideals of India and China. Both of these high civilizations had schools of thought emphasizing female fidelity and chastity, which attempted to confine women to household roles.

Because marriages in most places were virilocal (meaning that the bride moved in with the groom's family), husband and in-laws had an enormous impact on a woman's life. Marriages were traditionally arranged by parents in most cultures, as these unions were usually seen as bonds between families rather than individuals. Prevailing customs and ideologies often exhorted women to be humble and make themselves amenable to their new circumstances. In response, many women constructed what anthropologists have termed a "natal family" inside the usual patrilineal family. Surrounded by potentially hostile strangers, a mother would encourage her children to feel sole loyalty toward her and often would teach them to regard their father as an outsider or even a prospective enemy. The popularity of natal families helps explain the intense bond between mothers and sons seen in cultures as diverse as India, China, and Japan.

Women excluded from marriage found themselves on the margins of society. Widows were sometimes considered a social problem. In China they were sometimes called on to remain chaste. Indian ideas were even more radical. After the sixth century suttee (widow suicide) became more widespread. Some widows would immolate themselves on their dead husband's funeral pyre as an extravagant show of fidelity. Religion could provide some women with an excuse to remain unmarried, as was the case with Buddhist nuns. However, early medieval biographies of Chinese nuns show that devout thinkers found it difficult to reconcile female chastity with traditional ideas about the importance of marriage and procreation. Prostitutes and courtesans represented a very different kind of unmarried woman. Prostitution varied widely. At its lowest level, it was degrading and barely allowed women to survive. But some women trained as courtesans, distinguished by non-sexual skills. In China many elite men turned to educated courtesans for companionship and entertainment not provided by marriage, and these relationships were sometimes extremely passionate.

Rising female literacy had a notable influence on gender relations in several regions, particularly in China and Japan. Because of the Confucian emphasis on self-cultivation, some Chinese families of the educated gentry began to educate their daughters. Women usually followed a curriculum similar to that of male students, although they rarely received schooling that was nearly as intense, since they were barred from taking the official examinations. Some authors even began writing textbooks targeted specifically at female students, such as the Tang Dynasty (618–907) work *Nü lunyu* (Women's Analects), which taught ideal female behavior based on Confucian principles. In China women's literacy had contradictory results. Although it allowed women access to written knowledge, it

also exposed them to highly conservative works that taught female humility and submission.

In Japan the results of female literacy were equally contradictory. Women during the Heian Period (737–1185) were discouraged from writing in the prestigious foreign idiom of classical Chinese, which was considered inappropriately intellectual and manly, and were usually restricted to writing in their native language using Japanese script (*kana*). Ironically, this linguistic segregation doomed Japanese men to writing sterile prose in a difficult foreign language that they poorly understood, while women were free to employ their own vernacular to create some of the most important classics of Japanese literature, such as the 11th-century *Genji monogatari* (*Tale of Genji*) by Lady Murasaki Shikibu.

Generally speaking, many cultures viewed both masculinity and femininity as a life cycle consisting of progressive phases. Social conditioning nudged an individual's life trajectory toward conformity with this model. However, some social roles challenged these ideals and were often hotly contested. The ideal elite Chinese man would seek out a role in government and scholarship, but the chaos of the early medieval period made statecraft dangerous, and many talented men deliberately withdrew from the world to a life of quiet contemplation, decadent bohemianism, or hedonism. The morality of this sort of self-proclaimed eremitism, or reclusiveness, became a subject of debate. Similarly, the Buddhist renunciation of the world, often before marriage and procreation, was initially deplored by many Chinese scholars as a violation of basic family roles. Shaving the head, seen as ritual self-mutilation, was denounced as ungrateful because it harmed the body given to a man by his parents.

Gender relations in the Pacific are difficult to study because no written documents from the era remain. Nevertheless, given basic similarities in the customs of distant island peoples with common ancestors, it is possible to deduce the general outlines of earlier gender relations. Classic studies in Melanesian ethnography, for example, stress the importance of male bonding and a deep sense of male psychological insecurity. The most famous example of male bonding is the ritualized homosexuality of the Gebusi of Papua New Guinea, which deliberately created intense bonds between men of different generations while excluding women from a central social practice. However, the most important factors in gender relations remained marriage and residence patterns, which varied considerably. Couples in some societies lived with the husband's relatives, while in others they resided with the wife's kin. There were even cases of multilocal residence, in which a couple would shift from one set of kin to another. Of course, each of these basic social patterns produced extremely different forms of interaction between the sexes.

Likewise, the aborigines of Australia lived in hundreds of extremely diverse societies, making generalizations difficult. Overall, the indigenous societies of Australia are noted for their material simplicity and egalitarianism. In the absence of complex political organizations and social classes, gender became the main social distinction. Women usually worked as gatherers, and the vegetation and small animals that they found provided about two-thirds of the traditional diet. Men were hunters who specialized in obtaining large animals, valued for their protein. Taboos often enforced different spaces for men and women, and sometimes each sex participated in different religious cults. Customs ensured that these two differentiated groups, male and female, each carried out vital roles and cooperated for mutual survival.

EUROPE

BY BRADLEY A. SKEEN

In the Middle Ages of Europe the primary context for gender roles was the family. Marriage was the means of propagating the family and passing on its wealth and traditions to legitimate heirs. The most important roles that men and women could play were as husbands and wives and as fathers and mothers. This ancient Mediterranean social structure survived intact in Christian Europe.

The self-understanding of the medieval aristocracy of Europe was dominated by chivalry. The word derives from a Latin word for "horse" (*caballus*) and is closely related to the term *cavalier*, another word for "knight." Aristocratic men saw their purpose in society as waging war. The code of chivalry regulated the life of a knight devoted to warfare. In the first place the knight had a duty to God to defend the church, to uphold religious orthodoxy, and to fight heretics and infidels (non-Christians). The knight also had duties to his lord and to the king, to answer the call to war when it was issued and to fight expertly and bravely. Last, the knight had the duty to defend the weak, particularly women and the poor. Chivalry also dictated that the knight ought to have refined manners so that he could be presented at court without embarrassment and that his time not fighting be spent in pastimes that made him ready for war: hunting and tournaments in which knights would engage each other in group or single combat under controlled conditions. At the same time, knights were discouraged from engaging in behavior that was considered unmanly, above all acts of cowardice. Reading and study did not seem like knightly virtues but appeared rather too much like courtly women's reading of the extensive romance literature of the period or the work of monks and friars at the university. Strategy was distrusted as being too calculating and exposing a lack of faith in the justice of one's cause.

Although they were subject to many legal and social restrictions, knights' wives usually had considerable power and authority, since the women were forced to take over the administration of the household (even a castle with a staff of dozens or hundreds) while their husbands devoted themselves to military pursuits. The position of the church was that women were physically and spiritually inferior to men and that they led men to sin by inducing desire (based on the biblical example of Eve). Marriages were intended to be celibate except as necessary to have children. The universal practice of marriages arranged in childhood discouraged romance between husband and wife.

The ideals of chivalry, however, saw women in quite a different light from the teaching of the church. Medieval aristocratic culture created the idea of courtly love, widely propagated throughout Europe by the troubadours, a group of poets that originated in southern France in the 12th century, of whom the most widely regarded was Andreas Capellanus. His treatise *De amore* (On Love) describes the ideals of courtly love. It begins when the knight becomes physically attracted to a woman, usually of superior class and often the wife of his lord but never his own wife. The first indication is flirtatious eye contact. The knight then declares his love to the lady, who rejects him as unworthy. Crushed, the knight then dedicates himself to carrying out acts of superior courage on the battlefield or at a tournament. In this way, the knight is saved, having become spiritually improved through his love for the ethereal beauty and superior nature of his lady. In the end he is rewarded by winning the lady's love in



Spindle whorl, England, ca. 500; Saxon housewives spun woollen thread and wove cloth to make clothes for the family. (© Museum of London)

a spiritual union that leads to perfection, though not, in general, to physical consummation. While courtly love was an ideal of the aristocratic class, it is unclear how it functioned in actual society.

According to Christian theology, the full implications of gender identity were a result of the fall from grace described in the biblical story of Adam and Eve and their expulsion from the Garden of Eden. The original purpose in founding the monastic way of life was, if not to counteract the Fall (something that could be achieved only by divine grace and not by human effort), to live in a manner more closely resembling God's original plan for humankind. To this end, monks and nuns lived in monasteries or convents, single-sex communities devoted to worship. Besides the sexual segregation of their establishments, the monks and nuns carried out what was commonly called "spiritual warfare" against the fallen condition of their own bodies. The things that the body most needs to flourish are food, sleep, and freedom from physical suffering. These are the very things that monks and nuns denied the body by keeping vigil (praying all night instead of sleeping), fasting, and mortification (for example, by beating themselves with whips or by wearing garments whose inside surfaces were studded with nails). In this way, they brought the body into a state of exhaustion, hunger, and pain such that it could not feel sexual desire.

At the same time, nuns and monks, secluded from the things of the world, focused their attention and imagination on holy matters, such as contemplating Christ's suffering on the Cross, so that the mind would not wander toward thoughts that would produce lust. Even within the monastery or convent, monks and nuns were admonished not to treat their fellow monastics with undue familiarity in terms of touching, making eye contact, and having familiar speech on trivial topics. Although it is never mentioned as such, these kinds of rules were probably meant as a guard against homoerotic desire. Not all monastics carried out all of these practices all the time, but this struggle against the flesh was an ideal of the monastic way of life and one that was highly appreciated and respected by everyone in the Christian world. One purpose of monastic life was to turn the monastic into a person for whom sex had no meaning, effectively erasing gender identity.

Precisely because the monastic way of life was so honored in the medieval world, the monasteries soon found themselves in receipt of large gifts, usually in the form of land from which peasants' rents were collected. This forced abbots and abbesses to take on new responsibilities as administrators and merchants and other monks to engage in various agricultural professions. It also freed monks to follow intellectual pursuits. Throughout the Middle Ages the preserva-

tion, copying, and translation of ancient texts were in the hands of monks, and the universities were entirely overseen by monastics. (Even secular students of law and medicine had to take minor clerical orders.)

While this part of monastic life was generally the province of monks, at least one nun, Hildegard (1098–1179), became a leading intellectual. Hildegard founded two women's communities (Rupertsberg in 1150 and Eibingen in 1165), over which she presided as an unofficial "abbess." While formal study at a university was impossible for her, she nevertheless published in the field of natural history (largely in herbal medicine) and was widely recognized in her own time as an important artist, composer, and poet. Although she does not deviate from Catholic orthodoxy, much of Hildegard's thought was highly original, in part, no doubt, because the limits of her education relative to many of her male contemporaries denied her access to the tradition of learning but also because, as she claimed, much of her information was directly inspired in visions and auditions (hearing voices) that she experienced throughout her life, beginning even before she was dedicated to a convent by her parents at age eight.

The greater part of the population of medieval Europe constituted peasants living and working in the countryside. Their lives were prescribed by the agricultural labor they performed. Field work, because of its physically demanding nature, mostly fell to men and domestic labor, by convention, to women. Specialized work was also stereotyped by gender: Men, for example, largely ran mills, and women spun and wove cloth.

In the towns people of the peasant class generally owned various shops for trading goods or manufacturing wares. It was by no means unusual for women to work in shops. As the economy grew in the later Middle Ages, many men and women became for the first time employees of larger shopkeepers and paid servants in wealthy households of both merchants and aristocrats. Wealthy members of the peasant class came into increasing contact with aristocrats at court and so began to imitate their refined manners. This led to the writing of courtesy books, handbooks on manners and comportment based on those of chivalry. In this way aristocratic life became a model for all orders of society.

The social structure of the Byzantine Empire had more continuity with the Roman world than did western Europe. In the east the monastic communities were, if anything, more militant in their war on the body than were those in the west. Secular society was organized around multigenerational families whose head was the most senior male. Such a network would stretch out over family servants and employees as well as blood relations. While they were not bound to the land in the same manner as in the west, small farmers would look

to the heads of such great families as their protectors, in turn offering their support and service. The greatest such patron was the emperor.

A somewhat idealized conception of the life of a Byzantine emperor is given in the *Alexiad*, the biography of the emperor Alexius I Comnenus (r. 1081–1118). The author of this biography is more interesting than its subject, however. It was written by Alexius' own daughter, Anna Comnena (1083–1153), who violated the expectations of every role of Byzantine women. As an imperial princess, she was able to receive the education of an intellectual and scholar, and she showed a great natural ability for such studies. Dissatisfied with the rather limited part she was intended to play at the imperial court, when her father died, she attempted to stage a palace coup and seize power for herself and away from the legitimate heir, her younger brother. She had to do this in the name of her husband, since the public would have been reluctant to accept a woman as sole ruler of the empire. Her husband, however, betrayed her. After the coup failed, her brother, John II, forced her to retire to a convent to live as a nun. There Anna had a second career, so to speak, as the head of a private philosophical school (the normal setting for higher learning in Byzantium, because there were no institutionalized universities). There, toward the end of her life, she wrote the *Alexiad* which is in no way inferior to other Byzantine historical texts in its style or learning and is one of the most important sources for the period (which saw the loss of most of Asia Minor to the Turks and the beginning of the Crusades).

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

Gender roles and structures can be understood from several perspectives: the world in which Islam originated, existing norms in the lands conquered by Muslim armies, the status of women within Islamic law, and the status of women among the *dhimmi* (Christians and Jews), or subjugated groups living under Islamic rule. Pre-Islamic seventh-century Arabia was a harsh desert, with a few scattered oases on the peninsula's borders. Society was tribal and ruled by elders, who were held in esteem; both mothers and fathers were included among revered ancestors. The nuclear family unit in Arabia's pastoral-nomadic communities consisted of three generations. Men tended the flocks and women the household and children. Women were neither veiled nor secluded but were subordinate to men. Men owned land and landed property and passed them exclusively to male children.

Males were collectively responsible for the safety and protection of family members. The blood feuds that they

waged to avenge crimes against their kinship group could have devastating effects. A man's concept of honor required him to provide for and defend members of his family, especially women and children. This precept incorporated the man's sense of honor, which could be affected by behaviors in women that were deemed either lacking in modesty or disruptive to the social order. Acts that avenged male honor were permitted against any member of the adversary's group, a situation that protracted blood feuds and left clan members vulnerable to the misdeeds of a single member.

The Mediterranean world of the seventh century had inherited Hellenistic culture, to which it added the Christian biblical tradition. The gods and heroes of antiquity included princesses and queens, such as Semiramis of Assyria, Nefertiti of Egypt, and Zenobia of Arabia. Within the Hebrew scriptures are stories of women who had an impact on their societies, including Deborah, Ruth, Esther, and Jezebel. With the advent of Christianity, the status of women in the Holy Roman Empire improved through several reforms. The emperor Constantine (r. 306–337) forbade pagan sacrifices and outlawed temple prostitution and religious orgies. He replaced the existing rule permitting divorce by either spouse with more limited grants based on commission of serious crime, adultery on the wife's part, or for the keeping of a brothel. He also discouraged infanticide by providing poor families with public grants. Neither polygamy nor child marriage was sanctioned. Still, as in Arabia, the overall status of women was subordinate to that of men, and women were confined to the domestic sphere.

The role of women from the seventh-century Arab conquest onward into the modern era is grounded theologically in the Koran and legally in Islamic law, the sharia. Islamic law recognizes three official groups: free Muslim men, women, and slaves. *Dhimmi*s were not full citizens but were guaranteed their lives and permitted to practice their faith, provided they paid the poll tax and endured the restrictions and discrimination against them. Sharia enforcement, however, was uneven. Cases relating to personal status—marriage, divorce, and inheritance—were the most rigorously enforced and those concerning commerce less so; questions relating to penal and constitutional questions were given least emphasis. Nevertheless, from the Abbasid Caliphate (749–1258) onward, the sharia was accepted by both the population and rulers.

The historian Ibn Khaldun (d. 1406) expressed the status of women most starkly when he wrote that “women have no power whatever” and that men by and large control all their actions. The Koran itself posits the inferior status of women relative to men: “Men have authority over women because God has made the one superior to the other.” Other passages

of the Koran express the relative value of women's testimony in legal cases, calling for the testimony of two women and a man when there are not two male witnesses. Likewise, the inheritance of females is stipulated to be half that of males.

The Koran is specific in matters pertaining to marriage. The practices of polygamy (having more than one wife) and concubinage (sexual relations with slaves) are both sanctioned. According to the sharia, a woman is required to have a male guardian, and her marriage is essentially a civil contract between the groom and her guardian. If a girl has not reached puberty, her guardian may give her in marriage without her consent. Otherwise, her consent is necessary. Consent may be given by sheer silence if the woman has not had a previous marriage. The groom provides a dowry (*mahr*) to the bride, which she may retain in addition to other property she owns or inherits. Wifely obedience is expected in return for a home, clothing, protection, sexual intercourse, and general maintenance. The Koran sanctions even child marriage, and such marriages were common in seventh-century Arabia.

The sharia permits the marriage of a Muslim man to a non-Muslim woman, who may keep her faith. A non-Muslim man, however, may not marry a Muslim woman; doing so is considered a capital offense punishable by death. Islamic clerics created this rule because they held that Islam must dominate. Divorce was easily accessible to the Muslim male—he merely had to repeat the phrase “I divorce you” three times, a provision that left women vulnerable to their husbands’ fits of anger.

Most medieval Muslim philosophers overwhelmingly declared the domestic sphere as women's natural place. Women's purpose, according to the writer and vizier to a minor Seljuk sultan, Nizam al-Mulk (d. 1092), “is the continuation of the lineage of the race,” meaning that women's role was to ensure the royal succession. Umar ibn al-Khattab, the second caliph (r. 634–44), wrote against female literacy and advised men to take the opposite course of action after seeking women's counsel. The philosopher al-Amiri (d. 992) attested to the natural subordination of women to men. And the philosopher Ibn Sina (Avicenna, d. 1037) recommended that lawgivers prescribe that women be veiled and secluded. He also advised that they not have their own incomes and that they be forbidden to divorce.

Within the context of seventh-century Arabia, Muhammad's teachings, as laid down in the Koran, provided some reforms relative to existing practices. He sought to limit the scope and duration of blood feuds by permitting vengeance only against the transgressor rather than the latter's whole clan. Women were permitted to keep their property upon returning to their father's tents after divorce. Despite the fact that Muhammad himself did not limit his own access to

THE VEIL

The veiling of Muslim women is one of the most controversial issues today in the clash between Islamic and Western cultures. The veil typically consists of a head scarf, called a *hijab*. A more extensive form of veiling involves covering the face. The most extreme form of the veil is the burqa, which hides the entire face including the eyes, but this was a local medieval development in the remote mountainous territories of central Asia (modern-day Afghanistan and Pakistan).

Muhammad established the separation of the public and private spheres of life, symbolized by the veil. In the Koran women are admonished to act one way when they are with their husbands or among only their family members and another when they are in the larger world, among strangers. Women in public are expected to conduct themselves so that they will not become an occasion for sin by others, in whom they might arouse sexual desire or envy. Accordingly, they are not to meet the eyes of strangers or engage in unnecessary conversations with them. (This is an injunction against what we might call flirting and is also standard advice offered by medieval Christian authorities to monks and nuns.) Women are also not to dress so as to reveal physical attractiveness.

At the same time, Muslim women are neither to wear clothes that will draw attention to themselves nor to display jewelry. The significance of this last point is often missed. It was and still is a common custom in the Middle East for much of a family's wealth to be invested in gold jewelry worn by its female members, so the injunction here is against an ostentatious display of wealth. On the other hand, the more extreme forms of veiling that developed during the Middle Ages were possible only for women from wealthy families who did not have to work; thus it became a social display of wealth on its own.

If the Koran says nothing specifically about the wearing of scarves or other veils, this practice nevertheless became enshrined in later Islamic law. It represents the common practice of the Mediterranean world. In the Middle Ages, Christian and Jewish women would not have appeared in public without a scarf or hat, and even today many older women in places like Spain, Italy, or Greece follow the same custom.

women, he enjoined men to have no more than four wives. Within the context of Muslim society he encouraged men to treat their wives with a modicum of respect.

Dhimmi groups were left largely to govern themselves. They maintained their own court system to resolve issues in family law, inheritance, and commerce. They provided for education, for the poor, widows, orphans, foreigners, and the ransom of captives. Christian and Jewish women, like their Muslim counterparts, lived in patriarchal societies that subordinated their status relative to men. Women's sphere of influence was the domestic sphere. Property rights and inheritance laws favored males. Women's educational opportunities were likewise limited, though basic literacy was more prevalent.

Some important differences remained. Both Christian and Jewish communities prohibited slavery, polygamy, concubinage, and child marriage. Both limited divorce. Indeed, under Roman Catholic rule, divorce was prohibited. An annulment could be sought but only for extreme reasons. Neither community practiced infanticide or female circumcision. Although female modesty was encouraged, neither set of religious edicts required the extensive covering required of Muslim women.

Most *dhimmi* men were town-dwelling craftsmen or businessmen and belonged to the middle classes of urban craftsmen, master artisans, and professionals. A few found their way into the elite upper class of officials, doctors, and judges. Women worked in textile-related occupations—embroidery, spinning, weaving, and dyeing. They were also health care providers (primarily of folk medicine and midwifery), astrologers, fortune-tellers, and brokers.

See also ADORNMENT; ART; CHILDREN; CLOTHING AND FOOTWEAR; ECONOMY; EDUCATION; FAMILY; FOOD AND DIET; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; LITERATURE; MILITARY; MUSIC AND MUSICAL INSTRUMENTS; OCCUPATIONS; RELIGION AND COSMOLOGY; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TEXTILES AND NEEDLEWORK; WRITING.

FURTHER READING

- Ifi Amadiume, *Male Daughters, Female Husbands: Gender and Sex in an African Society* (Atlantic Highlands, N.J.: Zed Books, 1987).
- Sukumari Bhattacharji, *Women and Society in Ancient India* (Calcutta, India: Basumati, 1994).
- Alcuin Blamires, ed., *Woman Defamed and Woman Defended: An Anthology of Medieval Texts* (New York: Oxford University Press, 1992).
- Karen Olsen Bruhns and Karen E. Stothert, *Women in Ancient America* (Norman: University of Oklahoma Press, 1990).

- Andreas Capellanus, *The Art of Courtly Love*, trans. John Jay Parry (New York: Columbia University Press, 1990).
- Cheryl Claasen and Rosemary A. Joyce, eds., *Women in Prehistory: North America and Mesoamerica* (Philadelphia: University of Pennsylvania Press, 1997).
- Georges Duby, *The Knight, the Lady, and the Priest: The Making of Modern Marriage in Medieval France*, trans. Barbara Bray (Chicago: University of Chicago Press, 1993).
- Patricia Buckley Ebrey, *Women and the Family in Chinese History* (London: Routledge, 2003).
- Lowell S. Gustafson and Amelia M. Trevelyan, eds., *Ancient Maya Gender Identity and Relations* (Westport, Conn.: Bergin and Garvey, 2002).
- Bret Hinsch, "Confucian Filial Piety and the Construction of the Ideal Chinese Buddhist Woman." *Journal of Chinese Religions* 30 (2003): 49–76.
- I. B. Horner, *Women under Primitive Buddhism: Laywomen and Almswomen* (Delhi, India: Motilal Banarsidass, 1989).
- Rosemary A. Joyce, *Gender and Power in Prehispanic Mesoamerica* (Austin: University of Texas Press, 2000).
- Maurice Keen, *Chivalry* (New Haven, Conn.: Yale University Press, 2005).
- Dorothy Ko, JaHyun Kim Haboush, and Joan R. Piggott, eds., *Women and Confucian Cultures in Premodern China, Korea, and Japan* (Berkeley: University of California Press, 2003).
- Eugene L. Mendonsa, "Tradition, Civic Culture and Kinship." In his *West Africa: An Introduction to Its History, Civilization and Contemporary Situation* (Durham, N.C.: Carolina Academic Press, 2002).
- Irene Silverblatt, *Moon, Sun and Witches: Gender Ideologies and Class in Inca and Colonial Peru* (Princeton, N.J.: Princeton University Press, 1987).

► government organization

INTRODUCTION

People have created a dazzling number of ways for organizing themselves into communities. Their reasons for forming governments are many. Often, people organized under leaders in order to defend themselves against attackers bent on seizing slaves or a year's new harvest. On the other hand, people sometimes organized under leaders in order to attack and steal from others. Pastoralists sometimes needed to create government structures as a way to prevent conflict over rights to grazing lands. People with copper, tin, silver, and gold mines would form governments to distribute the wealth among community members and to protect the mines from outsiders. In areas where farmers competed for scarce water, people would organize come together to cooperatively build irrigation canals and dams as well as to allot water fairly to farmers.

There seems to have been a universal desire to justify the rule of government, and for this reason many cultures had myths saying that their governments were founded by God

or by great leaders of the past who had wisdom far greater than most people. These justifications of rule almost always resulted in the creation of rituals through which rulers symbolically fulfilled the role of the founding deity or founding ancestor. Indeed, the rituals often persisted long after people stopped believing the myths on which they were based. Thus, in China, long after Confucianism's secular governmental structure had become the empire's governing ideology, emperors continued to visit shrines, make pilgrimages to sacred sites, and seek ritual communication with the gods of the earth and weather even after most people had forgotten why the rituals existed in the first place.

It is human nature for someone reading about history to focus on the complexities of mighty empires. The Holy Roman Empire, the Mongol Empire, and the Islamic Empire amaze us because of their scope, covering thousands of miles of territory, spanning cultures, and organizing millions of people into a government run by a ruling elite. The ritual complexity of the medieval Japanese, Maya, and Indians capture the imaginations of readers. Still, some caution should be exercised in drawing conclusions about the relative cultural richness of a society with a huge government and numerous rules of decorum and that of societies with small or no governments. Even in a stateless society, government can be a complicated matter.

During the medieval era there were notable stateless societies in Africa, Siberia, Australia, Arctic North America, and South America. Sometimes there were not even chiefs. Nonetheless, people in these societies often behaved in an organized manner. They did so in part as a result of centuries of social adaptation to the demands of their environment. In western Africa people's survival depended on a rotation of farmlands, growing crops for a few years on a plot and then letting it lie fallow for 10 years or so. When Europeans colonized the region and forced people into European ways of managing land, environmental disaster followed, with poor soils ruined and land overworked. The stateless people had developed a system of rules of social conduct that enabled people to manage land cooperatively, with no one being able to control the lion's share of land. How did they manage to control crime and other antisocial behavior? They did so by ostracizing miscreants, a fate worse than death in their cultures, and through forming social groups based on family relationships that meted out punishment.

A leader in such a society was often someone whose behavior had earned him or her respect. Doing favors for others, caring for people in need, solving a problem such as where to find food after a crop failure could cause a person to become the acknowledged leader of a community. Occasionally, this person would have a title such as chief, but sometimes he or

she was just known in a community as the person to talk to when there was a problem. Another common way for leaders to come to power was through religious status. In many medieval societies a priest or priestess would have governmental power. Such people could be asked to intercede with supernatural beings on behalf of the living. In Africa these beings could be the spirits of dead ancestors, and among the Maya they could be gods of the underworld.

Such leaders usually had to perform rituals to establish their status, and often the rituals had to be repeated regularly to maintain status, such as the bloodletting rituals of Mayan rulers. Whether considering a government of no more than a village or an entire empire spanning a continent, the notion of governments having divine sanction was often invoked. The Mongol conquests were justified by the doctrine that God had designated them to become rulers of the world, but the also doctrine helped unify about a million Mongols such that they could organize and rule hundreds of millions of people of other cultures. Monarchs in Europe claimed the divine right to rule, and Muslim political theorists developed the same notion for caliphs and sultans. The reasoning was that God chose someone to care for his people and that there could be only one such person at a time; that person was likely to be the son or daughter of a monarch or of a sacred line of descent. Muslims fought civil wars over this matter, with some insisting that a caliph had to be the direct descendant of Muhammad and others believing that any descendant of Muhammad's extended family was acceptable or even that any good, just, and moral person could claim God's preference.

By uniting religion with secular power, governments could make powerful claims on the obedience of their people, but this authority was two-edged, because a government that failed to defend the kingdom against invasions, suffered repeated crop failures, or endured plagues could be judged a false government that lacked the necessary favor of God or the gods. In China, for example, weakness in an emperor or the government justified overthrowing the government and replacing the emperor with someone who had divine favor. Confucians regarded this notion as superstition, but emperors ignored the doctrine at peril of their lives.

AFRICA

BY KIRK H. BEETZ

Information for the governments of medieval Africa is often vague, and the validity of evidence is much disputed by historians and archaeologists. Written records tend to be scant, partly because many cultures were nonliterate and partly because documents have been lost or destroyed through warfare and neglect. The reliability of oral histories varies ac-

according to culture and time. In some cultures reciting oral history with exactness was a requirement for storytellers, but in many African cultures storytellers modified their accounts

of history to make them more exciting or to make a moral point, turning pastoralists into giants, transforming chiefs into gods, and imputing magical powers to great kings. Ar-



Among the African societies organized as monarchies in the late medieval period were Kanem, Zimbabwe, Kongo, and Songhai.

chaeological evidence has limitations: Evidence is found in physical remains, and physical remains do not tell complete stories; they often just offer possibilities. Thus, there has been a great deal of speculation about government organization in medieval Africa, based on oral histories, rare written accounts, and the physical remains. For instance, a community of large buildings and a fortress might be thought to be a capital of some sort, perhaps of a kingdom or of a province. Written and archaeological resources often have been combined to create pictures of how a government organized itself. For Ethiopia there are some written records of the doings of monarchs and church leaders; for Axum, Nubia, and East African city-states, archaeological findings are the primary source of knowledge, whereas oral traditions have been extensively studied for stateless societies and many of the empires of western, central, and southern Africa.

AXUM, ETHIOPIA, AND NUBIA

Axum was an old kingdom, having begun as a trading city in about the 11th century B.C.E., soon expanding to encompass its port city of Adulis, much of the Ethiopian highlands, and even for a time part of southern Arabia, ruled by a viceroy appointed by the king. The wealth and power of Axum depended on trade with Europe, the Near East, and southern Asia. Thus, the government was much concerned with controlling and protecting trade. The government ships that kept the sea-lanes open were characterized by medieval geographers as large, powerful, and capable of great speed but were not described in greater detail in surviving documents. To facilitate trade, the government created a mint and issued coins featuring depictions of the sun and the crescent moon, adding a cross in the fourth century when the royal family converted to Christianity.

A trader who arrived in Adulis would probably have first encountered representatives of Axum's government at the port. Axum charged tariffs on goods brought into its port, and officials assessed imported goods and enforced the law regarding tariffs. Adulis had a governor, appointed by the king, who oversaw the city's day-to-day operations. The capital city, Axum, was an eight-day trek from Adulis. Protecting the route from Adulis to Axum fell to an army directed by generals, who probably came from Axum's nobility. The fortresses of Axum dominated the heights above Adulis and were said to be intimidating to people who saw them when approaching Axum from the sea. The fortresses, army, and port officials were all tightly governed by a king whose responsibility was to keep Axum's borders secure, to collect enough taxes to maintain the military, and to keep open the sea-lanes and the overland trade routes from the interior of Africa.

In the seventh and eighth centuries Axum was powerful enough to shelter Muslims who had fled persecution in Arabia. The first group of such refugees included followers of Muhammad, and Muslim historians gave credit to the Axumite government for saving the Islamic movement from its enemies. Later, Muslims had a fierce dispute over who was the proper heir to Muhammad, with many fleeing to Axum for protection. What exactly happened to these refugees is not known for certain, but they may have settled in Axum. Such outsiders often were given honored status by the king, and they may have become vassals with their own territory. This situation may have contributed to the near collapse of the Axumite government, because Muslims eventually seized control of much of the coastal lowlands of Axum. With trade from the sea cut off and Muslim regimes to the north and the south, the king and his court retreated ever deeper into the Ethiopian highlands; for this reason most historians refer to the government as Ethiopia for the period from the 10th century onward.

Even though Ethiopia eventually regained control of Axum, its seat of government moved southward, following trade routes, onto the Shewan plateau. The royal family tried to meld religious faith with secular power and solicited the help of clerics with generous gifts to monasteries, which were the most influential Christian institutions in Ethiopia. In 975 there was a rebellion of the Jews in Ethiopia, nearly causing the collapse of the government. The rebels met with much success. The king survived by moving from camp to camp, setting up tents for himself, his bureaucrats, and his military aides. It was likely his vassals who turned the tide of battle. At present evidence suggests that in the medieval era Ethiopia formed a feudal society somewhat similar to that which developed in medieval Europe. Various nobles, some of whom were powerful lords of their own fortresses, could have mustered troops from the minor nobility and farmers in their territories. The rebellion was defeated, and the monarchy was more beholden to the goodwill of its vassals than ever.

Sometime in the early 12th century the royal family was deposed by Christian lords of the Agau people in the southern province of Lasta. At least one medieval Ethiopian king list suggests that the Agau ruling family was founded in 916 in Lasta, with the 10th in their line seizing the throne of Ethiopia. This lord founded the Zagwe Dynasty (ca. 1100–1270). The Zagwe monarchs depended on the support of the church for their dominance of Ethiopia because they apparently were otherwise unpopular. Thus, pleasing clerics by building churches, monasteries, and shrines was considered an essential part of the duties of government. The Zagwe established their capital at the town of Roha. They seem to have claimed that they were descended from Moses, an assertion

that formed part of the ideology that justified their rule. Both the nobility and the peasants appear to have been restless under the rule of the Zagwe, who were regarded as weak and corrupt, except for King Lalibela (r. 1189–1229). He alone of the Zagwe was remembered as a great man. He managed his empire partly by keeping his people occupied in public works, including carving churches out of solid stone near a village renamed Lalibela. These churches were an expression of royal power as well as a great source of income for the builders. Lalibela was believed to have been a sincere and pious Christian. Even so, most Ethiopians never accepted the Zagwe Dynasty as legitimate.

In 1270 Yekuno Amlak (r. 1270–85), an aristocrat claiming descent from the Axumite royal family, seized power and was declared *negus negasti*, the “king of kings.” He founded the Solomonid Dynasty, which claimed direct descent from King Solomon and the Queen of Sheba and ruled Ethiopia until the 1970s. The Solomonid kings oversaw a government composed of clerics and bureaucrats who managed the affairs of a feudal society. Ethiopia was divided into provinces, which were divided into chiefdoms. Each tribal chief and each noble ruler of each province had vassals who served him.

The royal government placed a heavy burden on its subjects. Instead of residing in a capital city, the royal government lived in 5,000 to 6,000 tents, which housed the emperor, the chief nobility, the courtiers, and their staffs. In addition, there were the tents of those who served the tent city—blacksmiths, potters, grooms for the horses, and so on. The tent city would remain in one place for three or four months and then would move to another place, usually in another province. Moving the tents and other gear required more than 50,000 donkeys, with the commoners often carrying their tents themselves. The tent city would not revisit the same site for at least 10 years.

One reason for the mobile capital of tents was that no one area could support the government administration indefinitely. Another reason for the mobile city was the way in which Ethiopia was governed. The emperor was not an absolute monarch; his authority was checked by the authority of the church and the collective authority of the nobility. This fragmentation of power frequently resulted in chiefs or lords refusing to pay their taxes or even declaring their independence. Further, in northeast Africa there were many small chiefdoms and kingdoms that paid tribute to the emperor and sometimes withheld payments. Thus, the emperor moved his entire capital to areas that were rebellious, placing the empire’s army and its supplies as well as government bureaucrats on top of the problem area. Should war break out, the tent city could be moved to get out of the way of invading armies or to be close to the fighting, allowing the emperor to

wage a military campaign and still tend to public business. This form of government had its ups and downs, but eventually Ethiopian emperors were able to regain access to the sea and its trade, and at the end of the medieval era they were aggressively expanding their realm.

Much less is known about the Nubian kingdoms along the Nile to the west of Ethiopia. They were Christianized by missionaries beginning in the sixth century. Many small kingdoms arose and disappeared during the medieval era in the general region of Nubia, but three kingdoms stand out in history: Nobatia, Makuria, and Alodia. Of these, the southern two, Makuria and Alodia, are best known to modern researchers, partly because Lake Nasser, formed by the Aswān Dam, has inundated the former Nobatia as well as much of what was Makuria. In the 1960s archaeologists uncovered extraordinary paintings and exceptional examples of architecture, indicating that the Nubian kingdoms were artistically and scientifically advanced cultures. Each had a literate class of government officials, and it is possible that the general populace was literate as well, giving archaeologists hope of someday finding documents that describe their governments.

Church government and state government were separate in the Nubian kingdoms, although the church and the state cooperated with each other. The royal government’s public works programs in each kingdom were heavily involved in building and improving churches and shrines. Visitors to the kingdoms reported that the churches were impressively beautiful and well maintained. The governments may have been confederations of small chiefdoms that were pledged to the king; the king could draw on small military units that were maintained in each chiefdom, but diplomacy seems to have been the basis of foreign policy. When Egypt fell to Muslim invaders, Nobatia, Makuria, and Alodia made treaties with the new Muslim government that were honored by successive Egyptian regimes until 1276, when Nobatia was invaded and its people put to the sword, with some fleeing south to Makuria and Alodia, east to Ethiopia, and west to the region of Kanem.

The capitals of Makuria and Alodia were Old Dongola and Soba. Pressures from Muslim attacks and raids by nomads from the south and the west may have caused the abandonment of Soba during the 13th century. In 1287 a visitor reported that Alodia had broken apart and was ruled by nine Christian warlords, each of whom commanded a small region from an impressive fortress. On the other hand, Makuria held out against attacks from Egypt for about a century, with its kings apparently doing an impressive job organizing a long-term defense before the prolonged war consumed its resources and the kingdom fell apart in about 1376, with some of its people being put to the sword and some becoming refu-

gees. These refugees may have contributed to the literacy of Kanem, near Lake Chad. Alodia's nobility held out against Egypt into the 15th century, when Alodia was overwhelmed.

STATELESS SOCIETIES OF THE GRASSLANDS AND FORESTS OF WESTERN, CENTRAL, AND EAST AFRICA

To understand the development of kingdoms of medieval western, central, and much of eastern Africa and the organization of their governments, it is helpful to examine the social organization out of which they arose. Large cultural groups arose in the region even in ancient times, but very little is known about them—not even whether they were kingdoms, confederacies, or some other form of government. Most people were either pastoralists or farmers. During the medieval era the pastoralists were gradually absorbed into empires but often retained their independent ways.

When anthropologists speak of the stateless societies of medieval Africa, they usually mean farming communities. These stateless societies were extremely complicated, in spite of their seeming to have no government. Many historians and anthropologists refer to the stateless cultures as democratic, though they were not societies in which people typically voted in open elections; the term *egalitarian* is more often preferred.

In these stateless societies leaders were not always easy to recognize, because a leader might have a home not much different from anyone else's and might work at the same tasks as anyone else. Status was achieved not through material wealth but through mutual obligation—the giving and owing of favors. The more favors a person was owed, the higher his or her status. This giving and owing additionally worked on the village level, with people of different villages owing each other favors that could be fulfilled during times of drought. In such times villages with food and water could gain favors or fulfill favors by helping villages without food or water. This system helped keep military conflicts rare and small, usually involving only a handful of warriors. Such conflicts could be bloody, however; in some areas near the Congo bringing home a slain enemy's head brought prestige.

Stateless societies often had governing bodies at the village level. These took the form of secret societies. They were not secret in the sense that nobody knew about them, because they were well known. Instead, they were secret because they held meetings and conducted rituals that only members could attend. These societies had their basis in family, in cult, or in craft. The family-based secret societies could be very complex. For example, in many cultures women formed social groups that limited membership to daughters of a certain family, and women who had married into that family. Thus it was that a

woman could be a member of more than one women's group, by being a daughter-in-law in one and a daughter in another. No one was allowed to prevent a woman from attending a meeting of her group. During the meetings women shared food and dealt with problems such as a husband beating his wife; as a group, they could impose sanctions on the husband, such as denying him food at family gatherings or denouncing him as an outlaw.

Cult secret societies were based on the veneration of a particular deity or of certain ancestors. Members of these groups often had special masks that they wore only at meetings. The masks were thought to empower wearers with the wisdom of the deity or ancestors. Like family secret societies, these groups could enforce social customs. Members of the groups could face denial of religious services for transgressing against customs. A cult society often had a specific responsibility in society, such as making or changing village laws, presiding as judges in criminal proceedings, or organizing armed forces in times of war. Crafts often had their own secret societies, with distinct rituals for their particular work. They would police the quality of their members' work. The kingdoms that arose out of stateless societies often depended on these secret societies in villages to organize warriors, supplies, and tribute on which their imperial governments depended.

Archaeologists and other anthropologists are uncertain as to why kingdoms and empires arose out of stateless societies. One possibility was the increase in raiding for slaves from across the Sahara after North Africa fell to Islam. Perhaps to protect themselves from slavers, people united under a chief who organized defenses; when the raiding parties became larger and better armed, the chiefdoms selected a leader to lead an army from all the chiefdoms. These leaders sought to make their rule permanent by declaring themselves close friends of the gods or even godlike. It is worth noting that while this theory is plausible for western African cultures of the grasslands south of the Sahara, kingdoms were arising farther to the south among the Kongo peoples without similar pressure from outside forces. Control and defense of important resources, such as copper mines or superior farmland or pastureland, may have contributed to the development of these kingdoms.

The process of development of governments seems to have begun with the establishment of chiefs of villages, perhaps village elders empowered to organize defense of a village or another important project. The manner in which such chiefs were chosen varied, with some chiefs being chosen by a council of elders, themselves holding their status because of their having built up respect by favors that made many people obligated to them. Sometimes chiefs were elected, perhaps at

feasts held for the purpose of choosing a leader. At other times they were selected by a secret society charged with providing political leaders. Often, the person who was village leader had no formal title or position but was the person most respected for his services to his community; he was accepted by general consensus as the person to be appealed to for guidance in public affairs.

None of these kingdoms seems to have ever been able to impose uniform rule throughout their territories. Their governments were based on support either from peasants or from cities. Those that depended on cities often declined or collapsed when their cities suffered economic recessions. In general, federal law did not supersede local laws. Villages tended to rule themselves according to their traditions; those villages that had mutual obligations might unite under a single chief, who would be their spokesperson when dealing with the imperial government. Sometimes these chiefs became threats to the imperial government, which was a reason why some monarchs traveled with their armies to various parts of their empires as a way to impose their authority on their provinces. Provinces themselves often represented sets of villages and towns that were united by a common set of beliefs, especially belief in an account of their founding by a common ancestor, often a deity.

When a kingdom or empire collapsed, it was sometimes a catastrophe for city dwellers, because the order imposed by their government had ensured that food and other necessities were supplied from outside the cities, yet such a collapse was not necessarily a catastrophe for rural peoples. It sometimes was, with rural peoples being swept into slavery by their conquerors, but the stateless social customs that were the foundation of their governments often preserved everyday life in villages.

KANEM

The kingdom of Kanem was shaped somewhat like a triangle, with its flat southern end including most of Lake Chad and its northern point being marked by the town of Bilma. Its people were the Kanuri. The northern Kanuri were pastoralists who kept sheep, goats, camels, and horses. The southern Kanuri were farmers who supplied the kingdom with grain. The people of Kanem were animists, and from about 800 to 1085 the monarchs were believed to be divine. The Kanuri were a literate people, and there is hope of finding documents about their government, although at present what little documentation there is comes from Bornu, a later kingdom formed by the Kanuri when the territory of Kanem was made unlivable by war.

The monarch was called the *mai*. Apparently the *mai* was not supposed to eat or drink because of his divinity and was therefore secretly fed by food and drink delivered to his pal-

ace in the capital, Njimi. The pastoral villages as well as the farming villages had a high degree of independence, with the *mai* running a confederation of villages rather than a strong central government. The *mai* was a military leader who commanded the combined forces of Kanem. Exactly how well these forces were organized is unclear, but the Kanem cavalry was a fearsome fighting force, and Kanem traded slaves for armor from the cities of North Africa. In 1076 the Sefuwa royal family converted to Islam, but the nobility and commoners remained mostly animists. Not until 1221 did Kanem become fully a part of the Islamic world.

EMPIRES OF WESTERN AND CENTRAL AFRICA

During the medieval era there were numerous kingdoms of various sizes in western Africa and central Africa, about which very little is known, although some archaeologists suggest that evidence may exist in the forests for kingdoms the size of Kanem. The two best-known and probably most important empires were ancient Ghana, which is unrelated to the present-day state of Ghana, and ancient Mali, which existed in roughly the same territory as modern-day Mali.

Ghana existed mostly on the grassy plains and in the temperate forests of the Sahel, a band of highlands stretching west to east across Africa south of the Sahara as well in some of the denser forests to the south, along the Niger. Although Ghana was famous for the gold it exported, it did not actually control the gold mines, which remained in the hands of very secretive people who defied every effort to follow them to their sources of gold. Ghana became a powerful and rich empire. Its emperors were in general smart, worldly leaders whose government monopolized the gold trade between the forest peoples and traders from the north who brought European and North African goods south across the desert. The emperors were aided by the secretiveness of the gold miners because the government ensured that only Ghanaian traders could meet the miners at special trading spots, and the miners did not strike out on their own to meet directly with North African traders.

Ghana arose long before it had contact with Muslims, and its government took care to keep Islam separate from government operations. Its main ethnic group was the Soninke. The capital was El-Ghaba, "the Forest," and the monarch lived in a fortress within the city. Archaeologists have yet to discover this city. The monarch was a very visible ruler, meeting with officials during most of the day. When he came out of his chambers to conduct business, his subjects knelt and poured dirt over their heads; visiting dignitaries clapped. He ruled through governors, who reported directly to him. They would sit on the floor in front of a pavilion in which the emperor sat. To his right sat the sons of the subject kings of his empire. These were usually

trusted confidants who had regular access to the royal family. Seated on the floor around the emperor were his aides and bureaucrats, who gave advice on law and policy. Chief among the concerns of the emperor and his government was holding together the empire, because it consisted of people whose local customs tended to be those of stateless societies, and the niceties of taxes and tribute were alien to them.

When trade with Islam became vital to Ghana's prosperity, the government established Kumbi Saleh near El Ghaba. Kumbi Saleh is known to archaeologists and is in modern-day Mauretania. Kumbi Saleh had 12 mosques and freshwater wells and was apparently run by Muslim scholars. Even after Ghanaian emperors professed the Islamic faith, the government continued to keep foreign Muslim traders isolated in town, separating government business from religious business.

Ghana was western Africa's dominant power from about 700 to about 1200. In 1076–77 Kumbi Saleh was sacked by the Almoravides of Morocco, who believed that even other Muslims worshipped God incorrectly; the people they conquered either converted to their religious views or were killed. Ghana regained independence in 1087 but collapsed in 1203, with its territory being absorbed in 1235 into the vast empire of Mali, which flourished for about 300 years.

Although Mali was officially Muslim for most of its existence, it arose out of local African societies and reflected the customs of those societies in its government. Visitors from Islamic countries often mentioned the power and position of the women of Mali. Indeed, one of the problems most monarchs of Mali, called *mansas* (conquerors), had to deal with was the influence in government affairs of powerful women. Mali's government had arisen out of a matrilineal society—a society in which ancestry was traced through women rather than through men. Consequently, the heir to the throne was not a child of the *mansa* but a son of one of his sisters. Therefore, the Malian government was influenced by the *mansa's* mother and the mother of his heir. The *mansa* tried to keep these women out of government affairs by forcing them to live in residences separate from his, but he was often away at war, leaving government officials to consult with the next-most important people in the royal family, the *mansa's* mother and sisters.

Another concern of the Mali government was the tendency of subject peoples to revert to stateless customs whenever the army was not around. The government tried to cope by dividing the population into *kafus*, units of 1,000 to 15,000 people, which were governed by *famas*, hereditary rulers beholden to the *mansa*. However, even the *famas* could become lax in their duties to the central government. Thus, at great expense to the government, the army had to be huge because Mali was the size of western Europe and was well maintained. Like Ghana before it, Mali managed the trade in western and

central African gold, and it charged tariffs for goods entering the country and even higher tariffs for goods leaving the country. As a result, Mali's government was very rich and could afford to pay the troops and maintain a well-organized bureaucracy. The government not only kept track of income but also maintained a well-enforced legal system; foreign travelers noted that they could move freely through even isolated areas without being robbed or otherwise victimized.

CITY-STATES OF EAST AFRICA

The city-states of East Africa were once thought by historians to have been created by foreign traders from Indonesia and the Near East, but archaeological studies have proved that these states were established by local, animistic peoples who were primarily responsible for the city-states' growth as ports of call as well as for their governments. When these peoples began to convert to Islam is not known, but in the 10th century they were recorded as being animists, and even in the 13th century many (possibly most) people in and around the cities were still animists, despite the presence of mosques and Muslim populations.

Most of the city-states remained small, perhaps no more than 10,000 people within their city limits; the cities of Mogadishu, Pate, Malindi, Mombasa, and Kilwa, however, grew larger and eventually controlled sizable territories beyond the immediate areas of their cities. For instance, in the 14th century Kilwa stretched its authority more than 900 miles south along the coast to the city of Sofala, a center of southern Africa's trade in gold from the interior. Sofala was ruled by a governor from Kilwa, perhaps making Kilwa the richest of East Africa's cities, although Mogadishu may have become more powerful. When the Portuguese invaded, looted, and murdered and enslaved the populations of all the other cities in the late 15th century and the early 16th century, Mogadishu was the only city to defeat a Portuguese invasion.

The rulers of the city-states called themselves sultans, but it is not known how absolute their power may have been. It is possible that some of them served only at the pleasure of a powerful merchant class that may have controlled most civic affairs. At Kilwa, Husuni Kubwa, the royal palace, had more than 100 rooms, with a freshwater pool for bathing, patios, and galleries, suggesting great wealth and the possibility that the sultan was a rich merchant. Kilwa took on some of the traits of a nation-state, including establishing a mint that produced coins in six denominations.

KINGDOMS AND EMPIRES OF ZIMBABWE AND THE SOUTHERN INTERIOR

The kingdoms of the interior of southern Africa are known primarily through folklore and archaeological research,

even though the empire of Great Zimbabwe survived until the arrival of Europeans in that part of the world in the 15th century. In the modern-day nation of Zimbabwe, on the Zimbabwe plateau, are the ruins of the city of Great Zimbabwe. Its huge stone walls and other structures may have been built as visible signs of an emperor's power. The Zimbabwean culture was extensive; so far, archaeologists have found more than 150 other sites with similar structures, exceeding 300 structures in all. Taken as a whole, these sites may represent a society that was slowly becoming a modern urban state.

The empire of Great Zimbabwe was the largest of the Zimbabwean kingdoms. Archaeologists are reconstructing its organization and extent on the basis of excavations at settlements. These settlements show relationships to Great Zimbabwe through building styles, such goods as pottery in similar styles, and goods that were first imported into the city of Great Zimbabwe and then distributed outward, such as glass beads. There is a discernable pattern of remote villages tied to towns probably populated by an elite group that governed the nearby villages. The towns acted as regional centers of government that were controlled by an imperial government in the city of Great Zimbabwe. In this arrangement of villages, towns, and the capital city may be evidence of a well-organized government that was able not only to exercise efficient control over its population but also to distribute aid and material goods efficiently from its center of commerce to its provinces. In their turn, the villages supplied crops from their farms or cattle and sheep from their pastures.

There were probably other smaller kingdoms in southern Africa that may have shared the Shona culture in common with Great Zimbabwe. These kingdoms seem to have been subservient to Great Zimbabwe, paying tribute in the form of milk and cattle. Great Zimbabwe appears to have had an army, and it may have been able to add to its army by calling on its tributary kings to supply troops. According to accounts recorded by Europeans at the city-states, the emperor seems to have been regarded as divine, and people approached him only by crawling on their bellies. During audiences the emperor's actions were imitated by his courtiers. For instance, if he coughed, they coughed. If he became infirm from illness or advancing age, he was expected to commit suicide by taking poison, to make way for a healthy, strong heir. The size of his household was greatly exaggerated, with claims of 3,000 serving women living in it; in actuality the place could have held no more than 300 people and most likely had about 100 to 200 inhabitants. The emperor's courtiers apparently held hereditary positions in the management of the government, and they may have managed the state religion as well. At present it seems that the people of the urban areas of Great Zimbabwe overexploited the land, creating an ecological disaster

in which soil eroded and crops failed, causing the empire to be abandoned in the 16th century.

PASTORAL AND HUNTER-GATHERER CULTURES OF SOUTHERN AFRICA

Little is known about the effects of kingdoms on the Khoi and the San of the southern African plains and southwestern Africa. There are archaeological indications that some of the Khoi, who were primarily herders of cattle, were required to pay tribute to Zimbabwean kingdoms, perhaps in exchange for being able to pasture their cattle in certain lands within the kingdoms. The Khoi may have waged occasional armed resistance that was put down by royal armies. The San were primarily hunter-gatherers. They regarded their territory as belonging to themselves and would defend it from outsiders, usually only in small tribal groups. The San were an adaptable people, and many may have served in the armies or on the farms of outside governments, but not enough evidence exists to suggest how this practice might have worked.

THE AMERICAS

BY KEITH JORDAN

NORTH AMERICA

Knowledge of medieval government in what is now the eastern United States comes from a mixture of sources. For most of the period before the Renaissance in the Old World, evidence for Native North American government east of the Mississippi is limited to archaeological finds. Elaborate burials, chiefly regalia of exotic materials, elite houses and mausoleums built atop high earth platforms, and large, often fortified towns tell of social inequalities and centralized governments. During the 16th century the Spanish expeditions of Hernando de Soto and others penetrated the U.S. Southeast. The diseases they brought led to the destruction of indigenous traditions and social organizations, but some of these European intruders, like the so-called Gentleman of Elvas, left written accounts of the governance of the Native American societies they found. Although native societies underwent rapid change following the European invasions, some pre-European forms of governance may have survived as late as the 18th century in some parts of the Southeast. The Natchez people of modern-day Louisiana, for example, had a very hierarchical social system led by a divine chief into the 1730s, at which point they were nearly exterminated by the French. Some anthropologists use this Natchez society as a model for understanding earlier government in the same region, but caution is needed. It is possible that much changed between the 1500s and 1700s, especially when indigenous

populations were so drastically reduced in number by the new European diseases.

Between about 900 and the Spanish incursions of the 16th century the peoples of the Mississippian cultural tradition were organized into chiefdoms. The term *chiefdom* is employed in anthropological theory to refer to relatively small (up to thousands of subjects per polity) hierarchical class societies ruled by chiefs whose office is inherited. Unlike kingdoms and other states, chiefdoms lack extensive bureaucracies, and formal political offices are limited to the chief and perhaps a few other positions like chief priests or war leaders. Chiefs and their families constitute the wealthiest and most powerful social class. Most chiefdoms, and certainly the Mississippian examples, had their economic base in agriculture, and the chiefs controlled the surplus food supply and its redistribution among their subjects. The majority of the Mississippian chiefs' subjects were maize farmers, though other social strata included slaves, privileged craftsmen attached to the service of the chief, and priests.

The Natchez social structure was broadly divided into nobles and commoners, or "Stinkards," with the nobles further separated into Suns (families of the chiefs) and lesser-ranked "Honored People." Chiefs, in general, often controlled trade with outsiders and had preferential access to exotic imported goods and raw materials, which they displayed and conspicuously consumed as marks of their power and which they used to reward their followers. Mississippian chiefs were also religious leaders who legitimized their claims to power by public performance of sacred rituals. Natchez chiefs, or Great Suns, were seen as living gods, descendants of an emissary of the sun god, and carried the power of life or death over their subjects. But in most chiefdoms the power of chiefs was not absolute. The chiefs' decision making and use of force often was limited by a council of nobles or elders serving as advisers, and their influence often rested on their personal charisma and ability to reward followers from their excess wealth. A decline in status or wealth could lead followers to desert their leaders.

Chiefs usually exercised their rule from a central town or capital with a population that could number into the thousands, and they controlled surrounding smaller towns by outright conquest or by recruiting local leaders into their orbit with rewards and the promise of status. The territories controlled by chiefdoms often fluctuated greatly, depending on an individual chief's success in holding on to subordinates by might or influence. In complex chiefdoms the ruling capital and its chief could dominate two to three levels of subordinate chiefs and governing centers. Paramount chiefdoms, of which several were encountered by De Soto in the Southeast, dominated whole networks of less powerful chiefs by

defeating or co-opting them. The subordinate chiefs had to pay tribute in foodstuffs and other supplies to the paramount chief, but without well-organized armies or bureaucracies, paramount chiefdoms were difficult to maintain and their domination over other chiefdoms often short-lived.

Mississippian chiefs could command their subjects to labor on large-scale building projects for the chiefs' benefit and glory. The largest, most influential, and probably the original Mississippian chiefdom had its capital at Cahokia, Illinois, between about 1000 and 1350. The first true North American city, with a population of 10,000 to 15,000 at its height, Cahokia's area of influence extended north into present-day Wisconsin and south into Georgia and Oklahoma. Its rulers lived atop massive earthen mounds, including the 105-foot high Monks Mound, the largest structure in North America before the 19th century. Young men and women, some of them from distant areas, were sacrificed to accompany Cahokia chiefs into their tombs. Community and religious leaders in smaller outlying towns and villages maintained their influence through their connections to the great city's rulers. Chiefdoms far to the south collected and displayed Cahokian ruling regalia—hammered copper images, carved stone effigy pipes of mythic ancestors, and shell ear ornaments showing a long-nosed character—as part of their claims to rule. These symbols of rule equated Mississippian elites with the mythic hero Red Horn or Morning Star and portrayed chiefs engaged in activities exclusive to their rank: impersonating Morning Star by wearing falcon costumes or playing the game of *chunkee*, in which a stone disk was rolled across the ground and the object of the game was to stop or hit the disk with a throwing stick.

Mississippian chiefs were treated with elaborate displays of respect by their subjects. They were carried in litters—at the time of De Soto's expedition, some were too well fed to move in any other fashion. Although most Mississippian chiefs were male, De Soto did encounter several female rulers during his travels. The symbolic center of a Mississippian chiefdom was the ancestral temple, where the bones of the chief's ancestors reposed alongside the chiefdom's sacred objects, the wealth used by the chief to reward followers, and the weapons employed in the capital's defense. Enemy warriors sacked and desecrated these ancestral shrines when they captured chiefly capitals, symbolizing their total defeat of the conquered chiefdom.

Our understanding of government in what is now the southwestern United States during this period relies on archaeological evidence, often interpreted in light of the behavior of the modern descendants of the medieval inhabitants, the Pueblo Indians. During the period from the first European contacts in the 16th century up to the early 20th century, Pueblo societies were seen to be very egalitarian on the

surface, with an ethic based on cooperation; with no class divisions; and, where chiefs were present, with chiefly offices that had only ritual or ceremonial functions. In fact, in each town much decision-making power and control of access to farmland rested with certain privileged families who maintained control over the masks, equipment, and rituals conducted at annual religious ceremonies. Still, one cannot speak of ruling classes or strong centralized governments, and for years the social organization of the Anasazi peoples (ca. 900–ca. 1300), the Pueblos' ancestors, was interpreted as being similar in principle.

Recent reevaluation of the evidence, however, suggests that a distinct ruling group presided over the enormous site of Chaco Canyon, New Mexico, between about 900 and 1100. The site has evidence of construction in stone and wood on a vast scale, and its planning shows an ability to control and organize labor on a massive level. Large Chaco buildings called "Great Houses" were once interpreted as collective apartment houses for people of equal rank, like the dwellings of recent Pueblo peoples. But new population estimates based on archaeological data indicate that at least one Chacoan great House, Pueblo Bonito, had few residents and that those who did live there did not make their own pottery, probably did not cook for themselves, and were buried with a vast array of turquoise jewelry and perhaps even accompanied by human sacrificial victims. Their bones show that they were better nourished and had fewer diseases than their neighbors.

Pueblo Bonito probably served as an elite residence, but what kind of rulers lived there is a mystery. Were they religious leaders who ran Chaco Canyon as a pilgrimage center to rival Rome and Mecca in the Old World? Did they manipulate their knowledge of astronomy (shown in the art and architecture of Chaco) to impress followers? Did their power depend on their ability to redistribute Chaco's surplus agricultural wealth to surrounding peoples in times of famine, or did they control the regional trade in exotic luxuries like local turquoise jewelry and copper bells and bright macaw feathers from Mexico? The period of Chaco's influence over the Southwest seems to have been relatively peaceful with the exception of cases of extreme violence involving the dismembering and even cooking of individuals. Did the Chaco rulers keep the peace by maintaining a monopoly on extreme force to punish challengers to their power? In any case, after Chaco's power collapsed in the early 12th century, subsequent Anasazi communities do seem to have been organized on a more egalitarian basis, similar to historic Pueblo Indian governments.

MESOAMERICA

The Late Classic (ca. 600–ca. 850) Maya were organized into about 40 independent and rival city-states ruled from capi-

tal cities some 12 to 19 miles apart from one another. Each capital city held the residences of the royal family and also functioned as the main religious center of the kingdom. Some of these ruling cities were quite large—Tikal in present-day Guatemala and Caracol in present-day Belize, for example, may have had as many as 100,000 inhabitants each in the seventh century. Increased insight into the offices and workings of these polities has come from the recent decipherment of Mayan hieroglyphs as well as the evidence of palaces and royal tombs. A hereditary king called an *ahau*, or "holy lord," of that city ruled each Mayan kingdom. A less frequently found title in inscriptions, *kalomte*, may be translated as "overking" and refers to rulers who conquered or persuaded other city-states to submit to their rule. A lower office, *sahal*, referred to the subordinate rulers or governors who administered smaller towns for the *ahau*.

Mayan kings adopted the role of religious specialists to justify their right to govern, performing public rituals to ensure the well-being of their subjects' harvests and mark the passage of time in the Mayan calendar. The *ahauob* conjured up ancestors through trance states induced by bloodletting in order to receive their forefathers' legitimizing blessings on their rule. Besides functioning as state shamans, *ahauob* were also war leaders and were expected to validate their claims to power by capturing enemy prisoners before their coronations. Mayan monuments frequently show *ahauob* triumphant over royal prisoners from rival city-states. Such defeated rivals were either tortured and sacrificed or returned to their cities to rule as vassals of their conquerors. Conquered states paid tribute to their conquerors in the form of goods and labor, but the conquerors did not occupy vassal kingdoms or expand their physical borders. Alliances were created through strategic marriages between ruling families and the exchange of rich gifts among elites. Although several Mayan city-states like Tikal and Calakmul in Mexico at times dominated a number of their neighbor polities, these arrangements were not stable. No permanent "empire" arose in the Mayan region, nor did Mayan kings apparently have much control over the economies of their states.

Succession usually passed from father to firstborn son, but female rulers are also documented in the inscriptions. One, Lady-Six Sky, ruled the city of Naranjo as regent for her young son but had herself portrayed on sculptured monuments carrying kingly regalia and taking captives in battle. Since the king was seen as the earthly representative of the maize god, princes were called "sprouts" (*ch'ok*) and the heir apparent "the head sprout" (*baak ch'ok*). At their accession rites kings were seated atop a scaffold or platform. After the sacrifice of captives, they received their royal regalia and a new "divine name," often incorporating the name of a god.

Members of the royal family who were not in the line of succession took on the role of royal scribes and artists. An *ahau*'s entourage not only consisted of these relatives and officials but also included dwarfs, apparently viewed as having supernatural abilities and consulted for advice by the monarch.

At the time of the Spanish conquest in 1521 the Zapotec of Oaxaca were scattered into separate, small kingdoms, each ruled by a lord called a *coqui*. These independent polities occasionally joined together to create unstable and short-lived alliances, as in the 15th century when they banded together against invasion by the Aztec. Disputes over succession could be resolved by consulting a powerful oracle priest, whose judgments supposedly reflected the will of deified royal ancestors. Zapotec social classes were rigidly defined, and marriage between members of distinct classes was forbidden. At the top were the nobles, including the family of the *coqui*. In the middle stratum were commoners—mostly maize farmers. Serfs—landless peasants—and slaves occupied the bottom rung of the hierarchy.

A variety of historical sources are available to shed light on Aztec government: the writings and letters of the Spanish conquerors who vanquished the Aztec in 1521, the writings of missionaries sent from Spain to Christianize the newly conquered territory of Mexico, and oral accounts recorded by colonial Spanish chroniclers as well as the archaeological record. However, the biases of European chroniclers have led to some misunderstandings of the Aztec system. What is commonly and erroneously referred to as the Aztec “empire” of the 15th to early 16th centuries was, in fact, an extended tribute network. Three cities in the basin of Mexico—Tenochtitlán, Texcoco, and Tlacopán, known as the Triple Alliance—conquered large parts of Mesoamerica, from Veracruz in the east and Oaxaca in the south all the way to Soconusco in modern Chiapas on the southeastern border of their influence.

Unlike the rulers of an empire like the Roman Empire, the Aztec did not set up their own administrators over the territories they dominated and for the most part did not garrison troops there. Rather, the conquered peoples were allowed to keep their own rulers and retain their own lifeways, provided they paid tribute in agricultural produce, textiles, clothing, and luxury items to the Aztec. Refusal to pay or violence toward Aztec emissaries or merchants led to punitive expeditions intended to get tribute flowing into the basin of Mexico again. Captured warriors were brought en masse to Tenochtitlán to be sacrificed, rebellious rulers were executed, and humiliating punishments were visited on recalcitrant peoples. One defiant people was forced to pay tribute in dangerous (and hard to catch) snakes. Subject rulers and sometimes even the enemy leaders of rival states were invited to Tenochtitlán on ceremonial occasions to witness the mass

sacrifice of captives—a potent means of intimidation for would-be rebels.

Aztec “kingship” actually was a dual rather than a single office. The ruler, called the *tlatoani*, or “one who speaks,” was the officer equated by the Spanish conquerors with their notion of an emperor. The *tlatoani*, ruling from Tenochtitlán, functioned both as supreme military commander and chief high priest for the Triple Alliance. He presided over massive public rituals aimed at the maintenance of rainfall and agricultural fertility. Like the Mayan rulers, he had to demonstrate his ability as a warrior as part of the rituals of coronation and underwent fasting and bloodletting before taking office. He was also the highest and final authority that could be appealed to in matters of judgment. The *tlatoani* was both a hereditary and elected position, selected from among the sons, grandsons, brothers, and nephews of the previous ruler by a council of nobles.

Paired with the *tlatoani* was a second ruler, the *cihuacoatl*. Although the title literally means “snake woman,” this official, like the *tlatoani*, was always male. The *cihuacoatl* presided over the state bureaucracy as chief administrator and “treasurer.” He also took the place of the *tlatoani* in the latter’s absence from the capital and served as his adviser in military matters. The office of *tlatoani* gained in power in the decades before the Spanish conquest of 1521, but the council balanced the influence of both offices. Life at the *tlatoani*’s court was characterized by feasting and the cultivation of poetic, formal manners of speech. His subjects treated the *tlatoani* with extreme deference as a semidivine being.

While Aztec nobles, or *pipiltin*, occupied the top of the Aztec class system, there was some room for upward mobility, as warriors who distinguished themselves in combat could be awarded land and wealth by the *tlatoani* and could pass their status to their descendants. Another wealthy and politically powerful class was the merchants, or *pochteca*. Although they were technically commoners, they accumulated considerable riches and played an important role for the state as spies. The base unit of Aztec social organization in the basin was the *calpulli*, a family-based landowning and farming collective. In the early days of the Aztec state, representatives of the *calpulli* advised the *tlatoani*, but their power decreased as that of the *tlatoani* expanded.

THE CARIBBEAN

At the time of Columbus’s “discovery” of the islands of the Caribbean, the Taino peoples of the Greater Antilles had been organized into chiefdoms for some three centuries. The office of chief, or *cacique*, was inherited via the maternal line. A *cacique* succeeded his maternal uncle rather than his father. The size of Taino chiefdoms varied. Some appear to have

been complex chiefdoms, called *cacicazos* by the Spanish. The whole island of Puerto Rico was ruled by a single paramount chief at the time of European contact, with subordinate chiefs beneath him. Chiefs could expand their influence and territories via marriages of convenience with other chiefly families as well as through warfare.

Taino chiefs functioned as religious as well as political leaders and controlled the most powerful sacred objects possessed by the polity, though priests and shamans were part of Taino society as well. In particular, *caciques* presided over massive public ceremonies aimed at promoting unity at times of transition for a chiefdom, like the death of a ruler's predecessor or a natural disaster. They appeared on elaborately decorated sacred seats, or *duhos*. But their power was not limited to religious pageantry. *Caciques* conspicuously displayed their wealth and were permitted to enter polygamous marriages as another prerogative of their status. Unlike Mayan *ahauob*, *caciques* exercised control over trade and the production of trade goods like textiles in their domains.

THE ANDES

On the north coast of Peru the Moche culture (ca. 100–ca. 700) was politically organized into at least two states, one ruling from the capital city of Cerro Blanco, and at least one separate state on the northern edges of Moche territory. Moche rulers seem to have had prominent religious roles. They are portrayed in paintings and sculpture impersonating deities and presiding over the sacrifice of prisoners of war. Their ruling ideology seems to have revolved around the person of the individual ruler to a greater degree than any other Andean government, and portraits of individual rulers, rare elsewhere in Peru, are common. Moche kings lived atop massive adobe platforms and were buried in them along with their riches in gold and silver jewelry.

Traditionally, archaeologists interpreted Wari (or Huari) in Peru as the seat of an empire (ca. 550–ca. 1000), like that of the Incas, in order to explain the wide distribution of its art and architectural styles. Its contemporary metropolis, Tiwanaku in Bolivia, was supposedly a theocracy whose extensive influence was spread by religion. Current evidence seems to confirm that the Wari conquered surrounding peoples and demanded tribute from them in the form of work, like the Incas. They built provincial outposts with Wari-style architecture and, also like the Incas, used *quipus*—knotted cords ordered around horizontal ropes—to keep records. Whatever the precise nature of Tiwanaku's government, it was sufficiently well organized to create massive agricultural projects and colossal architecture. It is possible that an individual monarch ruled Tiwanaku. Ruler images are rare, however, and the site may have been governed by a collective leader-

ship drawn from different family groups. The city seems to have influenced peoples to the south, in present-day Chile and Argentina, by maintaining trade relationships with local leaders who became clients of Tiwanaku, receiving ceremonial objects and luxury goods in return. It is possible that Tiwanaku also established colonies in agriculture-rich areas to the east of the city. Whatever the nature of their respective governments, the influences of these states overlapped and came into conflict in southern Peru, where both apparently sought to control a mineral-rich region.

The Inca Empire was called Tawantinsuyu in the Quechua language, translated as “the four quarters of the world”; at its height at the time of the Spanish conquest of 1532 it encompassed 80 separate provinces spanning the modern-day countries of Peru, Ecuador, Bolivia, and northern Chile and Argentina. The capital, Cuzco, was viewed as the center of the empire and indeed of the universe itself. Only Incan nobles resided in the sacred core of the capital. Skilled artists from conquered areas often were relocated to Cuzco to beautify the city with their work. These craftsmen and Incan administrators inhabited the surrounding “suburbs” of the capital. The nature of the top level of Incan government has been the subject of many debates among anthropologists. The Spanish conquistadores interpreted it as ruled by a single emperor, and they recorded lists of what they took to be a succession of kings. However, more recent theories suggest that Incan kingship was dual or multiple, with two or more royal offices held simultaneously by kings representing different elite family groups.

The basic social unit of the Inca Empire, and indeed even of some Andean peoples of today, is the *ayllu*, family-based landholding and farming collectives, divided into moieties, often with specific, separate, and complementary social roles and duties within the larger whole. In Incan times two nobles or *kurakas* presided over each *ayllu*, one for each moiety. *Kurakas* were ostentatious in their displays of wealth and had the privilege of polygamy, which enabled them to increase their riches through the textiles and other luxury goods manufactured by their many wives. Besides organizing community labor, the *kurakas* also functioned as religious specialists.

The *ayllu* was the basic unit of taxation in the Incan realm. These in turn were broken down into subgroups in units of 10. A group of 10 taxpayers constituted a unit directed by an overseer. Ten of these units were under the supervision of a higher official and so on up to the post of the “Lord of Ten Thousand,” who was subject to the Incan provincial governor. The state collected taxes from its subjects in the form of labor (the *mita* system). *Mita* service to the state could consist of construction work on buildings and infrastructure like the

extensive system of highways uniting conquered territories, or producing food or textiles for the state's storehouses. In return, the Incan state provided food to those engaged in construction projects and redistributed surplus food from its storehouses in time of famine, though the latter task was left mostly to local rulers. Incan administrators kept up a census of people and llamas using *quipus*.

Outlying provinces were administered from centers built in Incan style and connected by state roads. Local subjects—able-bodied young men—periodically gathered at these provincial outposts to perform *mita* labor and participate in ritual feasting and alcohol consumption under the direction of the resident Incan officials. To keep order in their conquered provinces, the Inca sometimes forcibly removed rebellious ethnic groups en masse and resettled them in distant regions, while subject peoples of proven loyalty were sent in to colonize newly acquired and potentially unstable territories. Local rulers often were left in power, their loyalty to the Incan state assured by rewards (luxury goods) and preventive measures (their families, and even their local gods, being taken back to Cuzco as hostages). Newly conquered local leaders might be bought off with gifts of fancy textiles, while Incan garrisons were installed in some provinces to keep order. The Incan language, Quechua, served as the official language of the empire.

ASIA AND THE PACIFIC

BY KENNETH HALL

Indian religion and Chinese Confucianism were critical to the founding and development of most Asian states, which emerged out of earlier tribal societies. The Indian governmental ideal was the mandala state, a conceptual “heaven on earth” in which regional political authority centered on a sacred royal court, a court's sacred temple complex, or a network of strategic temples sponsored by a monarch and his court elite. As the focal center of the realm or as the chief patron of the realm's temples, the monarch held power through his divine association as the gods' delegated authority on earth, if not a divine being himself who had temporarily taken human form, to return to divinity after death.

The debate in Indian kingship was whether the ruler should lead by moral example, with his subjects modeling their lives after his as a means of achieving their own salvation, or by direct intervention. The alternative was to rule by threat or to use force when necessary to maintain societal order. The greatest threat in the Indian system of statecraft was the potential autonomy of the state's temples and temple networks and the popular empowerment of priests as the moral alternative to a ruler's secular authority.

Chinese Confucian tradition resolved this dilemma by clearly distinguishing the state as a secular institution. The Confucian state was centered in its urban capital, which was primarily an administrative rather than a ritual center. Professional bureaucrats who had passed civil service examinations filled the state's administrative posts, and priests could not hold bureaucratic appointments. The Chinese emperor was the highest administrator of his secular realm but was subject to the conceptual Mandate of Heaven. In theory, an emperor received the mandate of the divinity, an assurance of their favor, as acknowledgement of his capacity to lead humanity successfully. If, however, the emperor became corrupt or ineffective, the mandate could be withdrawn and granted to another. The civil ruler was thus empowered by the divine but was a human ruling over a civil society in which the actions and decisions of humans determined the course of their existence on earth. A failed ruler who no longer held the mandate could be overthrown by public rebellion, in contrast to the Indian notion of kingship in which the monarch could be replaced only by direct divine intervention. As in Indian kingship, Confucians disagreed as to whether the emperor should lead by moral example or by aggressively involved civil leadership.

INDIAN POLITICAL CULTURE

In India's Dharmasastra (“dutiful law”) ideal there was no hierarchy among the caste tribunals and village and marketplace councils that had overlapping governmental jurisdictions. Every social group was allowed to formulate and apply its own customs and conventions. Governmental law and political institutions were not rigid but could be changed to meet fluctuating local needs and to achieve the best interests of the local community. Ultimately, Indian institutions were expected to make decisions consistent with the interests of the most powerful among the community's members, whose prominence was a combination of their political, economic, religious, or hereditary stature. Most local legal decisions resulted in expulsions and boycotts rather than the fines or the severe physical penalties that were typical of the Chinese political system. In theory, only a royal court could impose a death sentence.

A royal court of justice consisted of a king or an emperor or his designated agent assisted by learned Hindu and Buddhist clerics. Local justice could be appealed to royal courts, where kings made practical legal decisions based on their sense of common usage rather than on a written code of law. Few cases went all the way to the royal court, and such cases put the community at risk since the king's justice would not necessarily benefit the community's interests. While kings were supposed to pass judgments after weighing both the

Dharmasastra and local traditions, ultimately kings took actions based on their own best interests. Thus, it was in a community's best interests to reach a local resolution rather than to have the outcome dictated by a king.

Gupta imperial patronage of Hinduism (ca. 220–ca. 650) made the Hindu temple and its priesthood the centers of everyday life. In the absence of a strong central government that followed the collapse of Gupta rule, the temples, the temple networks, and their priesthood were the alternative source of societal leadership and set the cultural standards, based on the regulations of the Hindu caste system, for Indian society. This system empowered the Brahmin priest as the caretaker of Indian social order and human well-being, in partnership with kings (Kshatriya), who might exercise secular authority but were ultimately subject to the moral authority of the Brahmin priest. The Vaishya middle class (artisans and merchants) and Shudra laborers subjected themselves to Brahmin and Kshatriya leadership.

Perhaps in response to the organizational needs of settlements on the edges of settled agricultural zones, surrounded by hostile tribesmen—a response to the hostile physical and human environments in the development of India in the post-Gupta age—sophisticated village-based governmental institutions developed in the absence of centralized authority. In this age dynastic governments were impermanent. As one dynasty replaced another, group solidarity at the local level compensated for instability at the imperial level. Collective negotiation offered advantages in a village's relationship with other parallel commercial and religious institutions as well as with imperial regimes. Local institutions might evolve into regional governance (*nadu* in southern India and *visaya* in northern India), notably when there was a common geography, such as a river valley, or when there was need for cooperation to ensure regional access to water—as in the construction, maintenance, and management of irrigation systems. These local institutions collected taxes (normally a share of the local harvest and required labor dues), exercised varying degrees of land control, and assumed judicial powers, all of which contributed to the appearance of local autonomy.

Against this perceived autonomy, in the distribution of village resources local institutions were in a continuing process of negotiation between the village and the upper levels of governance. To ensure their right to regulate their own affairs and to minimize the opportunity for external interventions and to limit external knowledge of and control over local affairs and thereby to retain local resources, village governments went out of their way to convey an image of local solidarity. Imperial regimes and kingships seized every opportunity to extend their authority through intervention when a local crisis occurred, for example, a factional split

or the local inability to deal with certain types of problems, such as recurrent external threat of raids by armed warriors, whether neighboring tribesmen or competing armies. Royal governance in this age was itself subject to sudden expansion and contraction and lacked the institutional or bureaucratic capacity to integrate the local institutions into a continuous system of governance. Royal administrations were concentrated in the king's court; the royal army and a core of royal secretaries and petty officials, who were designated by impressive Sanskrit titles, made regular rounds to remind locals of royal authority and to maintain local submission.

To negate their governmental weakness, Indian kings patronized clerics and religious institutions. Over time these temples and their networks provided a ritual and institutional centrality that the monarchy lacked. Temples were independently empowered by their hold over delegated rights to shares of a land's produce. In some cases these were linked transfers that affected undeveloped land, which might be paired with lease rights or reassignments of war captives or bondsmen, but in many cases the land was already occupied and involved a transfer of all or partial income rights to land, paired with specified administrative rights over that land. Thereby, temples became more than agents of political centralization and religious well-being owing to their contributions to local economic vitality. Directly or indirectly they had an impact on local governance that superseded the rise and demise of dynastic authority.

The alternative potentials of the temple as partner, opponent, or center of governance were repeated throughout Asia. In the case of China, the Tang and subsequent Chinese dynastic regimes consciously monitored the activities and limited the resources of Buddhist and Dao temples to negate their potential for political rivalry.

CHINA'S CONFUCIAN GOVERNANCE

The Tang China state (618–907) was based in a network of administrative cities, centered in the Tang capitals of Luoyang and Ch'angan (now Xi'an), where Tang rulers negated the potential for split loyalties between ritualized courts and Buddhist temple centers. Tang Confucian bureaucrats thought of Buddhism as foreign, immoral, and a threat to the Chinese way of life. In their minds, Buddhism, which had developed strong roots during the interregal chaos from the fall of the Han Dynasty in 220 to the rise of the Tang, encouraged individual dedication to the Buddhist Church rather than to the Chinese state. To Confucian elite, Buddhism did not honor the traditional Chinese societal hierarchy: gentry, peasants, artisans, and merchants. Consequently, twice in the Tang era emperors ordered the closure of monasteries and the confiscation of Buddhist property by the state.

The confiscated property was assigned to private citizens in order to make this property (primarily land) subject to taxes. (Religious property was tax free.) This practice forced monks and nuns to return to civilian life to fulfill their family obligations. In doing so, they were forced to submit to the elaborate traditional family order that was based in a rigid Confucian code of filial piety. Confucian ethics stressed the subordination of the individual to the collective secular interests of the family; this included honoring parents and others in the family who held seniority over others. In 845 as many as 4,600 monasteries and 40,000 temples and shrines were destroyed, and 260,000 Buddhist monks and nuns were returned to their homes. Although this ban was lifted a few years later, the practice of the Buddhist faith never returned to its previous level of popularity.

Confucian statecraft was based on the teachings of the sage Confucius (551–479 B.C.E.). Unlike other teachers of the time, Confucius believed that it was possible for all people, regardless of their station in life, to do right. He taught “right relations,” which included “human heartedness,” benevolence, respect for superiors, and filial piety. More a set of ethical rules or a moral philosophy than a formal religion, Confucianism avoids questions of a divine being and is vague in its discussion of the afterlife and otherworldly matters. The Confucian ideal is a ranked or hierarchical social and political order composed of status groups and graded roles, from the ruler at the top through officials and gentry (landed and educated elite) to the family head. According to Confucian philosophy, the key to effective authority is setting a good example through “right relationships” in order to ensure “virtuous behavior.”

Confucius believed that the threat of punishment and a formal legal code were no guarantee of individual virtue or social harmony. He also believed that in a properly run society rules and punishments were ineffective and unnecessary. In the ideal Confucian order, people *want* to do right, a situation that is achieved only by making the Confucian ethical code of correct social relationships a part of one’s own thinking. Violence is only a last resort, when the social system has broken down.

As popularized in the writings of the scholar Mencius (ca. 371–ca. 289 B.C.E.), early Confucianism presents a highly optimistic view of humanity and society. Later Confucian scholars, known collectively as legalists, had a very different perspective. They argued that humans drifted naturally toward chaos and thus required an intervening force, or at least the threat of force. Legalists believed that people need a formalized code of law to achieve and maintain universal social harmony.

Both traditions, however, affirmed people’s right to rebel against immoral or unjust rulers, leaders who had forfeited

the Mandate of Heaven by their own lapse from virtue. While loyalty to superiors was the basic commandment of Confucianism, commitment to moral principles could prevail, especially in times of corrupt leadership. This situation, however, presented individuals with a severe psychological dilemma—loyalty to leader versus commitment to moral principle. Consequently, civil disobedience was extremely rare; however unjust, authorities (from the emperor at the top to one’s parents on the bottom) were seldom challenged.

The Tang governmental system that evolved through the medieval era tended more toward a “rule by law” rather than a “rule of law.” This system required severe penalties that would discourage disobedience: public humiliation, hard labor, physical mutilation, banishment, slavery, or death. The Confucian moral code advocated continuous self-cultivation and the performance of one’s proper social role in a hierarchically structured society. Aggressive selfish behavior was unacceptable. Since criminal activity was considered the by-product of improper management of a family’s individual members, the relatives of a convicted criminal could also be punished.

Most labor penalties lasted from one to six years; mutilation could include shaving the offender’s beard or head, branding, cutting off a nose or a foot, or castration. The sentence of death could take several forms, including being torn apart by horse-drawn chariots, although decapitation and hanging were the norm. Penal labor was the usual penalty for theft or other civil crimes. Even those who were required to pay fines might work off the sentence through a stipulated term of servitude. Those with servants or wealth could receive credit for work performed by others in their place. Males might redeem their relatives by performing services on their behalf.

Laws were intended not only to regulate common people but also to constrain officials. There were rules for keeping accounts, supervising subordinates, managing penal labor, conducting investigations, and dealing with the public. Those officeholders who violated this code of conduct might be fined, lose their official positions, be reassigned to a bureaucratic post on a distant frontier, or in extreme cases, be executed.

The Chinese legal system depended on magistrates who were state bureaucrats rather than appointees with local roots. Private lawyers were prohibited because they were considered to be social parasites whose involvement was more likely to result in further disputes rather than in a peaceful resolution. The government magistrate was both the judge and the prosecutor. (Chinese law held the accused guilty until proved innocent.) Nevertheless, the magistrate was expected to investigate a case thoroughly and to impose a fair sentence. A case could be reopened if one party claimed to be the victim of injustice. To prevent corruption and wrongful verdicts, the

Chinese state held the magistrate absolutely responsible for mistakes of law or fact, regardless of good intentions or absence of malice. To protect themselves from reprisals, magistrates tried to avoid accepting formal complaints and instead devoted most of their efforts to the mediation of settlements rather than to litigations inside their courtrooms.

The Chinese legal system was willing to make allowances for or penalize according to the extenuating reasons for a crime. Among these crimes was the failure to avoid inauspicious days in performing a ritual action, such as sacrificing to and burying the dead or marrying, thus allowing the demons and malignant spirits to work their will. An individual's crime also might be blamed on another family member who was negligent in ritual actions and thus made the guilty relative unknowingly vulnerable to a maligned spirit's reprisal.

By the Tang Dynasty era, under the Tang Code (624), there were three mandatory automatic reviews of a sentence of death before an execution could take place. Family members could appeal any conviction all the way to the emperor, but they were subject to the risk of punishment if their appeal was ruled to lack merit.

From the Tang era onward civil service appointments filled vacant government positions on the six imperial bureaucratic government boards: personnel, rites, public works, war (provisioning the military rather than commanding it), revenue, and justice. Appointees served at one of three levels of government: local, provincial, and the imperial court. Applicants underwent written examinations; passing each of three exams qualified the candidate for successively higher government appointments. The Chinese civil service was one among three "branches" of the Chinese imperial government; the other branches included the imperial court (consisting of the imperial secretariat, the eunuch corps of imperial guardians, ritual specialists, and the imperial household—the imperial family inclusive of the emperor's relatives, his wives, his concubines, and his children and their servants) and the imperial army (consisting of a corps of troops resident in the capital city as well as military regiments in each province). As a check on dishonesty, the Imperial Censorate held the power to investigate any seeming impropriety throughout the imperial system and to impose penalties that would discourage similar misconduct.

In theory, the Chinese civil service was open to any adult male, regardless of wealth or social status. In practice, however, preparing for the exams was costly and time-consuming. Because China lacked public schools, candidates had to study under the direction of a private tutor. As a result, most successful candidates came from a hereditary class of wealthy landholding gentry, who had the resources to afford private education. Aristocrats had an additional incentive to fill the posts: At least

one family member from each generation was required to pass the exams in order for a family to maintain its aristocratic status. However, passing the exams was no guarantee of personal success. Because there were not enough positions to employ all qualified applicants, only about 5 percent of those who took exams passed and received government posts.

The civil service and examination systems were also the critical means by which the Chinese government maintained the loyalty of the elite classes, or *shih*. Passing the exams without holding public office had other benefits. Only those who had passed the exams, whether or not they received government positions, were allowed to communicate directly with the Chinese government. Thus, non-*shih* had to secure the services of non-officeholding *shih* in order to deal with the government. *Shih* businessmen frequently received profitable government contracts and commissions not available to non-*shih*.

The system, however, often produced too many expectant *shih*, who believed they were entitled to receive benefits as the government's local agents. In fact, many *shih* depended on commissions as a valuable supplement to the family's land-derived income. Dynastic decline normally coincided with the court having too few rewards to distribute to retain the loyalty of the *shih*. As the opportunities for appointments or rewards diminished, the elite began to think in terms of their own self-interest rather than remain loyal to the imperial court, hastening a dynasty's fall from power.

JAPAN, KOREA, AND SOUTHEAST ASIA

Tang China's political culture spread to its neighbors, at first as an elite-level overlay. Over time, however, China-derived Confucian statecraft, with mixtures of traditional local practices considered to be critical, became the basis of new urban-centered court cultures. Imperial Japan, centered in Nara and Kyoto, and Korea's imperial Koryo civilization, centered in Kaesŏng, each built court cities that were faithfully modeled on Tang Ch'angan. East Asian cultures generally respected the Chinese written language as the universal language of eastern Asian scholarship (like Latin was in the contemporary Western world) and read Buddhist and Chinese books, written or printed in classical Chinese, which supplied the philosophical base for new urban-focused states. Common to the Tang model, these new states patronized the centers of worship of Buddhism and other major religions, but the new political regimes were careful to establish their own royal court complexes, rather than temples, as the focal points of their societies. The court complexes in Korea, Japan, and Vietnam might include significant temples, but these temples and their priesthood were, with rare exceptions, administered by secular elite.

FROM IMPERIAL RULE TO WARRIOR STATE IN JAPAN

The foundation for Japanese imperial order was the Seventeen Article Constitution issued by Prince Shōtoku (573–621) in 604. The constitution promoted a mixture of Buddhism, Confucianism, and the Chinese model as the basis of replacing traditional hereditary ranks with new Chinese-style designations of senior, junior, upper, and lower grades, totaling 26 divisions. Buddhist priests and the elite accepted their proper place in the new Yamato political and religious order.

The Taihō Code (701), written under the guidance of the Fujiwara noble family, who remained in control of day-to-day governance throughout the imperial era (604–1185), codified a new Japanese political order, formalizing the Yamato state structure that had emerged gradually over the previous century. The imperial system (inclusively known as the *ritsuryō* system) was modeled on that of Tang China, but with local adaptations. The Japanese imperial state was based in the imperial court centered at the imperial capital. In contrast to the Tang model, which had three divisions and six boards, the Japanese imperial bureaucracy was divided into two divisions, which in theory reported directly to the emperor. The Department of Worship (Jingikan) was thought to be the most powerful administrative unit owing to its administration of Shinto shrines and leadership in the worship and ritual affairs of the state. Civil administration fell to the Department of State (Daijokan), which had eight ministries: secretariat, ceremonies and personnel, aristocratic affairs, popular affairs (land, census, and taxation), war, justice, treasury, and the imperial household. Beyond the imperial court, 66 traditional provinces were centered in a provincial capital administered by a governor appointed by the court. Further administrative subdivisions included the county and the village, whose households were accountable for the payment of grain and silk taxes and mandatory labor and military services.

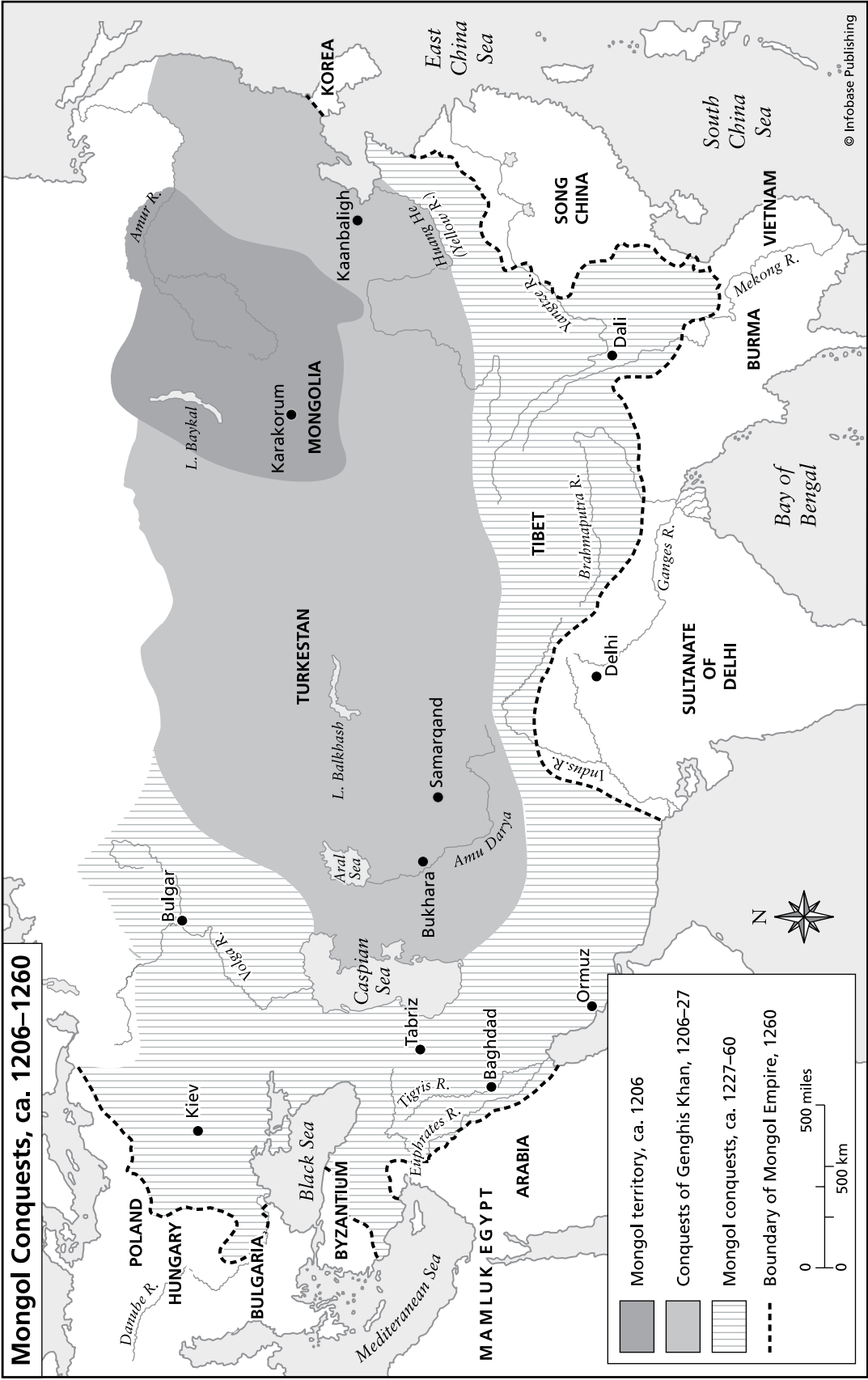
By the 12th century political authority had decentralized into the regional estates assigned to support absentee court elite. Lay officials managed the estates, keeping peace and administering taxation and labor services in the absence of the court elite. Military authority decentralized to professional warriors—samurai—who formed military regiments led by a shogun (“military guardian against barbarian peoples”), who protected Japan’s core agricultural regions from the periodic attacks of bandits living on the core’s frontiers. When the court finally collapsed in 1185, the local civic officials, religious orders, large landowners, and Buddhist temples became the new centers of Japanese authority, in partnership with new warrior elite, simply confirming the reality that had emerged over the past century.

A series of military strongmen, shoguns, wielded ultimate political authority in Japan for the remainder of the medieval era. The shogun received his authority from the emperor after winning battles against armed opponents. In theory, the emperor delegated to the shogun responsibility for running the Japanese imperial state, similar to prior authorization of the Fujiwara court “regents” in the previous age. In practice, local “stewards” and “constables,” who had managed the aristocratic estates during the imperial period, assumed the day-to-day affairs of what remained of the Japanese state. The new hereditary samurai military elite, who were ultimately bound by service contracts to the shogun, imposed local order.

The shogunate system, called the *bakufu* (“tent government”), depended on the shogun’s willingness to acknowledge the local territorial rights (*shiki*) of the samurai lords. Under the initial Kamakura Shogunate (1185–1333), although regional samurai lords were submissive to the Kamakura shoguns, they also were allowed to maintain their own samurai armies and had to enlist the cooperation of local administrators. The Kamakura Shogunate had two political centers. The shogunate was based in Kamakura, southeast of modern-day Tokyo, and was notable for its successful institution of the decentralized shogunate system, in which educated samurai became hereditary administrators who managed the affairs of the Kamakura court and were a key source of contact between the shogun and his regional subordinates. The Kyoto court, supported by court-based elite and the major Buddhist temple networks, continued to appoint civil governors, receive tax revenues, and directly administer the Kyoto region. The Ashikaga (1336–1573) shoguns who followed, based in Kyoto, took control over the remaining imperial government, but there was further decentralization of power. Samurai allied in regional warrior bands led by daimyo (feudal) lords. These alliances culminated in the Ōnin War (1467–77), in which regional samurai largely ignored the Ashikaga court and rival samurai armies openly competed for the right to govern the Japanese countryside.

THE MONGOL ALTERNATIVE

In contrast to eastern and southern Asia, the Mongolian state evolved from and remained consistent with its seminomadic roots in the central Asian steppes. The Mongol conquests, which at one time gave the Mongols authority from China’s shores in the east to the Mediterranean Sea in the west, was impressive since the Mongols numbered only about 1 million in an era in which China’s population alone numbered roughly 100 million. Mongol success was based on the Mongols’ skills as warriors; they literally spent their lives in the saddle. The Mongols’ great military advantage was their mobility and their superior cavalry tactics. The Mongols were the



Genghis Khan and his sons and grandsons conquered a wide swath of central Asia during their reign, building the largest land empire in history.

first to use signal flags to coordinate their battlefield actions and short compound reflex bows that they could load and fire at full gallop. They could cover 100 miles in a day, carrying whatever small food rations and supplies they needed in their saddlebags and therefore never having to wait for their supplies. In the absence of food, a Mongol warrior could cut open a vein in the neck of a spare mount, drink some blood, and close it again so the rider and his horses could continue.

The Mongols rarely lost a battle. Local populations found it better to submit to them than to fight, since a battle loss normally resulted in the butchering of men and the raping, slaughtering, and enslaving of women and children. This terror worked to the Mongols' advantage; they were widely described as inhumane monsters, often by their own spies and agents, who spread horrific tales about their exploits. The Mongols actively recruited local allies. Ultimately, the Mongol victory over China depended on the Chinese technicians, siege engineers, gun founders, artillery experts, and naval specialists, who helped the Mongols conquer China's heavily fortified cities that were defended by gunpowder weapons and explosives. The Mongol conquest of China involved the first use of cannon warfare, which quickly spread to Europe in the early 14th century.

The Mongol realm came into existence under Temüjin, who was proclaimed Genghis Khan (r. 1206–27), “universal sovereign,” by an assembly of all the Mongol chieftains. This assembly acknowledged Genghis Khan's conquests of central Asia, the Near East, and eastern Europe as well as his initial victories in northern China. Genghis Khan's success was based in his ability to unite under his personal leadership the traditionally divisive Mongol tribes living in what is now Mongolia and reorganize them into 1,000-man fighting and administrative forces (*minggan*). To maintain order among his ranks, Genghis Khan introduced a code of law that provided examples of appropriate military and social behavior. The code emphasized loyalty to the Mongol military over family clans, promised reward for meritorious service rather than for hereditary social standing, and promoted ethnic and gender equality. Genghis Khan's realm had four regional divisions (*khanates*): the Golden Horde in western Eurasia and Russia, the Ilkhans in modern-day Iran and the Middle East, the Chagatai in central Asia and Siberia, and what would eventually become the Yuan in China and eastern Eurasia.

Unfortunately, the unity of Genghis Khan's reign did not last, as the traditional Mongol tribal assembly system never had a clear succession policy and was unable to ensure successful transition following the great Khan's death. After Genghis Khan's death, the Mongol chieftains divided the realm among his four sons, each of whom was based in one of the four Mongol regions, but proclaimed Genghis Khan's

third son, Ögödei (r. 1229–41), as his father's successor, now titled Mongol “emperor.”

POLITICAL SYSTEMS OF THE PACIFIC ISLAND

The traditional political systems of the Pacific islands varied greatly. Yap island society in modern Melanesia, for example, never had a strong, centralized authority system. Order was based on a local chief who shared power with a council composed of the heads of the family clans. Village societies were arranged in an island-wide ranking based on the debts owed by one village to others.

In contrast, the islands of Kosrae and Pohnpei were once ruled by supreme chiefs. Kosrae traditionally had a single chief who ruled the entire island, with the assistance of sectional chiefs who passed on the head chief's share of local production (food or handicrafts), to which he was believed to be entitled in payment for his successful community leadership. Pohnpei initially had several roughly equal confederated chiefs who held control over villagers in their region. They were assisted by “talking chiefs,” chosen from the second-ranking family clan in each region, who acted as designated mediators if disputes arose between two regions. As in Kosrae, the two elite clan lines received an entitled share of local production from the local nonaristocratic clans.

The Kosrae and Pohnpei supreme chief system reached its height, perhaps as early as the eighth century, under a mysterious line of kings known as the Saudeleurs. These kings built a spectacular capital city at Nan Madol, on the southeastern shore of Temwen Island, off the coast of Pohnpei. The remains of this city consist of a coral reef of 92 man-made islets intersected by a network of artificially constructed canals and waterways, protected by seawalls of loglike basalt stone that are up to 50 feet high and 20 feet wide. The focal centers of this ancient city were the 58 islet sites of elaborate funeral rituals, the residences of priests, and royal tombs, which were surrounded by the islet residencies of state elite and marketplaces.

In New Zealand's Maori society the *marae*, an open grassy area in front of a large, carved wooden meeting-house, symbolized group communal unity. Community elders managed the *marae*, where they passed along group traditions and cultural practices to the young by teaching oral folktales, songs, and the traditional arts of weaving and woodcarving. Among the most important lessons taught at the *marae* was distinction between *tapu*, that which is sacred, and *noa*, that which is held in common. A person, an object, or a place that is *tapu* could not be touched or even approached except according to specific rules and prohibitions. By tradition, those of lower rank could not touch the *tapu* objects of those of higher rank, as those of higher birth

could not touch the *tapu* belongings of the lower ranks. If a person of low status touched the glass of a higher-ranking person, the drinking vessel would be destroyed. Such an elaborate code of ethics reinforced societal hierarchy as well as respect for individual rights and possessions within the local communal order.

EUROPE

BY JUSTIN CORFIELD

The system of government in medieval Europe relied on the interplay between important political forces. The church, contending rulers, dynastic rivals, powerful political and military figures, parliaments, city councils, and mass movements involving the peasantry all shaped the organization of government throughout medieval Europe.

THE PAPACY

The peak of the organized government system at this time was the Papacy of the Roman Catholic Church. Selected by the College of Cardinals, the pope, the leader of the church, was able to bring considerable symbolic and actual power to bear on political disputes. Rome was not a significant urban center—after its sacking by the Visigoths in 410 it had long since declined. However, with the popes living in Rome, the city was a center of pilgrimages for rulers as well as their subjects, who traveled to Rome to satisfy their curiosity, to demonstrate their power or their piety, or to show remorse for bad decisions. In spite of England's geographical distance from Rome, a number of English rulers did visit the holy city, with Alfred the Great (r. 871–99) establishing an English college there and King Henry II (r. 1154–89) going there in penance after the murder of the archbishop of Canterbury Thomas à Becket (ca. 1118–70) in 1170.

The Papacy's power was clearly shown by what it influenced. Pope Leo III (d. 816) crowned Charlemagne (r. 800–14) in 800, Pope Alexander II (d. 1075) supported Duke William of Normandy's invasion of England in 1066, and in 1095 Pope Urban II (ca. 1035–99) used his power at the Council of Clermont to call on the people of Europe to join the First Crusade. Other examples of papal influence on the running of countries in medieval Europe include Pope Adrian IV's (ca. 1100–59) promulgation of the Bull *Laudabiliter*, which King Henry II of England used to justify his conquest of Ireland 16 years later; Pope Innocent III's (1160 or 61–1216) launch of the Albigensian Crusade against the Cathars in southern France; Pope Clement V's (ca. 1260–1314) refusal to help after the French monarchy started persecuting the Knights Templars in 1307; and, at the very end of the Middle Ages, Pope Alexander VI's (1431–1503) assistance in setting up the

Treaty of Tordesillas in 1494, dividing the world between the Portuguese and the Spanish.

In an extreme situation the pope could declare an interdict on a country, a state, or a city. An interdict was official censure by the Roman Catholic Church, excluding people from receiving church sacraments. Adrian IV even declared an interdict on Rome itself following the murder of a cardinal. Pope Innocent III placed England under an interdict from 1208 until 1215 because King John (r. 1199–1216) refused to accept the papal choice for the archbishop of Canterbury.

However, papal power was not unlimited, and the authority of some popes was challenged by France and by the Holy Roman Emperors. Indeed, during the 11th century there were antipopes who claimed to be lawful popes, and from 1378 until 1417 there was the Western Schism, or the Great Schism, following the election of Pope Gregory XII (ca. 1325–1417) in Rome and then the election of Pope Benedict XIII (ca. 1328–1423) in Avignon, France. The matter was resolved at the Council of Constance in 1414–18; by the end of the medieval period the Borgia family of Pope Alexander VI (1431–1503), particularly his son Cesare, had established an effective temporal state of Romagna, which was later turned into the Papal States.

HOLY ROMAN EMPIRE

In addition to the Papacy bringing its power to bear on the running of countries and states, the establishment of the Holy Roman Empire in 800 dramatically changed the political landscape of central Europe for centuries. While the emperor



Chest made of iron plates (Britain, early 15th century), used as a safe for the storage of important civic documents, valuables, and the City of London seals; six keys, kept by six different people, were required to unlock it (© Museum of London)

was officially determined by a vote of electors, there were also constant disputes on the investiture and the exact role, if any, the Papacy should play in the ceremonies connected with the office. After 1452 the Hapsburg family of Austria dominated the Holy Roman Empire, allowing much of central Europe to be controlled from Vienna.

The major political system in Europe throughout the entire medieval period was that of a hereditary monarchy, with kings ruling in England, Scotland, Ireland, France, Léon, Navarre, Aragon, Portugal, Hungary, Poland, Russia, Denmark, Norway, and Sweden. In 1282, after the Vespers rebellion, the Kingdom of Sicily split to form the Kingdom of Naples and the new Kingdom of Sicily based only on the island of Sicily. Other parts of Europe were controlled as principalities, and there were also a small number of republics, mainly in the Italian peninsula.

MONARCHIES

Many of the monarchies operated through advisory bodies, such as parliaments, but the success of the political system relied largely on the effectiveness of the monarch. Several medieval rulers earned the title “the Great,” some for good deeds and some for their military victories over their enemies. The first medieval ruler acknowledged as “the Great” was Theodoric (r. 474–526), king of the Ostrogoths. Of those who became known as “the Great” because of their role as nation builders, the first was Charlemagne. Others included Rhodri the Great of Wales (r. 872–78); Alfred the Great, king of Wessex; Otto I, “the Great,” of the Holy Roman Empire (r. 936–73), who overcame internal revolts and established the Ottonian system; Canute the Great, king of England (r. 1016–35) and of Denmark (r. 1018–35); William V, “the Great,” of Aquitaine (r. 994–1030); Vytautas the Great of Lithuania (r. 1392–1430); Ivan III, “the Great,” of Russia (r. 1462–1505); and Stephen III, “the Great,” of Moldavia (r. 1457–1504), who was also later declared a saint, as was Edward, king of England (r. 1042–66), who gained the title “the Confessor.”

Those who are known solely for their military prowess rather than for their administrative skills include Alfonso III of León (r. 866–910) and Sancho III of Navarre (r. 1000–35), who both defeated the Moors; Valdemar I of Denmark (r. 1157–82), who became Valdemar the Great for defeating a foreign invasion; Peter III of Aragon (r. 1276–85), who gained the title “the Great” through his campaigning in the Mediterranean; Llewellyn the Great (r. 1194–1240) of Wales; and Louis I, “the Great,” of Hungary (r. 1342–82), who extended the lands of Hungary to incorporate Dalmatia, Bosnia, and parts of modern-day Bulgaria. Mention should also be made of King John I of Portugal (r. 1385–1433), who gained the title “the Good” or occasionally “the Great” and was the king whose capture of

Ceuta in 1415 led to the start of overseas European colonies. King Edward I of England (r. 1272–1307), for his military victories, gained the title “Hammer of the Scots.”

Although the monarchs known as “the Great” successfully ruled their respective lands, there were also many kings and princes whose rule was disastrous. There were also many rulers, including four English kings—Henry III (r. 1216–72), Richard II (r. 1377–79), Henry VI (r. 1422–61 and 1470–71), and Edward V (r. 1483)—who inherited the throne while young, with the first only narrowly surviving a civil war and the other three all being deposed. Henry VI also spent much of his reign ill. King Henry III of Castile (r. 1390–1406) was 11 when he became king; he became known as King Henry, “the Infirm.” Erik V (r. 1259–86) became king of Denmark in 1259 around the age of 10. An exception was Louis IX (r. 1226–70), who was 12 when he became king of France in 1226 but went on to reign for 44 years and later to be canonized. Because of the potential instability, many states tried to avoid having a young king and broke from traditional hereditary succession to allow an older man to become king.

In addition, there were problems with young kings who had mothers with lovers who tried to rule their kingdoms. Alfonso I (r. 1139–85), the first king of Portugal, was only two when he became the head of the ruling family. In 1128, when he became 17, he raised an army and defeated his mother and her lover at the Battle of São Mamede; and in 1330 King Edward III of England (r. 1327–77) managed to have executed Roger Mortimer, the lover of his mother. In Aragon, in northern Spain, James I (r. 1214–76) was five when he became king, and when he was 11, he staged a palace coup to end the regency of his granduncle.

On many occasions the illegitimacy of succession led to revolts, and the three English kings who took over to prevent nephews from being crowned all spent most of their reigns fighting challenges to their rule. Two of them, Harold II (r. 1066) and Richard III (r. 1483–85), died in battle, and King John became known as “Lackland” because of his rule at the time of the end of the Angevin Empire. The advent of a female ruler was also seen as inherently dangerous, with the reign of Matilda, also known as Maud (r. 1141), daughter of King Henry I of England (r. 1100–35), initiating a disastrous civil war. The death of Charles IV (r. 1364–80) in France created debates over the Salic law (preventing women from ascending the throne), and when King Edward III of England claimed the crown through his mother, the act led to the Hundred Years’ War (1337–1453) between England and France. For Margaret, Maid of Norway (1283–90), many accounts do not recognize her as a ruler.

With so much aura invested in the monarchy, the issue of illegitimate birth occasionally raised some problems.

There are debates over the legitimacy of the English Saxon king Edward the Martyr (r. 975–78) as well as King Edward IV of England (r. 1461–70 and 1471–83). William I, “the Conqueror” (r. 1066–87), described by English Saxons as “the Bastard,” managed to rule successfully, but queries over the birth of King Edward V of England led to his deposition and possibly his murder. Certainly, murder was a traditional way to resolve dynastic disputes, and the number of kings who were murdered is large. In medieval England six kings were murdered, including William II (r. 1087–1100), whose death was ascribed at the time to an accident, and Edward V. The record in Scotland is not much better, with six Scottish kings being murdered, along with John III Comyn (d. 1306), the guardian, who was killed by Robert Bruce. Spain also saw a large number of murders in the late 14th century, starting with the killing of Pedro the Cruel (r. 1350–69) in 1369.

The sanctity of the institution of the monarchy meant that abdication was rarely accepted. Both of the English kings who abdicated, Edward II (r. 1307–27) and Richard II, were subsequently murdered, although Constantine II of Scotland (r. 900–42 or 43) did manage to live another nine years after abdicating and becoming a monk. Several murders were associated with hunting “accidents,” the best known being that of William II of England. The murder of King Erik V of Denmark in 1286 while he was sleeping after hunting was certainly no accident. The death of King Louis V of France (r. 986–87) in May 987 does, however, appear to have been a genuine hunting accident.

Most of the threats to the monarchy came from rivals who tried to use dynastic disputes to overthrow rulers. Probably the worst dynastic disputes plagued the Byzantines and also the Merovingian Dynasty in France, which saw many warring brothers and rival queens. The Wars of the Roses from 1455 until 1485 marked the longest period of fighting in medieval England, largely deciding a number of dynastic claims.

In addition to dynastic disputes, rulers in medieval Europe also had problems dealing with important nobles and others who were able to establish large power bases, often in regions of countries. This situation occasionally led to pretenders, often with no real royal connection, trying to rule through rulers and then trying to depose them. In Anglo-Saxon England some Vikings managed to establish virtual fiefdoms in parts of England. Earl Godwin of Wessex (d. 1053) exerted great influence during the reign of Edward the Confessor, leading to his son Harold’s succeeding Edward in 1066. Simon de Montfort (ca. 1165–1218) was able to lead a successful rebellion against King Henry III, forcing the king to call a parliament. Subsequently, Harry Hotspur

DOMESDAY BOOK

The maintenance of the governments of medieval Europe relied on the raising of taxes, and this in turn depended on the maintenance of accurate records by central authorities. The greatest of the early medieval surveys, produced for taxation purposes, was the *Domesday Book*, commissioned by the English king William the Conqueror in 1086. Besides the ambitious scope of the *Domesday Book*, also important were the speed of its compilation and the accuracy of its records, making it one of the best examples of government organization in medieval Europe.

The *Domesday Book* was put together by seven or eight groups of commissioners who worked through various counties collecting information on every village and also noting the estates owned by the Crown and by major tenants-in-chief. Once the information was collected, it was summarized, and this summary forms the basis of the *Great Domesday Book*. It covers most of England but excludes some parts of the north and also the counties of Essex, Norfolk, and Suffolk. For some administrative reason, the three latter counties were not summarized, and the complete returns from them were sent to Winchester, where they form the *Little Domesday Book*. The *Inquisitio comitatus Cantabrigiensis* (The Inquisition of the County of Cambridge), an early surviving draft for Cambridgeshire, helps show how the information was initially collected, as do other extant records for some other counties.

Overall, the *Domesday Book* provides a list of each feudal lord in the country and also the names of all the landholders in 1066 as well as in 1086, which has been used by historians to show how property changed with the Norman Conquest. Similar records, called the *Rotuli hundredorum* (Hundred Rolls), were collected by later English kings, but none was ever as comprehensive as the *Domesday Book*.

(1364–1403) and Richard Neville (1428–71), “Warwick the Kingmaker,” both died on the battlefield trying to control the kingdom. William Wallace (ca. 1270–1305) and Owen Glendower (ca. 1359–ca. 1416), respectively, in Scotland and Wales led initially successful and ultimately disastrous campaigns against the English. In Spain, Rodrigo Díaz de Vivar, “El Cid” (ca. 1043–99), tried to move from being a leading general to establishing his own dynasty in Valencia.

REPUBLICS

There were a few states in Europe that maintained republican political systems. Most were in Italy, with the oldest being San Marino, where the republican tradition dates back to 301. The parliament in San Marino also is said to date back to 301, the year in which the city-state became a republic. As such it has the oldest continuous legislature in the world. Other Italian republics include Venice from the ninth century until 1797, Amalfi from 839 until 1131, Pisa from the 11th century until 1406 (and again from 1494 until 1509), Genoa from about 1100 until 1797, Florence from 1115 (although Emperor Otto I conceded many privileges in 962), and Siena from 1167 until 1557. Nearby Ragusa (Dubrovnik) was a republic from the 14th century until 1808, and Iceland was a republic from 930 until 1262, with the Novgorod Republic in Russia lasting from 1136 until 1478.

PARLIAMENTS AND OTHER ELECTED BODIES

A number of the countries that had kings also had parliaments or other forms of elected bodies. The Viking lands of northern Europe also had a tradition of parliaments that served to restrain the rule of their kings. The Løgting, in the Faeroe Islands, dates from at least the ninth century, but its exact origins are unknown. The Icelandic parliament, the Althing, was founded in 930 at Thingvellir. On the Isle of Man, the Tynwald was established in 979, although many historians believe it can trace its origins to the 800s, when a similar body existed. However, from the 11th century until the 15th century it fulfilled the role of a judicial court rather than creating legislation. From the 10th century there were regional assemblies in Norway, with the system amalgamated in the mid-13th century under King Magnus VI (r. 1263–80).

Poland, which for much of the Middle Ages had a monarchy elected by the parliament, was one of the first places in Europe to hold elections. According to folklore, the first Polish election was held in the ninth century for the legendary Siemowit, who founded the Piast Dynasty. The Polish parliament, the Sejm, dates back to 1182, when it held a meeting at Łęczyca. The original Sejm consisted of nobles, elected from within their number.

The Anglo-Saxons had a system of advising the king through the witenagemot, which is usually described in history books as the “witan.” Its origins were in the Germanic assemblies that were gathered to provide witness to royal grants of land. These operated in parts of England in various forms beginning the seventh century, and initially there were different witanes for each of the Saxon kingdoms. However, with the creation of England under Aethelstan (r. 929–39), the Witan of Wessex came to dominate English politics, al-

though some of the local witanes met until 1065. The most important role of the witan was in the choice of a king. In 1066, rather than choosing the young Edgar Atheling, the Witan of Wessex supported Harold Godwinson’s claim to the English throne, leading to the Norman invasion later that year. The witan also had the right to depose kings, with the Wessex Witan deposing Sigebert in 755 and the Northumbria Witan deposing Ethelwald (r. 759–65) in 765.

When William the Conqueror took control of England, he exercised his rule through the feudal system using a council of tenants-in-chief and church authorities to advise him before he made laws. The system was effective when presided over by somebody with the strength of personality of William the Conqueror, who ruled a land in which insurgencies were organized by the Anglo-Saxons. Although the civil war between Matilda and Stephen (r. 1135–54) did shake it, the system was used to administer England in the absence of Richard I, “the Lionheart” (r. 1189–99), when he embarked on the Third Crusade. However, the absence was to lead to other problems involving the formation of powerful factions, as happened when other rulers left for the Crusades: Robert of Normandy (ca. 1054–1134) on the First Crusade (whose lands were taken from him by Henry I) and Henry of Burgundy, who left for the Second Crusade. Philip II of France (r. 1179–1223) on the Third Crusade and Louis IX on the Seventh Crusade both managed to leave competent administrators behind, and the former was also assisted by the fact that the English king was away for even longer than he was.

In the early 13th century there were important administrative changes in Europe. In 1215 the feudal tenants-in-chief in England managed to force King John to agree to sign the Magna Carta, which states, among other things, that the king cannot collect taxes, with the exception of feudal dues, without the consent of the Royal Council. This change gradually led to the formation of a parliament, with King John’s son, Henry III, having to accept the first elected parliament, which was called in 1265 by Simon de Montfort, sixth earl of Leicester. Members of the parliament were elected from county constituencies, which had a franchise allowing citizens to vote provided they held freehold land producing an annual rent of 40 shillings or more. In addition, boroughs could also send members to the parliament, elected under various laws and charters. The unicameral structure of the Model Parliament of 1295 was adopted by Henry III’s son, King Edward I, and his son, Edward II, separated the parliament into two houses, one consisting of the nobles and the higher clergy and the other consisting of people elected to represent the counties and boroughs.

In Spain the system of *cortes* also had its origins as advisory councils that consisted of feudal lords who advised the

kings of Castile and León—the two entities being combined from 1188. In all the kingdoms except Aragon, within the *cortes* there were three *brazos* (estates): prelates and representatives of cathedral clergy (not clergy from parishes), the *ricosombres* (magnates) and knights, and the representatives of particular towns. In Aragon the kingdom's *corte* divided the magnates into the major nobles and the lesser ones, giving them four estates. With the enlarging of the cities in Spain in the 12th century the kings in Spain started to allow more urban representatives to be members of their respective *cortes*, the members occasionally vetoing decisions made by kings. When King Henry III of Castile came to the throne in 1390 at the age of 11, the *corte* appointed 12 governors to form a regency council. In addition, there were regional assemblies, the most famous being the one that helped with the rule of the province of Biscay, the members traditionally meeting under the famous oak tree in the town of Guernica—the Gernikako Arbola. The extra power of the nobility in Aragon resulted in the kings of Aragon having to grant more privileges to the nobility.

The États généraux (States-general, or Estates-general) in France also originated in an assembly that served to advise the kings of France. As with the English Parliament, traditionally the States-general existed at the behest of the kings, who could technically call it or not as they chose. The manner in which it was called also varied considerably. In 1302 Philip IV (r. 1285–1314) called a large assembly that was representative of the people in order to show the strong support for him in his dispute with Pope Boniface VIII (ca. 1235 or 40–1303). The concept of the assembly as a legislative body came much later, with the term States-general being used for the first time in 1461 and coming into common use from 1484, when the body met at Tours. However, unlike the bicameral English houses of Parliament, the States-general had three assemblies for the three estates of the kingdom: the nobility, the church, and the commoners. It should be noted that some of the nobles attended only through proxy. While the English Parliament gradually made itself indispensable to the governing of England, the role of the States-general from 1302 was solely to counsel the king, only needed to grant subsidies when the Crown wanted funds to fight a war or at other times when large amounts of money were required. However, when Charles VII (r. 1422–61) went to war, he ensured that the States-general gave retrospective support for the taxes he raised. In France the members of the house of the nobility in the States-general were all nominated by the Crown; those of the church were chosen by ecclesiastical bodies. Only the Third Estate (the commoners) was elected, from a narrow franchise.

Elsewhere in Europe several other countries also had advisory bodies that existed on a similar basis. The Estates of

Parliament met in Scotland from 1235; in Switzerland power was in the hands of the Tagsatzung, which consisted of the executive council and the legislative council of the Swiss Confederation. Regional diets existed within the Holy Roman Empire—some, such as that in Brunswick-Lüneburg, having more power than others, such as in Bavaria, where the regional assemblies remained weak until the 14th century. The States-general of the Netherlands emerged from the 15th century, with the first meeting consisting of delegates from the constituent states being held on January 9, 1464, at Brugge (in what was then Flanders and is now Belgium), with regular meetings subsequently held at Brussels. Even in Russia, where the royal rule was absolute, there was occasional reference to “advice” being given by the boyars (nobles), which was important in administrative matters but far less so in policy decisions.

JUDICIARY

The judiciary within the various countries of Europe during the Middle Ages varied considerably. In most places justice was delivered in towns, with punishments involving fines, branding, floggings, and, for major offenses, executions, usually by hanging. In the early Middle Ages there were also trial by ordeal, trial by fire, trial by water, and trial by combat, with little mercy shown to heretics, especially relapsed heretics, who could be executed, usually by burning. Such was the fate of many suspected witches throughout Europe and also the Cathar “heretics” of southern France. Even formerly powerful men like Jacques de Molay (1243–1314), the last grand master of the Knights Templars, could face charges of heresy, Molay's case resulting in his execution by burning in 1314.

LOCAL GOVERNMENTS

Although parliaments were important in medieval Europe, the councils and lord mayors of various cities and towns exerted considerable political influence and power, especially in Italy and Germany, which had many city-states. Some cities held elections for their councils, with elections for the Signoria in Florence being held every two months. Even those councils that maintained a level of democracy were heavily influenced by the city and town guilds. Some of these guilds gained considerable power, the Mercers Company in London quickly emerging as one of the wealthiest and most influential of all. The Mercers Company had more of their members elected as lord mayor of London than any other company, one being Sir Richard Whittington (ca. 1350–1423). At a lower level, throughout medieval Europe, parish councils existed, run through parish churches.

One situation that made some states inherently unstable during the Middle Ages was the fluid nature of boundaries,

which changed with wars and treaties. The collapse of the Western Roman Empire, Viking invasions, the collapse of the Angevin Empire, the Hundred Years' War, the constant fighting in Germany and Italy, and the battles between the Christian kingdoms of northern Spain and also against the Moors led many cities and towns to move from the jurisdiction of one kingdom to another. Combined with these changes there were a few changes in capital: The Western Roman Empire, for example, moved its capital from Rome to Ravenna in 402. The change from Winchester, the capital of Wessex, to London, as the capital of England (though Winchester was still used for administering Wessex until the late 1060s) symbolized the move from an inland capital to one that was a port. In the Kingdom of Asturias in Spain, Pelayo (r. 718–37) established his capital at Cangas de Onís, but his successors moved it to Pravia, and Alfonso II (r. 791–842) moved it to Oviedo. In 1910 León became the new capital, with the kingdom being renamed.

UPRISINGS

In spite of the kings and assemblies, the efficient running of the government relied on the acquiescence of the population. In times of exceptional troubles there were peasant, or popular, uprisings. In England there were three “peasant” revolts: those of William FitzOsbern in 1196, the Peasants' Revolt of 1381, and Jack Cade's Rebellion in 1450—the first coinciding with the emergence of “popular” bandits, encapsulated in the story of Robin Hood. The relative success of the latter two (although the Peasants' Revolt of 1381 was quickly crushed) relied on being able to get large numbers of supporters into London as quickly as possible. In Europe there were similar revolts, such as that in Flanders in 1323–28 and the Jacquerie in France in 1358. Of more importance were the uprisings that took place in city-states, such as the popular insurrection in Florence in 1250 that ended the Ghibelline predominance. These uprisings showed that even though a government run by an unelected ruler did not need to get the support of the people, it still had to placate them.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In a broad sense, the story of government organization in the medieval Islamic world was about a struggle to determine the proper balance between political power, military power, ethics, and morality. In the earliest years of the Islamic world government leaders had little experience in running an empire, and they often used or improvised government institutions left over from the people they had conquered. They looked to the Koran and the Hadith, a compilation of the sayings and actions of Muhammad, for guidance, as well as to

the community of Islamic jurists and religious scholars. More important, there was the well-known Medina constitution, written in 622, which served as a model for the Islamic state during the succeeding centuries. This was a social compact to enable the peaceful coexistence of diverse groups—Muslims, Jews, Christians, and others.

TRADITIONAL GOVERNMENT ORGANIZATION IN ARABIA

A large chunk of northeastern Arabia was under the control of the Sassanian Empire (sometimes called the Persian Empire) in the 600s. The Red Sea coast and southern Arabia sometimes were united under a single government but more often were composed of independent towns near the west coast, farmers in the south, and nomadic herders elsewhere. The southern end of Arabia was often under the control of the African kingdom of Axum, which had a viceroy governing its Arabian holdings. Axum frequently sent its army into southern Arabia to influence local governments.

During the pre-Islamic period government organization among the Arabs was loose, without clear hierarchies or chains of command, and the farther one was from the towns of western Arabia, the looser the organization became. Among the nomads, honor was highly valued, and people, tribes, and clans were judged on the basis of their honor. A clan that failed to help one of its own, failed to show hospitality to strangers, or failed to make common cause with other clans against an outside enemy lost honor. The loss of honor resulted in very real problems, because members of a dishonored clan would have little claim on other clans for help, and members would be scorned even in trade.

There were no written laws for the nomads, who relied on the family as the basic unit of government. Families helped and protected members. Clans were composed of groups of families who had a common ancestor, either male or female, and preferably someone of such honor that he or she had become the subject of songs and poems of praise. Within a clan, a man sometimes rose to prominence and was called a *shaykh*. A *shaykh* had moral authority but no legal authority, so his ability to organize and rule his people depended on how much they respected him. A *shaykh* of proven honor could become respected enough to earn the loyalty of other clans, especially those related by intermarriage. Most of the time a *shaykh* could arbitrate disputes among family members and between clans and could suggest punishment for thieves and other criminals. On occasion, a *shaykh* could acquire such moral authority that he could organize clans into united governments able to wage war.

In the villages and towns of pre-Islamic Arabia families and their clans ran the government. Usually, one family be-

came preeminent in wealth or in moral authority and therefore ran the essential aspects of village or town life, such as the marketplaces and the defense of the village or town. Authority would change when the dominant family dishonored itself or another family became more powerful. Perhaps the key difference between the organization of the nomads and the organization of settled communities was that a *shaykh* in a settled community could use coercive power—that is, he could control a police force, the army, or courts of law, and through any of them force other people in the community to do as he wished. This meant that he could try to make his family's dominant position permanent.

Soon after Islam emerged, the prophet Muhammad became the key figure who tried to provide the people of Arabia with a strong unifying government based on religious principles and practical needs, and during the early decades of Islam his followers fought and defeated the followers of rival groups. Under Muhammad's leadership, until his death in 632, the Medina constitution, or compact, served as the pluralistic model of relatively peaceful coexistence among diverse groups. The first caliphate began with the death of Muhammad.

The loose government organization of Muhammad's time did not mean that his followers were bands of undisciplined cavalry. There was enough warfare before his time for towns to organize their own infantries, and a leader as capable as Muhammad could organize the cavalry of the nomadic clans into units that worked closely with the infantry. Thus, when the Muslims exploded out of Arabia in the seventh century, they met opposing armies with tough infantry units of their own, and their army proved a match in discipline and skill for those of the Sassanian and Byzantine empires.

The early Islamic world was organized under caliphs, who were the successors of Muhammad. Disputes over who was rightfully a caliph led to civil war even during the first few decades after his death. From 632 to 661, during the reign of the immediate successors of the prophet, *Khulafa-ur-Raashidun*—the four "Rightly Guided Caliphs"—and then from 661 to 750, during the Umayyad Caliphate, the office of caliph combined secular and religious authority. The caliph was expected to set the standards for moral behavior and to make final rulings on matters of faith. Ideally, a caliph ruled all of the Islamic world, but only during the first two centuries was this nearly the case.

There were three divergent views of the authority of a caliph. The Sunni view became the dominant one. The name Sunni derived from the phrase *ahl al-sunna wa l-jamaa*, which refers to Muslims who in addition to the Koran are guided by the Hadiths. The Sunnis believed that a caliph should be a member of Muhammad's extended family but,

more important, should be chosen by consensus of prominent followers. The Shia Muslims believed that a caliph had to be a direct descendant of Muhammad. The fourth caliph, Ali ibn-abi-Talib, was such a descendent, the son of the Prophet's daughter, Fatima, and her husband, Abu Talib, the only one recognized as legitimate by Shiites. In the Shiite view, a caliph was both a political leader and an infallible religious leader whose religious pronouncements were to be accepted without question.

EMPIRES OF CITIES

Within a generation or two the Islamic world was an empire that encompassed almost all of the Near East, some of central Asia, and much of North Africa. The new caliphate initially established its headquarters in Damascus (in modern-day Syria), which had been part of the Byzantine Empire for many centuries. The official government language of that part of the empire was Greek. Another center of government administration was the former Sassanian capital Ctesiphon (in present-day Iraq), where the official language was a dialect of Persian. In Egypt the official language of government was Coptic. Since the Islamic scriptures fundamentally accommodated the followers of other faiths, in particular, Jews and Christians ("People of the Book," as they were known to Muslims), often there were non-Muslims in prominent government positions.

Many of the peoples of the Near East had flexible attitudes toward religion. For centuries the Roman Empire and the Parthian Empire had fought each other over the lands of the Near East; then the Byzantine Empire and the Sassanian Empire had continued the fight, weakening each other enough to allow the Arabs to defeat each. The people in the territories that changed hands during these wars often shifted their religion accordingly. They worshipped Rome's gods when Rome was in charge, changing to Christianity when Rome became Christian and worshipping Iranian gods when Parthians or Sassanians were in charge. Perhaps because of similarities with Christianity, shifting to Islam was easy for them, but they could not be counted on to conform to Islamic laws.

Thus it was that in the regions formerly part of the Byzantine Empire, the government was organized as if still under Byzantine rule. The Byzantine government kept a very firm hold on the government organization in its provinces, with governors (called prefects) of cities under the careful watch of officials of the central government. All crafts were carefully organized to serve the state by producing what the state wanted in the quantities it dictated and selling products at prices set by the government. Farming communities paid heavy taxes that provided the principal revenue of the empire. In the eastern part of the Islamic empire, Sassanian



Objects from the Nihavand find, Iran, 11th–12th centuries; the group includes an amulet case, silver plaques, and a belt buckle ring (belts being an emblem of rank) inscribed with the name of a Turkish Seljuk courtier. (© The Trustees of the British Museum)

practices prevailed, including the exaltation of the emperor as more than human, a practice adopted by the caliphs.

It was during the Umayyad Caliphate that Muslim scholarship became of great importance to the Islamic government. While the rulers had little or no experience in governing an empire, there was the model of the Medina constitution for guidance, along with direction from the Holy Scriptures and jurists. Specifically, guidance was also available from the relatively secular, socially oriented Koranic verses that appeared in Medina. By 700 Islamic scholars were transforming the language of government into Arabic, and the central government used Arabic to help unify and organize its imperial government. Some aspects of pre-Islamic practices of Arabia seemed inescapable. There was a tendency in government to treat the caliph like a *shaykh*, the powerful head of a family, and members of his family expected and tended to receive a share of the power and wealth of the government. Nepotism became a common complaint against the government.

Playing on the discontent of the public, the Abbasid family fomented a rebellion against the Umayyad government and overthrew it in 750. The Abbasid Caliphate, centered in Baghdad, was to last until 1258, when the Mongols overran the empire. This era included the most important period of Islamic civilization, the golden age of Islam, during which

the Greek legacy was rediscovered, synthesized, and further developed in all its manifestations, for the benefit of future generations.

The Abbasids organized their empire by cities, with each city having its own governor. The pattern was one of a confederation, with each city being semiautonomous from the central administration. This seems to have been an adaptation intended to solve the problem of ruling an empire with large populations in very different climates—wet to dry and hot to cold, with rich soil and barren soil. Each governor had the power to adjust civil laws to the needs of the land he ruled. A weakness in the confederation was that independent-minded governors tended to manipulate the system of appointments so that they were succeeded by family members, and thus most governorships became hereditary.

The cities had zones of control, forming a pattern that would be imitated even after the Islamic world had fragmented into many independent states. The city itself was the center of Islamic life. Each city had mosques next to markets, and the prestige of a city often was judged on the basis of how many mosques and markets it had and on how large and beautiful they were. The cities were centers for the arts and for learning. In them the *ulema* (an educated class of Islamic legal scholars) formed an important body that could

be consulted by governors and later sultans. A pervasive rule of conduct was the separation of the *ulema* from public officials, the purpose being to maintain the independence of the former so that they could give dispassionate advice to government officials based on their scriptural and philosophical knowledge, without prejudice to any group. One scholar wrote that there was a special valley in hell awaiting members of the *ulema* who accepted social invitations from governors. Such was the influence of the *ulema* that it could stir up revolt against governments and declare leaders unfit to rule because of transgressions against Islam, and their declarations could be used as excuses for overthrowing a leader.

The governor was expected to use the military forces at his command to keep trade routes open and safe. Muhammad had been a merchant, and therefore merchants and trade were highly regarded. Islamic leaders believed their governments depended on the vigor of trade. Just outside of a city was the next zone of control. In a ring around the city were the gardens from which the city reaped fresh produce and where many of its residents worked. Caravans camped in that region, and people seeking employment went into it to find work. It also harbored malcontents and criminals and was a source of vexation for governors. Each city had a police force charged with keeping streets, homes, and businesses safe, but outside the city they had trouble controlling criminals. The farmers of the gardens paid most of the taxes collected by the government. Beyond that ring were desert, steppes, oases, and low mountain areas. This zone was administrated by local chiefs who were subordinate to the city's governor, and it produced surpluses in agriculture and in herds of domesticated animals that the government could collect through the chiefs. The final zone extended into mountainous terrain and remote deserts, far from cities. The people in these areas tended to follow chiefs who ruled as they pleased, with more authority than chiefs in regions closer to a city. Often, the city government accepted the pledges of the chiefs to follow Islam and to provide troops in case of war without asking for more. This zone often was out of the control of a governor, and its trade routes were kept open by the imperial government.

The early Abbasid caliphs reformed the Islamic government. They put imperial administrative power in the hands of a small elite group drawn from their family and clan as well as from others of unquestionable loyalty. Sometimes these officials were Christians or Jews whose knowledge of the intricacies of government bureaucracy made them invaluable. Many people outside the government's inner elite were suspicious of non-Muslims in government, suspecting them of disloyalty, but throughout the medieval era Islamic governments found people of other faiths to be useful for cutting through the numerous intrigues that seemed to incessantly develop among

pretenders to the throne. Further, their professional dedication to running a government made them almost indispensable during transitions between governments.

The office of the vizier, or minister, became perhaps the most visible part of Islamic government. The vizier was the chief executive assistant of a caliph or sultan. He was in charge of running the civil government, except under the Mamluks of Egypt and Syria (1250–1517), when the vizier ran only the treasury. Another important office was that of the *hajib*, who controlled access to the ruler. The government was divided into three parts: the department in charge of writing official documents (and preserving them), the treasury (managing revenues and expenditures), and a military department. A ruler was expected to maintain a strong, well-disciplined army. In addition, the state was obligated to build socioeconomic infrastructure—schools, hospitals, bridges, irrigation canals, and the like—as well as to fund monuments that would attest to the power and cultural glory of Islam. As long as he maintained flourishing trade within his domain and managed tax collection effectively, a ruler could generate funds to fulfill the infrastructural needs of the economy and the social welfare needs of the general public. In much of the Islamic world well-developed infrastructure supported, for example, the irrigation canals that enabled bountiful production of food and generated taxes that kept cities thriving.

The city of Baghdad was an example of what was expected. It was founded in 762 by the caliph Abu Jafar al-Mansur (r. 754–75) as Medina al-Salam (“City of Peace”) and later named Baghdad (“Gift of God”). The city was set in the midst of rich farmlands and designed in the shape of a circle. Over many years great mosques were built in it, and schools and colleges proliferated; the city welcomed trade from all over the world. People speaking hundreds of languages from many cultures walked its streets and attended its colleges. There was a problem inherent in having chiefs and governors responsible for collecting taxes: The chiefs and governors took cuts of the revenues and sometimes just kept all the revenues for themselves. Caliph Hisham ibn Abd al-Malik (r. 724–43) tried to change this by shifting the task of collecting taxes from governors to officials—about like tax auditors—whose sole duty was to enforce the tax laws.

LOCAL VARIATIONS

After 945 the concept of a united nation of Islam became an ideal rather than a reality. The Fatimids (909–1171) had established their own Shiite caliph in North Africa, first in Tunisia but eventually ruling from Egypt. In Spain the last surviving member of the Umayyad family established himself as emir; a descendant eventually proclaimed himself to be caliph, es-

establishing a new caliphate in Spain. This meant that the Islamic world had three caliphs, where supposedly there could be only one caliph. The *ulema* found themselves becoming irrelevant, being pushed aside by military rulers more intent on ruling by force than by consent. By finding ways to support the institution of the caliphate, scholars found ways to justify their position in society as experts on jurisprudence.

The caliph most scholars chose to support was the one without much actual power outside his palace, the Abbasid caliph. Most scholars believed that a caliph should administer the government, should be the final arbiter on matters of faith, and should be a military leader. During the 1000s and afterward many scholars settled on an alternative: that three men could form one caliph. This was unacceptable to the Fatimids, who believed that a caliph was God's voice on earth. It proved to be a practical compromise, however, for most Islamic governments, and it helped preserve Abbasid rule. An Abbasid caliph was characterized as the leader of religion, which gave him moral authority. Other government monarchs found this acceptable because they and sultans like them were given the military role of the caliphate. The third part—government administration—was left to viziers or other chief administrators, usually answerable to the military leaders.

Perhaps the most influential writer on government practices was an administrator for the Seljuks (the first important Turkish Muslim dynasty, ruling from 1038 to 1194), Abu Ali Hasan ibn Ali (1018 or 1019–92), who was better known as Nizam al-Mulk, roughly meaning "Order of the Empire." The son of a tax collector, he won admiration as an expert in the law. He became the vizier of the Seljuk Empire in 1063, and he placed his family in control of much of the empire's civil administration. The book for which he is known is *Seyasak-nameh* (Book of Statecraft).

To Nizam fell the task of transforming Turkish tribes into a centralized state. To do this, he used religion and education to unify the empire. He established madrassas—religious schools—in all the cities of the empire. His hope was to move the Shiites of the eastern part of the empire toward a view more compatible with Sunni beliefs. To help him, he summoned Muhammad al-Ghazali (1058–1111), a political theorist who believed in a system of cooperation between caliph and sultan. These men argued that a caliph had to be a legitimate successor to the Prophet and had the duties of managing worldly concerns and caring for the Islamic faith. Their effort was to provide a philosophical rather than a theological basis for government, one in which a caliph was not the final arbiter of all matters in the Islamic world but was instead part of a government in which his authority was balanced by that of sultans and the *ulema*.

Although the Byzantine government's organization was very influential on the governments of Islam, the Sassanian manner of government became ever-more influential, and it tended to shape Islamic governments in the Near East and India. It gave the central role in government to the king. Kingship was a hereditary office, because a king must stand apart from those he rules in order to make dispassionate judgments about right and wrong. In the Sassanian view, a king was selected by God to rule; that is, he ruled by divine right. To challenge a king was to challenge God. Thus, even a tyrant was to be tolerated. A king could be deposed only if he plainly defied God's will. Many a sultan would build mosques and so on, thus proving that he was doing God's will. Like a caliph, a king was to be wise and just. This notion was central to medieval Islamic concepts of government. When a Muslim geographer visited the kingdom of Mali in Africa near the end of the medieval era, he took pains to praise the people of Mali as the most just in the world, with a ruler who forgave no crimes.

In Muslim India the influence of Sassanian kingship was particularly strong. By the end of the 1200s a sultan in India was considered "the shadow of God"—God's representative on earth, to be obeyed and honored as such. When the sultan gave audiences, those approaching him had to kiss the ground and then kiss the sultan's feet. Failure to follow such rules of decorum resulted in the instant death of the offender at the hands of armed retainers.

In the 1300s Egypt and Syria were ruled by a sultan of the Mamluk Dynasty. The Mamluks organized their lands in a military fashion, perhaps partly because they were military men and partly because they were threatened by significant military enemies—the Ottoman Turks and the Mongols. They divided their land into provinces called *mamlakas*, each with its own capital, a town or city, and each divided into smaller territories. These territories, too, had capitals. A viceroy ran the government of a *mamlaka*, with a council of Mamluk soldiers and scholars that helped make decisions on local policy. A civilian scholar usually led the council. The *mamlaka* government organization had four parts: the Mamluks, the religious scholars, the religious leaders, and the army.

Set apart from Sassanian notions of kingship was al-Andalus, the name for Muslim Spain. In 756 Abd al-Rahman I declared himself the first Umayyad emir of al-Andalus, reigning until about 788. He established his center of power in the city of Córdoba. North of Córdoba, he divided al-Andalus into three marches, or border regions, each centered on a city. The Northern March centered on Saragossa; the Central March centered on Toledo; and the Lower March centered on Mérida. Each city was an administrative center for the collection of taxes, the organizing of military defense, and the

building of public works. Al-Rahman I was particularly desirous of creating a rich agricultural basis for al-Andalus, probably remembering the rings of gardens surrounding Islamic cities to the east, and he had the land of al-Andalus accurately surveyed so that he could organize the land's agriculture efficiently and build irrigation canals where they could bring water to parched, but otherwise fertile territory. His purpose seems to have been to give his cities a sound grounding in the countryside around them, enabling them to survive independently in times of war as well as providing a deep tax base. He and his successors tended to depend on foreigners to man their armies, rather than drafting farmers. This may have been a sign of the importance he placed on the work of farmers, or it may have indicated a distrust of farmers, many of whom were only recent converts to Islam and could switch back to Christianity or Judaism when convenient. If there was suspicion, it eased a little under Abd al-Rahman III, who gave Jewish merchants trading privileges and protections.

On January 16, 929, Abd al-Rahman III (r. 912–61) declared himself caliph, basing his claim on his descent from the Umayyad caliphs and effectively breaking off from the Fatimids and Abbasids. In al-Andalus and much of western North Africa he was regarded as the only true caliph, the others in Baghdad and Cairo being regarded as usurpers. Cities in al-Andalus were run by governors who were responsible for collecting taxes and maintaining public order. The Hafsun clan had taken over much of eastern al-Andalus, and members of the caliph's family had taken control of the cities of Seville, Ronda, and Jaén and taken their territories away from the imperial government, leaving only the province of Cordoba for al-Rahman III to inherit. In only two years, he retook the cities and expelled the Hafsuns from al-Andalus. He later established governors for much of North Africa.

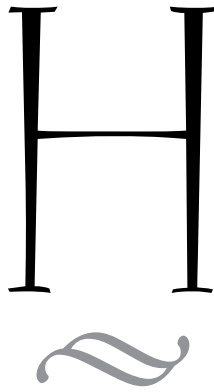
Al-Rahman III reformed the imperial government, centering control of public order, tax collection, and public works in his capital of Córdoba. His government administration was focused on an elite group of administrators, with himself serving as the chief administrator. He was a hands-on ruler, personally visiting parts of his empire and organizing a new irrigation program for farms. He treated foreign policy with vigor, developing a good diplomatic corps and establishing diplomatic relations with the Holy Roman Empire and the Byzantine Empire. Further, he reorganized the military administration, taking authority from regional governors and placing it in Córdoba, where he favored the military leadership of Slavs and Berbers, who served directly under him. An important part of his administration was fostering the arts, literature, and sciences, bringing scholars and poets to his court. His reforms seem to have eased rivalries among dif-

ferent regions of al-Andalus, which some historians credit with fostering the widespread conversions to Islam during his rule. The overall effect was to give his subjects a strong sense of unity.

See also ARCHITECTURE; BORDERS AND FRONTIERS; CITIES; CLIMATE AND GEOGRAPHY; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; FAMILY; FOREIGNERS AND BARBARIANS; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; INVENTIONS; LANGUAGE; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MONEY AND COINAGE; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SCANDALS AND CORRUPTION; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SACRED SITES; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; WAR AND CONQUEST; WEAPONRY AND ARMOR.

FURTHER READING

- Graham Connah, *African Civilizations: An Archaeological Perspective*, 2nd ed. (New York: Cambridge University Press, 2001).
- T. Patrick Culbert, ed., *Classic Maya Political History* (Cambridge, U.K.: Cambridge University Press, 1991).
- Terence Daltroy, *Provincial Power in the Inka Empire* (Washington, D.C.: Smithsonian, 1992).
- Patricia B. Ebrey, *China: A Cultural, Social, and Political History* (Boston: Houghton Mifflin, 2006).
- Thomas Emerson, *Cahokia and the Archaeology of Power* (Tuscaloosa: University of Alabama Press, 1997).
- Rosemary Horrox, ed., *Fifteenth-Century Attitudes: Perceptions of Society in Late Medieval England* (New York: Cambridge University Press, 1994).
- Albert Hourani, "Cities and Their Rulers," in his *History of the Arab Peoples* (Cambridge, Mass.: Harvard University Press, 1991).
- John K. Hyde, *Society and Politics in Medieval Italy: The Evolution of the Civil Life, 1000–1350* (London: Macmillan, 1973).
- Steven Lekson, *The Chaco Meridian: Centers of Political Power in the Ancient Southwest* (Walnut Creek, Calif.: Altamira, 1999).
- James E. Lindsay, "The Political Character of Medieval Islamic Societies" and "Fragmentation of the Caliphate and Perso-Islamic Kingship" in his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- David Nicolle, "Age of the Mamluks," in his *Historical Atlas of the Islamic World* (New York: Checkmark Books, 2003).
- Roland Oliver and Anthony Atmore, *Medieval Africa, 1250–1800* (New York: Cambridge University Press, 2001).
- Timothy Pauketat and Thomas Emerson, eds., *Cahokia: Domination and Ideology in the Mississippian World* (Lincoln: University of Nebraska Press, 1997).
- J. M. Roberts, "The Arab Empires," in his *Age of Diverging Traditions* (New York: Oxford University Press, 1998).
- David Williamson, *Debrett's Kings and Queens of Europe* (Topsfield, Mass.: Salem House, 1988).



► health and disease

INTRODUCTION

Medieval people were not, on the whole, very healthy. Throughout the world infant and child mortality rates were high, and only about half of all children born survived to adulthood. Of those, perhaps another half survived their reproductive years. Women died in childbirth, men died in wars, and both sexes were equally vulnerable to diseases that had no cures and for which treatments were generally rudimentary.

That being said, medical treatment and overall health were not the same around the world. In China, India, and the Islamic world doctors studied for years and actually knew a good deal about anatomy, diseases, surgery, and pharmaceuticals. People in many parts of the world understood the need for sanitation. Western Europeans, on the other hand, lived in extremely unsanitary conditions and were treated by doctors with little or no scientific background.

The causes of most diseases were a mystery to medieval people. Even the best-educated people living in the Middle Ages could not know about microorganisms and the germ theory of disease. Lacking scientific evidence, people did their best to concoct explanations for illnesses and epidemics. For many, sin was believed to be a cause of illness. The Inca, for example, saw disease as a manifestation of a person's sins and thought that disease could best be cured by washing away those sins through rituals and treatments such as bleeding or

enemas. A belief in curses and witchcraft was very common throughout the world, and treatment for illness often took the form of counterspells and charms.

Regardless of what people of the time believed, many medieval diseases such as typhoid and cholera were the result of poor sanitation. Europe was particularly unsanitary. Although Byzantine towns and cities such as Constantinople maintained the old Roman sewer systems, western European threw their food and toilet wastes into gutters running alongside streets. This waste traveled directly to rivers and streams that also served as sources for drinking water.

Other diseases were carried by insects. In Africa and Asia large numbers of people died from malaria, yellow fever, and other diseases borne by mosquitoes and other insects. Travel contributed to the spread of all types of disease. The bubonic plague, for example, traveled from Asia to Europe in the 14th century in the entrails of fleas that infested black rats.

Medical theory generally was based on the balancing various bodily aspects, though the details varied from place to place. Chinese, Islamic, and Ayurvedic medical theory all taught that illness was caused by imbalances of elements such as yin and yang or the four humors of the ancient Greek physician Galen. Doctors used diet, massage, herbs, enemas, acupuncture, and a variety of other practices to correct imbalances and maintain health. Asian doctors, in particular, used such a holistic approach to health. Herbal medicines, many of them developed in ancient times, were common throughout the medieval world. European monks still consulted the

works of ancient doctors such as Dioscorides. Muslim doctors and doctors in China and India used a wide variety of drugs to treat numerous ailments.

Medieval peoples could successfully perform basic types of surgery, though some did not produce the desired effects. Many practitioners knew how to set broken bones. Inca doctors would cut holes in their patients' skulls to treat headaches, and most patients survived this operation. In Europe barbers had the joint duties of cutting hair and conducting such surgical procedures as excising tumors or amputating limbs. In India, Ayurvedic practitioners could remove bladder stones and cataracts. The best Islamic doctors could perform a number of complicated operations, including removal of breast tumors and thyroid cysts.

In many cases basic nursing care was the best that medical workers could offer. European monks and nuns cared for the poor and the sick by providing their patients a comfortable place to rest and a good diet. The Maya used massage therapy to treat infertility and to ease pregnancy. Ethiopian doctors gave their patients steam baths. Islamic doctors built hospitals to provide a comfortable place for patients to receive treatment and convalesce.

Many medieval health practices seem downright dangerous. The Maya would bind the heads of their infants to elongate them, causing the skull to become misshapen. They sometimes gave patients enemas of alcohol, which can be poisonous. Childbirth in the medieval period was extremely dangerous. Midwives or female family members assisted at most births. Most of these assistants had little or no training in obstetrics or hygiene and consequently could offer little real help to mothers who were in trouble. Ill-trained midwives could harm mothers and spread infection from their unwashed hands. Many women bled to death or died from infection after birth. It is no wonder that life expectancies were relatively short.

AFRICA

BY KAREN FLINT

Africa is a huge continent with numerous ecological zones where a number of tropical diseases flourished in the medieval period but also were contained by geographical features as well as by public health initiatives undertaken by local population groups. These diseases included malaria, blackwater fever, yellow fever, sleeping sickness, bilharzia, typhoid, and river blindness. In addition, Africans encountered a number of parasites that not only created their own discomforts but also led to ailments resulting from nutritional deficiency. Malnourishment weakened the immune system, causing greater susceptibility to disease and infection. Persons who

lived in areas with high incidence rates of malaria and yellow fever acquired genetic defenses against these particular ailments but also were more inclined to have sickle-cell anemia, a painful genetic blood disorder. The harsh disease climate led Africans to give their children temporary names and put tattoos and scarifications on their bodies to dissuade the spirits believed to cause disease and death from taking them. Europeans were led by the proliferation of tropical diseases to dub western Africa the “white man’s grave,” and, until the development of antimalarial drugs like quinine, that proliferation largely prevented European settlement in Africa except along the coastline and in the cape of southern Africa, which enjoyed relatively milder disease climates.

The trade routes of Africa, Europe, and Asia effectively exposed the populations of these continents to numerous contagious diseases. The trans-Saharan and Indian Ocean trade routes predate the medieval period, but both saw significant increases in traffic between the 1250s and 1500s, thereby speeding the transfer of trade, culture, religion, and microbes. Population groups along these two trade routes—which included much of western Africa and the coastline of East Africa—had the greatest exposure to worldwide diseases and consequently developed a certain degree of immunity against epidemics. Contagious diseases were passed inland as well, via internal trade routes, though many of these communities suffered less-virulent epidemics. The degree of immunity conferred by previous outbreaks can be seen by the fact that Africa largely avoided the “virgin soil” epidemics that so drastically affected peoples in the Americas and Oceania,



Kilga, a support for a water jar, 12th century; marble kilga were designed to hold a large jar of unglazed earthenware that allowed water to filter through into the stone receptacle beneath, thus filtering the polluted water of the Nile and making it fit to drink. (© The Trustees of the British Museum)

with the primary exception of the relatively isolated Khoisan people, who died in great numbers from diseases like smallpox that accompanied European settlement at Africa's most southern tip. Virgin soil epidemics refer to epidemics that cut a swathe through a population not previously exposed to a disease.

After Europeans traveled to the Americas and accelerated world trade during the Age of Exploration, new diseases were introduced not only from Europe but also from Asia and the Americas. The slave trade, which itself had a devastating impact, served only to heighten this interaction. Given the similar climatic environments in parts of Asia, Africa, and the Americas, global trade facilitated the spread of tropical disease among these three continents. Such transfers of disease intensified with colonialism. European settlement and trade not only resulted in more virulent forms of smallpox and the plague but also introduced whooping cough, cholera, polio, syphilis, tuberculosis, pneumonia, and leprosy. The so-called Columbian exchange between the Americas and Europe introduced new food crops such as cassava and maize, which were readily adopted by Africans, given their larger crop yields, but they provided significantly less nutrition. These factors, in combination with the slave trade, produced a significant reduction in the African population. While the slave trade extended well beyond the medieval period, it is nevertheless important to note the beginning of its impact during this early period. Not only the numbers of persons killed in warfare fueled by European weapons traded for slaves must be considered but also the impact on farming and population growth that resulted from taking the healthiest and most fertile members out of Africa.

How did Africans comprehend the origins of ill health? In many ways Africans understood the body and disease as did other medieval world populations—though such views differed regionally throughout the continent. Although Africans did not believe in the humoral theory that attributed disease to an imbalance of bodily fluids, they nevertheless viewed blood and bile as being particularly important to health and vitality; this can be seen in the bloodletting and medicinal purgatives that were used throughout many areas of Africa. Other Africans told stories of the influence of snakes and bugs that either lived metaphorically within the body or penetrated it and thus caused numerous ailments. Such causes of disease were seen as natural and treated with a variety of natural substances, massage, poultices, enemas, steaming, bloodletting, and minor surgeries. In Ethiopia, vapor baths were used to heal a number of ailments among the royal and upper classes. Such medicinal baths were created by building houses around natural springs as well as by heating water using a fireplace and underground flue that distributed

the hot water and steam into a bathhouse. Other treatments and minor surgeries included those associated with the extraction of teeth, ritual surgeries such as scarification and circumcision, and treatment of injuries.

Not all illnesses, however, were seen as the result of natural forces. Depending on the specific circumstances in which they emerged, certain illnesses could be deemed retaliation by ancestral or territorial spirits or the result of witchcraft. Whether an illness was natural or supernatural was determined by judging the symptoms, the duration of illness, and the social relations of the patient at the time of sickness. Medical treatments to cure the symptoms would be administered, but healers needed to diagnose the root of the illness to adequately eliminate it. Once it was determined, measures were taken to appease or to make reparations to ancestral or local spirits or to find the witch or wizard. In the case of witchcraft, the person accused of practicing witchcraft had either to be killed or to be stripped of his or her powers and sent into exile.

African public health practices can be seen in African architecture, in community planning, and in a strict adherence to rituals and avoidance taboos. Responsibility for public health fell primarily on the kings, chiefs, and healers, though the effectiveness of their measures was dependent upon the compliance of the community. While spiritual elements were often incorporated, African health initiatives resembled many modern public health practices. These included measures to control both epidemics and environmental hazards. Throughout West Africa vaccinating against smallpox was practiced by pricking the arm of a healthy person and rubbing in pus from a smallpox pustule. This practice often could be deadly, but those who survived did gain immunity from the disease. Slave traders in western Africa were said to look for evidence of such immunity on their captives.

To avoid disease and pestilence, Africans often moved entire communities to healthier sites. In Ethiopia people fled to the mountains to avoid pestilence, and the cooler region of Danqaz was chosen as the monarch's headquarters to avoid the plague. In central and southern Africa local populations minimized the threat of the tsetse fly that caused sleeping sickness by creating buffer zones between residential and farming areas and uncultivated areas that contained game which attracted the flies. Likewise local taboos and edicts generally prevented the contamination of drinking water with human and animal refuse.

Given that African ideas of health and well-being were intricately connected and that good social relations played an important role in the maintenance of community health, African public health initiatives also included ensuring rainfall, preventing lightning strikes, and protecting the community

from sorcerers. In East Africa persons suspected of witchcraft, either by causing the illness or death of an individual or by withholding rain from the whole community, would be subjected to a poison ordeal. While this poison ordeal varied from area to area, basically a poison drink prepared by a chief or king determined who had bewitched a community or individual. Surviving the poison was proof of one's innocence.

While much detailed information regarding African health, medicine, and medical practices comes from the period of European contact, particularly the 19th century, there is considerably less evidence for medical practices and the impact of disease in medieval Africa. Ethiopians, Nubians, and Egyptians left written documents that describe health and medicine during the medieval period. A lot of information regarding African health and healing, however, comes from sources written by outsiders, predominantly Muslim traders and, in the later period, the Portuguese who interacted with Africans along the coast from the 1450s onward. Smaller communities and those that were geographically isolated from major trading routes received less attention from outside visitors and remain outside the written record.

Fortunately, historians can assemble information for this early period through oral histories, historical linguistics, and the archaeological record. Oral histories from the ancient kingdom of Mali tell of the important role that kings and blacksmiths played in the maintenance of public health for the community, while historical linguistics tells of common medical traditions and practices shared throughout southern and central Africa. Likewise, archaeology can help date medical paraphernalia such as medicine containers, cupping horns, surgical tools, enemas, and snuff spoons. Medieval African art sometimes depicts not only the use of medical paraphernalia and medicinal plants but also the existence of various medical conditions and diseases suffered by Africans. Finally, by studying the skeletal remains of Africans who lived during this period one can gain a sense of nutrition levels as well as various surgeries that may have occurred or the ways in which broken bones were set. Unfortunately, it is not known with certainty whether specific medical procedures observed in the 19th century were practiced during the medieval period, since many procedures left no tangible evidence.

THE AMERICAS

BY BRADLEY SKEEN

Medical treatment throughout the Americas in the Middle Ages may be termed *shamanic*. It consisted of religious and magical rituals or the administration of herbal medicine (the formulation of which was often obtained through visionary

experience), performed by a healing specialist believed by the community to have special access to the supernatural world. Because of the lack of writing, there is little direct evidence of the characteristic practice of shamanic medicine in most native cultures. However, we have a far better understanding of the specific forms that healing took in the three great American civilizations of the Aztec, the Maya, and the Inca because of either their own written records or the records made by both the Spanish and the natives themselves immediately after the European discovery of the Americas.

In Mesoamerica and Peru, the home of the Aztec (ca. 1200–1521), the Maya (fl. 150–1521), and the Inca (ca. 1400–1532), the average age of adults at death during the medieval period has been calculated as 37. This information comes from examining archaeologically recovered skeletal remains. The average life expectancy must have been much less, since there is no reason to think that many more than half of all children born lived to adulthood. Many factors contributed to this short life span. Perhaps the most important was the absence of the germ theory of disease, leading to the inability to treat illness effectively. The ordinary diet consisted largely of potatoes or of maize and beans and so lacked many elements vital for health. The lack of knowledge about the transmission of disease through insect vectors, such as mosquitoes, also encouraged settlements near lakes and swamps, contributing to the spread of epidemic diseases, among them, yellow fever.

The diet of the Aztec may have been somewhat better than that of contemporary European peasants, for instance, owing to a higher protein level derived from the Aztec habit of eating insects. While ritual cannibalism was widely practiced as part of the Aztec religion, it could not, as has been argued, have been an important part of the people's diet. The sanitation procedures in the Aztec capital city (with at least 200,000 inhabitants) of Tenochtitlán (modern-day Mexico City) seem to have been better than in many other large medieval cities. Tenochtitlán was built on a group of islands on Lake Texcoco, but its water supply was brought in by aqueduct from nearby mountains. Many houses had their own latrines, and there were even public restrooms. Owing to the ease of transport provided by the lake and the canal system, the city's night soil was transported to the mainland each night for use as fertilizer. The government maintained a special labor force to clean the city streets.

The Aztec were aware of simple medical procedures, such as setting broken bones. Such procedures usually were done by an herbalist, who could also perform simple surgeries. (Without steel to make scalpels, the herbalist relied on obsidian knives.) However, there were essentially three levels of medical treatment available, depending on the patient's



Stone pipe in the form of a squatting figure, Paint Creek, Ross County, Ohio, North America; Mississippian Period, 1200–1500; such pipes were used in ceremonies to ensure both the health of the community and the maintenance of the power of the principal clan. (© The Trustees of the British Museum)

understanding of his own condition or on the advice given from divination or other sources. Disease or accident might be caused by divine disfavor. In that case, a priest would perform divination (sometimes via interpreting an experience of the divine world he would induce using hallucinogenic drugs) to determine which deity the patient had offended and whose displeasure he had incurred. The herbalist would then prescribe the appropriate rituals the patient had to perform in order to be relieved. If, on the other hand, the patient believed that he had been cursed by a witch, he could consult a witch doctor, or *tlictil*. This specialist would then determine which spells the witch had used and enact appropriate counterspells.

If the patient believed that his condition had a natural cause, he would turn to the herbalist. The plant materials could be administered variously: by applying the plant as a poultice over a wound or a broken bone or by boiling it into either a drink or a compound for general anointing of the whole body. Moreover, each drug used by the herbalist was said to have properties against numerous different conditions, and the particular condition of any patient had to be treated by a unique combination of drugs determined by the herbalist. Therefore, it seems very unlikely that any pharmaceutically active qualities of the herbs involved actually

benefited the patient. Tobacco could be used for almost any medical condition.

The differences among the three kinds of treatment are not entirely straightforward. If a warrior suffered a wound in battle, for example, and had a dressing applied by an herbalist, he still might easily believe that the ultimate cause of the wound had been the will of a god or the curse of a witch and seek further treatment elsewhere. The Aztec idea of “natural cause” was far different from ours: For instance, the Aztec believed that an infant would naturally fall sick if an adulterer or a homosexual entered the room in which it was sleeping.

Mayan cities were essentially royal courts with attached temples and ceremonial complexes. The peasant population was spread out over the countryside, so the Maya did not have to deal with the health and sanitation problems of large concentrations of people, such as in the Aztec capital of Tenochtitlán.

Mayan medicine shared many features with that of the Aztec culture. The setting of broken bones was possible, and simple sutures closed wounds. Women were actively involved in many Mayan professions relating to health. Herbal medicine was used, as were priestly shamanic practices in an attempt to determine the supernatural cause of disease. Chocolate, in particular, was considered an effective treatment for almost any disease or medical condition. The Maya possessed a wide range of effective drugs that could be used to ease sleep, induce hallucinogenic experiences that were often given a religious interpretation, or numb pain. These drugs allowed an extensive practice of dentistry. Fillings were made from iron pyrite (fool’s gold) or out of semiprecious stones, such as jade or turquoise, but they seem to have been used mostly for cosmetic purposes (for example, to introduce a small jade medallion into each tooth that would be visible in a smile) rather than to treat tooth decay. The usual treatment for toothache (short of pulling the tooth) was to exorcise the “worm” causing the pain.

Mayan aristocrats had an extensive culture of health whose practices cannot be described as either purely religious or purely medical in character. These practices began in infancy, during which time children’s heads were bound in order to produce a somewhat flattened face and an elongated skull, because this head shape was considered by Mayan physiognomy (the pseudoscience of predicting character from the shape of the head) to be indicative of a superior individual. It can be seen in a highly exaggerated form in the characteristic idealizations of Mayan art.

It was also thought that saunas, massage, and enemas generally promoted health, though their purpose was as much for ritual purification as for inducing physical effects. The idea was that these practices helped restore physical and

spiritual balance. Such was not necessarily the case. Frequent enemas, for instance, can actually interfere with the absorption of nutrition from food and result in starvation even in a person eating a healthy diet. If, as seems probable, the Maya introduced such drugs as tobacco (nicotine) and alcohol into the body through enemas, this practice was extraordinarily dangerous because lethal doses could quickly be absorbed through the bowel. An outgrowth of massage therapy was the practice of treating women for infertility and other characteristic problems, such as menstrual cramps or menopausal discomfort, by actually breaking and resetting bones in the patient's abdomen.

The Inca believed that disease was caused by sin. The sin a person committed manifested itself as a harmful presence in the patient's body. In order to cure the patient, the sin and its physical effects had to be washed away. Healers could attempt to wash away sin in several ways. One way was to give the patient a drink or an enema with specific herbs that were believed to be effective for the apparent illness. The sin and illness could be sucked out if the patient had sores or lesions containing a liquid, such as pus. The patient could be bled in the hope that the illness would drain away with the blood. The patient's clothes could be thrown out in the hope that whoever took and wore them would take the illness with him. In any case, the patient had to confess all of his sins to the physician. All of these activities would be accompanied by rituals of divination and propitiation of deities. The public health of the Inca Empire was promoted by the Citua ceremony, the ritual purification of the capital city of Cuzco held every spring. Sin and illness were driven out of the city by priests and warriors and sent away down rivers to the ocean, just as they were driven out of a sick patient's body by the physician.

Despite this highly mythological conception of disease and its cure, the Inca did have practical medical knowledge. Coca leaves (a plant native to the Andes and the source of the modern drug cocaine) were chewed as a stimulant and a cure-all. Trepanation is a surgical operation in which the physician cuts a small hole into the skull of a patient, either for some medical purpose, such as to relieve pressure after a head injury, or for various ritual purposes. The hole could be made with a drill or with abrasives (particularly in the Mayan culture). Its practice in the past can be detected archaeologically by finding skulls with the characteristic healed-over holes (the bone will fuse back over the hole but not with the original thickness) and from surgical implements designed for the operation.

The procedure was invented in prehistory and was practiced worldwide. It was certainly practiced throughout the Americas, but it had a special prevalence in the culture of the Inca. While the Maya used trepanning mostly as part of their

interest in reshaping the human skull, the Inca seem generally to have used it for medical purposes. Trepanning is effective in reducing swelling after a serious head injury, but it was used just as often to relieve headache, for which it could have had only a placebo effect. Studies of trepanned skulls suggest an amazing 70 percent survival rate among trepanned patients.

Understanding the medical practices of Americans outside the Maya, Aztec, and Inca civilizations is problematic. We have no written sources for other parts of North America north of Mexico, and archaeological research offers little help. Mended bones and trepanned skulls have been found, but it would be difficult to identify a stone tool as being specifically surgical. Plant material would not survive to be found by archaeologists. The usual procedure therefore, when dealing with medieval American civilizations of North America, is to infer their medical practices from the Mesoamerican world or to derive information from the traditions of modern successor peoples whose cultures seem to be descend from the medieval civilization.

The Anasazi (ca. 900–ca. 1300) civilization seems continuous with those of modern-day Pueblo tribes. While they did not disappear, their large settlements and structures in the four corners area of the Southwest were relatively quickly abandoned, so that public health issues were probably never fully addressed. Settlements such as those at Chaco Canyon or Mesa Verde had large saunas, suggesting that they were used in common by the aristocratic class, if not the entire population. Pueblo people still use the sauna, but in connection with the rites of the Kachina religion, which postdates the Anasazi culture. It is therefore possible that the more ancient saunas were used for health-related reasons, as in Mayan culture.

In the case of the Mississippians (mound builders centered at Cahokia in southern Illinois and diffused up the Ohio valley, dating to ca. 750–ca. 1500), archaeologists turn to the Choctaw and Chickasaw people to help understand the earlier culture. The primary traditions about medicine that survive concern herbal medicine. Shamans among these peoples believed that their knowledge of herbal medicine came from visionary experience of the teaching of a forest spirit manifest in the form of a tiny human being. Storytellers relate that those destined to be shamans were kidnapped by this spirit and taught herbal lore before being returned to their parents. In other respects, the city of Cahokia grew rapidly from a population of as few as 1000 in about 1050 to as many as 40,000 by 1400, when the site was abandoned. It must have had adequate public health measures, though the site has not been excavated thoroughly enough to tell exactly what these were.

The same kind of shamanic herbalism was common throughout North America. The Sioux shaman Black Elk

described in the 1920s how he had had a dream in 1890 in which supernatural beings pointed out to him a new medicinal plant as well as its purpose and the means of applying it. The next day he found a plant previously unknown to him and identified it with the one from the dream. This pattern of identifying and prescribing herbal medicine based on visionary experience seems to have been commonplace among many native peoples in the 19th century and can reasonably be inferred back to the Middle Ages. Exact patterns vary between tribes and probably changed over time. For instance, among the Ojibwa female shamans identified the plants to be used, while male shamans devised the rituals and ceremonies to be used in conjunction with them.

We have some historical information about the Arawak, Carib, and other peoples living on the Caribbean Islands and coasts at the time of the Spanish conquest. Although colored by Christian antagonism to traditional religion, Spanish writings suggest that the practice of medicine among these peoples was largely shamanic. The primary emphasis was on the belief that illness was caused by evil spirits entering and attacking the body and that these spirits had to be expelled through ritual actions (exorcisms). The use of herbal drugs played a part but was not the most important element. The same is generally true of medical practice among peoples from the interior of South America in later times and was probably not much different in the Middle Ages. There is some evidence of large settlements in South America whose inhabitants must have understood something of public health measures.

ASIA AND THE PACIFIC

BY TOM STREISSGUTH

Two of the world's earliest medical sciences originated in Asia, where the civilizations of India and China had fully developed systems of diagnosis and treatment of disease by the first millennium of the Common Era. Chinese medical tradition harkens back to a classic text, of uncertain date, attributed to Huang Ti, the Yellow Emperor. The basic precept of this work and all Chinese medicine is the opposition and balance of two basic principles: yin and yang. According to this tradition, the attainment of balance between these two principles allows the patient to achieve good health and a long life. Loss of yin-yang balance and harmony results in disease.

The Chinese physician also employed the principle of five basic elements: wood, fire, earth, metal, and water. Interactions of the five elements had an effect on the physiology and functioning of the body and the occurrence of disease. Diseases were endogenous (in which the causes lay within the body and the emotional state of the patient), exogenous (caused by exterior environmental factors, including climate,

temperature, humidity, and precipitation), or caused by miscellaneous factors such as accidents, poor diet, sexual habits, or disease brought on by overstimulation of the body and the senses. Observation of the body was carried out by visual inspection, the posing of questions, olfaction (smelling), and feeling the pulse.

The Chinese physician put great store in the condition of the pulse. The pulse gave many indications of the state of the body, and some doctors spent long hours in interpreting its speed, intensity, and rhythm. The pulse indicated the heart rate and rhythm, the condition of the blood and arteries, the blood pressure, and the severity of disease. *Mai ching* (The Pulse Classic), written in the third century, was a respected text on this subject used in China throughout the medieval period. The book spread via trade routes to the rest of Asia, India, and the Middle East, where it was considered a standard text on the art and science of reading the pulse.

Many therapies were available to the Chinese physician to restore the body's needed harmony. *Qigong* were breathing exercises. Acupuncture was a method of puncturing the skin at certain points to relieve pain and release unhealthy energy. The practices of acupuncture and moxibustion (the application of the ground-up mugwort herb) spread to Japan and Korea and eventually throughout eastern Asia as Chinese traders and physicians migrated beyond the borders of the empire. The Chinese also had an extensive catalogue of herbal remedies, dietary prescriptions, massage, and physical exercises designed to release harmful energy.

Drug therapy, using mineral and plant material, was used as a last resort to treat disease. The *Shennong bencao jing* (Shennong Emperor's Classic of Materia Medica), the standard text in this field, recorded 365 kinds of drugs, including many that are still used and considered effective. Around the same time as this book was written in the second century B.C.E. a method of anesthesia was first developed by the physician Hua Tuo.

The treatment of disease considered the state of the body as a whole rather than as an assembly of independently functioning parts. This feature of Chinese medicine distinguishes it from the science of medicine as it was developing in Europe during the Renaissance of the 15th and 16th centuries. Rather than the disease, the entire patient was treated to bring the five basic elements and the yin and yang principles back into their proper balance. Much of the prescribed treatments came from a work of Zhang Zhongjing, *Shanghan zabing lun* (Treatise on Febrile and Miscellaneous Diseases), dating to the second century C.E. Another respected work was the *Zhou hou bei ji fang* (Handbook of Prescriptions for Emergency Treatment), written in the fourth century by Ge Hong, who was the first to describe smallpox. Describing the treatment

of rabies in his work, Ge Hong suggested applying a small amount of infected tissue to healthy patients as an inoculation against rabies. This was the first instance of vaccination and the predecessor to the smallpox vaccines that were introduced in China in the 1500s and in the West in the 1700s.

The Tai Yi Shu, or Imperial Academy of Medicine, was established during the Sui Dynasty (598–618) and was one of

the world's first colleges of medicine. It trained physicians in internal medicine, pediatrics, massage, and incantation. Students apprenticed to a master who prepared them for their roles as doctors, assistants, nurses, and pharmacologists. Students were subject to frequent examination and rigorous qualifications. During the Sung Dynasty (960–1279) China also pioneered the field of medical criminology and the examination of the dead to determine cause and time of death. The principles were applied to cases in which suicide or homicide was in question, and evidence gathered by physicians was considered valid in criminal cases against suspected murderers.

Medical ethics was an important field of study in medieval China as well. A book entitled *Beiji qian jin yao fa* (Prescriptions for Emergencies Worth a Thousand Pieces of Gold), written by Sun Simiao in the seventh century, treated the conduct of the doctor, instructing that the physician should practice diligence in study; treat all patients regardless of their rank, age, or gender; and take the greatest care when making diagnoses and prescribing treatment. In addition, doctors should refrain from criticizing others of their own profession and avoid jealousy or an arrogant posture.

As contact increased in the early medieval period between China and neighboring states in Korea and Japan, disease epidemics became more common in these outlying areas. In 735 a devastating smallpox outbreak occurred in Japan, brought first to the northern port of Kyushu from Korea. Several more outbreaks over the next two centuries had a devastating effect on Japan's society and economy. Mystified by the workings of the malevolent spirits whom they believed had brought the epidemic, the rulers of Japan turned to a caste of Buddhist monks, who employed effigies, astrology, and ritual to combat the disease.

In Southeast Asia the medieval civilizations of Thailand, Burma, Laos, and Vietnam all had traditional medical texts, which listed diseases and their descriptions and remedies. Influenced by medical theories of China and India, these works were preserved in court libraries and frequently copied out for the use of royal physicians. Parasitic diseases of the digestive system, including cholera and dysentery, were common subjects of medical treatises in the region.

The people of the Pacific Islands and Australia were largely isolated from these outbreaks but still had to deal with endemic diseases, particularly malaria. Migrants from Southeast Asia and the East Indies who spread through the western Pacific brought with them respiratory infections, enteritis, arthritis, yaws, and a skin inflammation known as filariasis. Ciguatera, brought on by eating poisonous reef fish, was combated with purges, while other digestive diseases were often treated with healing massage and herbal remedies. Witch



Standing Bhaishajyaguru, the medicine Buddha, cast bronze with gilding, Korea, ca. 668–800 (Los Angeles County Museum of Art, Purchased with Museum Funds, Photograph © 2006 Museum Associates/LACMA [M.2000.15.123])

THE HEALING TEMPLES OF HAWAII

The Hawaiian *heiau ho'ola*, or healing temple, was a unique institution in Polynesia. Those taken ill and unable to combat disease on their own or with the help of a family elder paid a visit to the *heiau ho'ola*, which was consecrated to one of the Hawaiian gods. Home to the *kahuna la'au lapa'au*, or herbalists, and *kahuna lapa'au*, or healers, the *heiau ho'ola* served many different functions. It was a training center for medical students and also served as a research center for the gathering and testing of medicines. It offered pregnant women a birthing place and a child-care center. Physicians at the temple performed simple surgeries and healing massage, set broken bones, and called on spiritual forces for the purpose of healing disease and bodily disharmony.

The system of healing—both practical and spiritual—worked well throughout the medieval period, when Hawaiians were largely isolated from the epidemic and endemic diseases that were more common in the rest of Polynesia. Most medical problems were related to injury or poor functioning of the digestive or nervous system, which the Hawaiians put down to disharmony of the body's spirit or the displeasure of the gods. This era came to a sudden end with the arrival in 1778 of Captain James Cook and his crew, who brought a range of deadly infectious diseases previously unknown in the Hawaiian Islands.

doctors, always male, were trained in the folk medicine and ritual necessary to combat disease and heal injuries.

Precepts of Chinese medicine spread through Asia as the powerful imperial dynasties, particularly the Ming Dynasty (1368–1644), gained in social and political influence. On the Indian Subcontinent, however, a long-established system of medicine known as Ayurveda had been in use for millennia. This medicine arose from the ancient religious texts known as the Vedas and from ancient practices that combined systematic observation with magical prescriptions for the treatment of disease.

Ayurveda dealt with the spiritual and physical condition of the patient. This system of medical practice and training was passed on orally from masters to apprentices. The Ayurvedic tradition held physicians to a life of chastity, modesty, study, and the avoidance of meat and alcohol. Doctors were trained for seven years and continually tested on their knowledge and skills. They learned through observation, as

dissection was prohibited by religious doctrine. Ayurveda conceived of three basic *doshas*, or aspects: *vata* (air, corresponding to the working of the nervous system), *pitta* (fire, the digestive system), and *kapha* (water, the system of blood and nutrients). These aspects in turn were composed of five elements: space, air, earth, fire, and water. In observing patients, Ayurvedic physicians examined the breathing and pulse, which was checked on both wrists. They listened carefully to the heartbeat, which was considered the indicator of life force within the body by its speed, rhythm, and strength.

Treatment of disease was carried out by the use of emetics to induce vomiting; purgatives, or enemas mixed with oil, water, and herbs; and the administration of herbs designed to cause sneezing and the expulsion of unhealthy humors. Indian physicians used leeches to bleed the body and employed cupping, in which a vacuum is created by the application of a hot glass or cup to the skin and then allowing the air to cool and form a vacuum that creates intense pressure on a localized area. Physicians prescribed a strict diet and a ritual cleansing of the body as means of prevention. They performed various forms of surgery, including the setting of broken bones, removal of bladder stones, removal of cataracts, and suturing of wounds.

Ayurveda considered the effects of certain foods on the body and classified food as *madhura* (sweet), *amla* (sour), *lavan* (salty), *katu* (pungent), *tikta* (bitter), and *kasaya* (astringent). All foods and herbs, according to the practice, had these properties in various proportions and could be used as medicine and to maintain health. Physicians combined herbs with minerals, animal parts, oils, cooked food, and water for treatment. Purification techniques were applied to cleanse the body of disease-causing humors and included diet, massage, purgatives, enemas, and sweating. Massage was another central feature of Ayurvedic treatment, designed to relieve pain and nervous anxiety, ease sleep, calm the emotions, and improve the digestion and the circulation of the blood. Massage was believed to release poisons and allow the body to eliminate them naturally.

Ayurveda formed the philosophical foundations for later medical treatises. The original Vedic texts were revised by the physician Charaka in his work known as the *Charaka samhita* (Compendium of Wandering Physicians). Another important medical text was the *Sushruta samhita* (Shushruta's Compendium), written by the renowned surgeon Sushruta. In the medieval period Ayurvedic medicine was divided into eight branches of study: surgery, pediatrics, internal medicine, toxicology, purification, longevity, spirit, and the study of the eyes, ears, nose, and throat. The distinct schools were founded by different masters at various times, and they have basic texts that were emended in the medieval period.

EUROPE

BY BRADLEY A. SKEEN

During the Middle Ages no one had any idea that microorganisms could cause disease. Medieval Europeans relied on the authority of the Bible, and disease, whether personal or epidemic, was usually seen as either a divine punishment or the work of demons or witches. Consequently, systems of public hygiene were rudimentary at best. Constantinople, the capital of the Byzantine Empire, maintained its original Roman sewer system, built in the third century, which routed waste through underground conduits with water flowing constantly to the ocean. In most other European cities, however, sewage was thrown into gutters or (especially as city population expanded after about 1300) into underground dry sewers, to be washed into the local watershed (usually a nearby large river) only when it rained. In the countryside night soil was generally kept for use as fertilizer in agricultural fields. In his writings the Arab explorer Ahmed ibn-Fadlan mentions that the people of Kievan Rus (in modern-day Russia) in the 10th century practiced the quarantine of any ill person. However, such measures probably were motivated by the desire to isolate spiritual pollution. Leprosy was an exception and was routinely dealt with in Europe by lifelong quarantine of lepers.

The lack of public hygiene in medieval culture combined with the absence of any effective treatment of infectious disease contributed to an infant mortality rate so high that no more than half of everyone born could expect to live to age 18. Women of childbearing age died at almost the same rate because of the inability of midwives to stop bleeding or to otherwise aid difficult births. (A cesarean section, for instance, was routinely used only on mothers who had already died from complications of labor, since its use on a living mother scarified her for the life of the child.) Given the high mortality rate from simple infections, probably only about half of those who survived childhood lived past their reproductive years, attaining ages 40 to 50. The biblical life span of “three-score and ten”—70 years, less than the average age attained in western Europe today—was considered a divine blessing. For these same reasons royal and noble lineages did not usually last more than a few generations.

The main inheritance of medieval medicine from antiquity was a sense that medicine was a rational practice based on a sophisticated understanding of the physical world rather than the magical healing practices of the folk tradition or the hope of curing disease through prayers and appeals to the shrines of saints (although this was probably as common a way to treat disease in the Middle Ages as was turning to medical practitioners). Medical practice existed primarily in three places in the culture of medieval Europe: the monas-

tery, the village, and the university. In the early Middle Ages only monks had any access to the few ancient medical texts that survived. Moreover, the medical care of the poor was an important aspect of Christian charity that occupied many monks and nuns. Care provided by monastic institutions usually consisted of bed rest, a healthy diet, and the use of herbal medicine.

One of the most important medical books circulating in the West was the herbal text of the ancient Greek author Dioscorides (ca. 40–ca. 90). This work is an exhaustive treatise on the preparation of medicines from plants. However, it is unlikely that many of the medicines (except for a few, such as sleeping potions made from the opium poppy) were actually effective. The book is divided into entries by individual species of plants, and it is now usually impossible to identify precisely the plant to which an entry refers. Each plant might be said to be effective for 50 to 100 different symptoms. With the lack of any scientific method of testing their results, even the herbalists (or apothecaries) who practiced such medicine could not have determined whether the treatments were effective. In such traditions, any recovery from illness or alleviation of symptoms is usually attributed to the medicine given, while failure of the same medicine in a different instance is explained away. There was no shortage of medieval writers, from Saint Augustine (354–430) to Saint Bernard of Clairvaux (1090–1153), who argued that medieval medicine was a sort of high-sounding fraud unable to cope with disease.

A common medical practitioner in the villages in which most medieval people lived, and especially in the cities, was the barber-surgeon. He (the profession was exclusively male) was called upon to perform such simple surgeries as were possible, including extracting teeth, setting broken limbs, rearticulating dislocated joints, and excising tumors and other skin lesions. Barber-surgeons worked with Hippocratic physicians and often bled patients under their direction. Barbers were especially useful in military camps, where they would routinely perform amputations; usually the only way to stop a serious arm or leg wound from bleeding was to saw off the limb and cauterize the stump using a red-hot piece of metal. (There was, of course, no form of anesthesia available.) Midwives (exclusively female) would use similar hands-on methods to help deliver babies. Without knowledge of the germ theory of disease, barber-surgeons and midwives did not clean surgical instruments, and these inevitably became a means of spreading infection from one patient to the next.

The other common medical practitioner in the village was the cunning man or woman. This tradition probably went back to pre-Roman Celtic, Germanic, and Slavic cultures. Cunning men and women essentially believed that disease was caused by witchcraft. They would often try to discover



Late Saxon/Norman woman's skeletal feet, showing signs of arthrosis and fused toes, Britain, 11th–12th centuries (© Museum of London)

the identity of the person who was bewitching the patient and neutralize the original spell. Alternatively, they would cast their own spells to promote healing and also give out herbal remedies, using different (if no more reliable) principles than did the monastic herbalists.

The medical science of the ancient world was essentially Greek and was written about in that language. Only a small portion of the available medical texts had been translated into Latin before the collapse of the Western Roman Empire. However, most of the ancient medical writings in the Hippocratic corpus (fifth century B.C.E.) and of the influential physician Galen (129–ca. 199) had been translated into Arabic in the Islamic world, and extensive commentaries and expansions of them had been written as well. These became available in western Europe during the Little Renaissance of the 12th century. In the 15th century more Greek texts became directly available from Constantinople (where the practice of Hippocratic medicine had continued uninterrupted throughout the Middle Ages). Hence, medieval universities became new centers for educating Hippocratic physicians. Usually a student would complete a basic university doctorate in the liberal arts and then spend an additional year in medical studies. The universities at Salerno and Bologna in Italy and at Montpellier and Paris in France became the leaders in medical studies. In the 14th century medical students at these schools, for the first time in history, routinely learned anatomy through observing the dissection of human cadavers.

Jews were somewhat ahead of other Europeans in academic medicine. A Hebrew language medical literature existed in the Islamic world, based on the more sophisticated

Arabic rendering of ancient medicine. These writings also freely circulated among Jewish physicians living in western Europe. Thus, in the early Middle Ages, Jewish physicians were highly regarded, though this predominance was eclipsed as university-educated Christian physicians absorbed translations of Arabic medical texts.

Hippocratic medicine, named for the Greek physician Hippocrates (460 B.C.E.–370 C.E.), held that the body was made up of four liquids, called humors: blood, phlegm, bile, and black bile. These humors corresponded to the four elements that ancient Greeks believed made up the universe: fire, air, water, and earth. Each humor also had two of the four qualities: hot or cold and wet or dry. Blood, for instance, was hot and wet. These substances should not be confused with elements of the body that modern medicine calls by the same name. What a medieval physician understood as “blood” was far different from what a modern physician understands by the same term. The blood that could be seen flowing in the veins was thought to be a combination of the humor blood with traces of the other three humors mixed in. The humors were manufactured by individual organs: The gallbladder, for instance, produced black bile, while the liver made blood. (This was transported throughout the body by the heart and “eaten” by the other organs, so blood was constantly created anew rather than recirculated.)

In the Hippocratic view a healthy body held the four humors in balance. Balance was to be maintained through diet and exercise and restored by the same means if an imbalance resulted in disease. The balance or imbalance of the humors was called the patient’s complexion. A person might, for example, have a sanguine (bloody) complexion and be hot tempered and fiery. Individual organs, too, were said to have complexions: For instance, the brain was cold and wet and the heart hot and wet. Women were thought to be weaker and less capable than men because they were colder and wetter. Races were stereotyped in this way as well, with Ethiopians considered to be hot and dry, while Scythians (Russians) were cold and wet. The ultimate cause of variations in complexion was the astrological influence of the stars, so the pseudoscience of astrology became an important tool of medical diagnosis.

The Hippocratic physician checked the balance of the humors by examining human waste products to determine the balance in them between wet and dry and hot and cold. If an imbalance resulting in disease symptoms became too great, physicians would allow herbalists to prescribe medications that they believed would increase or decrease the production of the unbalanced humor. Many diseases are accompanied by fever, the heat of which the Hippocratic physician attributed to an excess of blood. Thus, patients exhibiting fever were frequently sent to a barber-surgeon, who would open

a vein purposely to bleed a patient and reduce the excess of blood. Alternatively, the blood could be extracted by applying a leech (a small, blood-sucking eel). For this reason *leech* was formerly a standard title in English for any kind of healer. Increasingly in the later Middle Ages physicians themselves took over the actual procedure of bloodletting. Imbalance of the humors could be corrected by other procedures also. Smallpox pustules, for instance, seem wet and cold, so they were treated by wrapping them in red bandages, since the color red was hot and dry.

In time university-trained Hippocratic physicians came to dominate over the social position of other kinds of practitioners because their education appealed to the aristocratic classes. They took over the institutions of public medicine as these institutions were established in the growing cities of the later Middle Ages. Thus, they carved out the social status associated with the modern physician as a university-trained intellectual in charge of public health as well as private medical practice, without using any techniques or therapies still practiced or considered legitimate today.

THE ISLAMIC WORLD

BY DAVID W. TSCHANZ

In the prologue to the *Canterbury Tales*, the 14th-century English poet Geoffrey Chaucer identifies the authorities used by his “Doctour of Physic.” Not all were Western Europeans. Among the ones he cites are “Avycen” (Ibn Sina, known to the Western world as Avicenna), “Averrois” (Ibn Rushd, or Averroës), “Razi” (ar-Razi, or Rhazes), and “Haly” (Ali ibn Isa, or Jesu Haly). The Arab physicians Ali ibn Isa, ar-Razi, Ibn Sina, and Ibn Rushd were cited by Chaucer for the same reason that European medical schools used their textbooks and Western scholars regarded them as medical authorities for centuries. First discovering, then translating, and finally adding to the Greco-Roman heritage that Europe had lost, medieval Arab physicians laid the foundations for modern medicine and created some of its institutions.

By the middle of the fifth century C.E. a series of barbarian invasions had caused the collapse of the Roman Empire in the West. While Europe stagnated in the wake of this onslaught, Islamic civilization rose in the east. Islam’s birth and the period of political expansion that followed led to a period of sustained progress and development in all branches of learning. The Arab conquerors not only achieved political supremacy but also assimilated the cultures of their subjects. Muhammad’s insistence that the Koran be studied only in Arabic meant that a single language brought together peoples from the Rann of Kutch, a salt marsh in northwestern India, to the Pyrenees, the mountain range that divides Spain from France. Arabic rapidly became the language of

literature, art, and science as well as the common tongue of learned men.

Medicine was the first of the Greek sciences studied by Islamic scholars. Following the conquest of Persia in 636, Arab rulers gave active encouragement and support to the great medical school at Gundishapur, the old Sassanid capital in what is now southwestern Iran. For 200 years Gundishapur was the greatest center of medical teaching in the Islamic world. There Islamic physicians familiarized themselves with the works of Hippocrates, Galen, and other Greek, Roman, and Byzantine physicians. At the same time they were exposed to the medical knowledge of Persia, India, and China.

Recognizing the importance of translating Greek works into Arabic to make them more widely available, the Abbasid caliphs Harun al-Rashid (r. 786–809) and his younger son, al-Mamun (r. 813–33), established a bureau of translation in Baghdad. The most important of the translators was Hunayn ibn Ishaq al-Ibadi, who was reputed to have been paid for his manuscripts by their weight in gold. He and his team of translators rendered the entire body of Greek medical texts, including all the works of Galen, Oribasius, Paul of Aegina, Hippocrates and the *Materia medica* of Dioscorides into Arabic by the end of the ninth century.

Muslim medical practice was primarily based on the Greek physician Galen’s concept of humors and their role in health. This theory held that the human body is made up of the same four elements, which constitute the entire world—earth, air, fire, and water. These elements could be combined in various ways, and the mixtures in turn gave rise to different human temperaments and humors, or body fluids. Galen identified the four humors that govern the human body as blood, phlegm, yellow bile, and black bile. When the body’s humors are in their correct proportions, a person is healthy. Sickness, the absence of health, was not thought to be due to supernatural forces but instead caused by an imbalance among the humors. This imbalance could be corrected by a skillful doctor.

While the development of uniquely Islamic clinical medicine was delayed by the monumental task of translation that went on in the ninth century, major advances were being made in other health-related fields. Harun al-Rashid established the first Muslim hospital at Baghdad in about 805. Within a generation, 34 more hospitals had been founded throughout the Islamic world.

Islamic hospitals (*maristans*) bore little resemblance to their present-day European counterparts, but their basic purpose served as the prototype on which the modern hospital is based. The sick entered expecting to be tended and cured by physicians who were masters of the art of healing. Doctors saw the *maristan* as an institution devoted to the promotion of health, the cure of disease, and the expansion and dissemination of medical knowledge. Medical schools and libraries

were attached to the larger hospitals. Students heard lectures and saw demonstrations given by chief physicians and surgeons, who expected them to apply that knowledge at the bedside. The hospital authorities then examined the medical students and issued diplomas.

Special wards were set up for men and women, each furnished with its own dispensary. By the 11th century traveling clinics staffed by hospital physicians brought medical care to those too distant or too sick to come to the hospitals themselves. Like hospitals, the practice of pharmacology also flourished in Arab countries in the medieval period. Islam teaches that Allah has provided people with natural remedies to cure their ills. People in turn are obligated to discover and use these remedies with skill and compassion. Several pharmacological treatises were composed in the medieval period, beginning with those of Jabir ibn Hayyan (fl. 776), the father of Arab alchemy.

The Arab pharmacopoeia was extensive and gave detailed descriptions of the geographical origins, physical properties, and methods of application of all substances found useful in the cure of disease. Arab pharmacists (*sandloni*) introduced a large number of new drugs to clinical practice, among them senna, camphor, sandalwood, musk, myrrh, cassia, tamarind, nutmeg, cloves, aconite, ambergris, and mercury. The *sandloni* also compounded syrups, juleps, aldehydes (all originally

Arabic words), and such pleasant-tasting vehicles for drugs as rose water and orange water. They were also familiar with the anesthetic effects of *Cannabis indica* (marijuana) and hyosciamine, both when taken in liquids and inhaled.

By al-Mamun's caliphate, pharmacy was a profession practiced by highly skilled and trained specialists. Pharmacists were required to pass examinations in order to be licensed; they were then monitored by the state. At the start of the ninth century the first privately owned and operated apothecary shops were opened in Baghdad. Pharmaceutical preparations were manufactured and distributed commercially in the marketplace and then dispensed by physicians and pharmacists in a variety of forms, including ointments, pills, elixirs, tinctures, suppositories, and inhalants.

Translations of at least 400 Islamic authors writing on such varied topics as ophthalmology, surgery, internal medicine, child care, and public health have survived. Medieval Arab physicians made accurate diagnoses of a large number of diseases, including bubonic plague, diphtheria, leprosy, rabies, diabetes, gout, cancer, and epilepsy. They advanced a theory of infection and introduced the practice of quarantine. Arab doctors laid down the principles of clinical investigation and drug trials. They pioneered surgical procedures for hernia and cataract, filled decayed teeth with gold leaf, and prescribed spectacles for defective eyesight.

There were many important medical practitioners in the medieval period. Abu Bakr Mohammed ibn Zakariya ar-Razi (ca. 865–between 923 and 935) was known to the West as Rhazes. He is regarded as the greatest clinician and most original thinker in the field of Islamic medicine. A prolific writer, he wrote some 237 books, about half of them on the topic of medicine. His treatise on the diseases of childhood led some historians to regard him as the father of pediatrics. He was the first-known medical authority to identify hay fever and its cause. He also wrote important works on kidney stones, smallpox, measles, and the introduction of mercury-based ointments as the basis of experimental medicine. He also called for “continuing medical education” for licensed physicians.

Abu Ali al-Husayn bin Abdullah ibn Sina was known in the medieval Western world as Avicenna (980–1037). His contemporaries called him the “Prince of Physicians.” He compiled the monumental *Al kanun*, or the *Canon of Medicine*. More than a million words in length, it represented a codification of all existing medical knowledge. The *Canon* stressed the importance of adequate nutrition and the influence of climate and environment on health. It included discussions of rabies, hydrocele (a collection of fluid in a saclike body cavity), breast cancer, tumors, childbirth, and poisons and their treatment. Ibn Sina differentiated the symptoms of meningitis (inflammation of the membranes covering the brain) from the symptoms of other acute diseases and de-



Outdoor scene of a mad dog biting a man from an Arabic translation of the *De materia medica* by Dioscorides (Freer Gallery of Art, Smithsonian Institution, Purchase, F1953-91)

scribed chronic nephritis (inflammation of the kidneys), facial paralysis, gastric ulcers, and the various types and causes of hepatitis (inflammation of the liver). He also described the dilation and contraction of the pupils and iris of the eye and their diagnostic value, identified the six motor muscles of the eye, and discussed the functions of the tear ducts. He noted the contagious nature of some diseases, which he attributed to “traces” left in the air by a sick person. The *Canon* also included a description of some 760 medicinal plants and the drugs that could be derived from them. At the same time, Ibn Sina laid out the basic rules for conducting clinical drug trials. The *Canon* served as a medical textbook for a longer period than any other medical work.

Abu al-Qasim Khalaf bin Abbas al-Zahrawi was known to the West by his Latinized name Albucasis (ca. 936–ca. 1013). He was the greatest Muslim surgeon. Contemporary and later medieval European surgeons came to regard him as a greater authority than Galen. Al-Zahrawi produced a medical encyclopedia in 30 volumes, *at-Tasrif* (The Method of Medicine), covering numerous aspects of medicine, with particular emphasis on obstetrics, maternal and child health, and the anatomy and physiology of the human body. The largest section of *at-Tasrif* was devoted to surgery, the first independent treatise on surgery ever written. The work covers a wide range of surgical issues, including cautery, the treatment of wounds, the extraction of arrows, and the setting of bones in simple and compound fractures. Al-Zahrawi also promoted the use of antiseptics in treating wounds and skin injuries; he made sutures from animal intestines, silk, wool, and other substances; and he developed techniques to widen urinary passages and to explore body cavities surgically. He was also the first to describe the classic operation for cancer of the breast, the use of lithotomy for the removal of bladder stones, and techniques for removing thyroid cysts. *At-Tasrif* is also the first work containing diagrams of more than 200 surgical instruments. Many of these instruments, with modifications, are still in use today.

Hunayn ibn Ishaq, known in the Western world as John of Nithius (809–73) wrote *Ten Treatises on the Eye*, composed in the ninth century, which demonstrated considerable advancement in knowledge of the eye and its workings over Greco-Roman treatises on the same subject. It also accurately described the way in which the retina of the eye inverts images.

Ammar ibn Ali al-Mawsili (fl. ca. 900) specialized in eye care. His only surviving writing discusses 48 eye diseases. The book also describes surgical instruments for use in eyes, including a hollow needle that could remove a cataract from the eye by suction. This hollow tube is mentioned by later ophthalmologists. The removal of a cataract by suction with a hollow needle was observed by the oculist and historian Ibn Abi Usaybi in about 1230 in the famed Nuri hospital in Damascus. A high degree of surgical and diagnostic skill was displayed in al-Mawsili’s treatment of trachoma, the major cause of blindness in the medieval period, and the disorders that sometimes followed it. Treatment consisted of scraping the interior of the eyelid with a selection of scrapers. Intricate surgical procedures were used for dealing with trichiasis (superfluous or ingrown eyelashes) and entropion (rolled-in eyelids).

Ala-al-din abu al-Hassan Ali ibn Abi-Hazm al-Qarshi al-Dimashqi, known as Ibn al-Nafis (1213–88), was a Syrian-born physician practicing in Egypt, where he was chief of physicians at the Mansuriya Hospital. Some diagrams and a treatise that he had written were rediscovered in Berlin in 1924. These documents demonstrated that Ibn al-Nafis had described the pulmonary circulation of the blood some 300 years before William Harvey.

See also ALCHEMY AND MAGIC; CLIMATE AND GEOGRAPHY; DEATH AND BURIAL PRACTICES; EDUCATION; FESTIVALS; FOOD AND DIET; GOVERNMENT ORGANIZATION; INVENTIONS; MIGRATION AND POPULATION MOVEMENTS; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SCIENCE; SETTLEMENT PATTERNS.

Europe

~ Paul of Aegina: Extract from *Epitomes iatrikes* biblio hepta (Byzantium, seventh century) ~

ON FRACTURE AND CONTUSION OF THE THIGH AND THE NOSE

The case of a broken thigh is analogous to that of the arm, but in particular, a fractured thigh is mostly deranged forwards and outwards, for the bone is

naturally flattened on those sides. It is to be set by the hands, with ligatures, and even cords applied, the one above and the other below the fracture. When the fracture takes place at one end, if at the head of the thigh, the middle part of a thong wrapped round with wool, so that it may not cut the parts there, is to be

applied to the perinaeum, and the ends of it brought up to the head and given to an assistant to hold, and applying a ligature below the fracture, we give the ends of it to another assistant to make extension. If it is fractured near the knee, we apply the ligature immediately above the fracture, and give the ends to an assistant, with which to make extension upwards; and while we put a ligature round the knee to secure it, and while the patient lies thus, with his leg extended, we arrange the fracture. Pieces of bone which irritate the parts, as has been often said, are to be taken out from above; and the rest of the treatment we have already described in the section on the arm. The thigh gets consolidated within fifty days. The manner of arranging it afterwards will be described after delivering the treatment of the whole leg.

The under part of the nose being cartilaginous does not admit of fracture, but it is liable to be crushed, flattened, and distorted; but the upper part being of a bony substance is sometimes fractured. . . . When, therefore, the nose is fractured in its under parts, having introduced the index or little finger into the nostril, push the parts outwards to their proper position. When the fracture is of the inner parts this is to be done with the head of a probe immediately, during the course of the first day, or not long afterwards, because the bones of the nose get consolidated about the tenth day. But they are to be put into the proper position with the index-finger and thumb externally. In order to prevent the bones from

changing their position, two wedge-like tents, formed of a twisted rag, are to be applied, one to each nostril, even if but one part of the nose be deranged, and these are to be allowed to remain until the bone or cartilage gets consolidated.

If the nose become inflamed we may use some anti-inflammatory application to it, such as that from juices [diachylon], the one from vinegar and oil, and such like; or a cataplasm of fine wheaten flour boiled with manna or gum may be applied, both for the sake of the inflammation and in order to keep the nose in position. When the nose is distorted to either side, Hippocrates directs us, after it has been restored to its proper position, to take a piece of leather of a finger's breadth, and having spread one of its ends with taurocolla or gum, to fasten one extremity of it on that side of the nose to which it inclines, and after it dries to bring the thong by the opposite ear to the occiput and forehead, and to fix the other end of the thong firmly there, so that the nose being drawn sideways may take the proper position in the middle. This practice, however, is not much approved of by the moderns. If the bones of the nose are broken into small pieces we must make an incision or enlarge the wound, and having removed the small bones with a hair forceps, unite the divided parts with sutures, and use the applications for recent wounds and those of an agglutinative nature.

From: *The Seven Books of Paulus Aegineta*,
trans. and ed. Francis Adams (London:
Sydenham Society, 1844).

The Islamic World

≈ *Ibn Sina (Avicenna): Excerpt from "On Medicine" (ca. 1020)* ≈

Medicine considers the human body as to the means by which it is cured and by which it is driven away from health. The knowledge of anything, since all things have causes, is not acquired or complete unless it is known by its causes. Therefore in medicine we ought to know the causes of sickness and health. And because health and sickness and their causes are sometimes manifest, and sometimes hidden and not to be comprehended except

by the study of symptoms, we must also study the symptoms of health and disease. Now it is established in the sciences that no knowledge is acquired save through the study of its causes and beginnings, if it has had causes and beginnings; nor completed except by knowledge of its accidents and accompanying essentials. Of these causes there are four kinds: material, efficient, formal, and final.

(continued)

(continues)

Material causes, on which health and sickness depend, are the affected member, which is the immediate subject, and the humors; and in these are the elements. And these two are subjects that, according to their mixing together, alter. In the composition and alteration of the substance which is thus composed, a certain unity is attained.

Efficient causes are the causes changing and preserving the conditions of the human body; as airs, and what are united with them; and evacuation and retention; and districts and cities, and habitable places, and what are united with them; and changes in age and diversities in it, and in races and arts and manners, and bodily and animate movings and restings, and sleepings and wakings on account of them; and in things which befall the human body when they touch it, and are either in accordance or at variance with nature.

Formal causes are physical constitutions, and combinations and virtues which result from them. Final causes are operations. And in the science of operations lies the science of virtues, as we have set forth. These are the subjects of the doctrine of medicine; whence one inquires concerning the disease and curing of the human body. One ought to attain perfection in this research; namely, how health may be preserved and sickness cured. And the causes of this kind are rules in eating and drinking, and the choice of air, and the measure of exercise and rest; and doctoring with medicines and doctoring with the hands. All this with physicians is according to three species: the well, the sick, and the medium of whom we have spoken.

From: Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*. Vol. 6, *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Malcolm L. Cameron, *Anglo-Saxon Medicine* (New York: Cambridge University Press, 2006).
- Alan K. L. Chan, Gregory K. Clancey, and Hui-Chieh Loy, eds., *Historical Perspectives on East Asian Science, Technology, and Medicine* (Singapore: Singapore University Press, 2001).
- Constance Classen, *Inca Cosmology and the Human Body* (Salt Lake City: University of Utah Press, 1993).
- Owen Davies, *Cunning-Folk: Popular Magic in English History* (New York: Hambledon and London, 2003).
- Roger K. French, *Medicine before Science: The Rational and Learned Doctor from the Middle Ages to the Enlightenment* (New York: Cambridge University Press, 2003).
- Sharif Kaf Al Ghazal, "Al-Zahrawi (Albucasis)—A Light in the Dark Middle Ages in Europe." *Journal of the International Society for the History of Islamic Medicine* (April 2003): 37–38. Available online. URL: <http://www.ishim.net/ishimj/3/08.pdf>. Downloaded on September 25, 2007.
- Monica H. Green, *Women's Healthcare in the Medieval West: Texts and Contexts* (Burlington, Vt.: Ashgate, 2000).
- Martin Levey, *Early Arabic Pharmacology: An Introduction Based on Ancient and Medieval sources* (Leiden, Netherlands: E. J. Brill, 1973).
- Vivienne Lo and Christopher Cullen, *Medieval Chinese Medicine: The Dunhuang Medical Manuscripts* (London: Routledge Curzon, 2004).
- Bernard R. Ortiz de Montellano, *Aztec Medicine, Health, and Nutrition* (New Brunswick, N.J.: Rutgers University Press, 1990).
- R. Pankhurst, *An Introduction to the Medical History of Ethiopia* (Trenton, N.J.: Red Sea Press, 1990).

- Plinio Prioreschi, *A History of Medicine*, 2nd ed. (Omaha, Neb.: Horatius Press, 1996).
- Emilie Savage-Smith, *A Brochure to Accompany an Exhibition in Celebration of the 900th Anniversary of the Oldest Arabic Medical Manuscript in the Collections of the National Library of Medicine*. Bethesda, Md.: National Library of Medicine, 1994. Available online. URL: http://www.nlm.nih.gov/exhibition/islamic_medical/islamic_00.html. Downloaded on May 31, 2007.
- Nancy G. Siraisi, *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (Chicago: University of Chicago Press, 1990).
- Ilza Veith, trans., *The Yellow Emperor's Classic of Internal Medicine* (Berkeley: University of California Press, 2002).
- G. Waite, "Public Health in Precolonial East-Central Africa." In *The Social Basis of Health and Healing in Africa*, ed. S. Feierman and J. Janzen (Berkeley: University of California Press, 1992).
- Dominik Wujastyk, trans., *The Roots of Ayurveda: Selections from Sanskrit Medical Writings* (New York: Penguin Books, 2003).

► household goods

INTRODUCTION

When archaeologists study a site, they often are especially interested in the household goods used by people in their daily lives. Although great fortifications, tall city walls, and elaborate palaces have their appeal, learning about what people

used just to get from one day to the next has its own powerful fascination. Furthermore, household goods can tell archaeologists much about a culture. For instance, finding nearly identical furniture at different sites could suggest that they had a culture in common. Household goods can indicate how prosperous people were and how well people benefited from their governments and natural resources.

This is not a simple matter. One might look at the paucity of household goods in some medieval central African cultures and infer that the people were poor, even miserable, yet this was not the case. The paucity of household goods in those cultures stems more from a lack of interest in material wealth. A fancy pot might be displayed by some people to show off their status, but in general people were more interested in building good relationships in families and villages than in acquiring furniture; they saw wealth as an accumulation of social debt, a matter of befriending others so that they owed favors in return. Children and respect mattered much more than goods. To those people, they had a high standard of living in which material goods mattered little.

Household goods would vary according not only to social attitudes toward what constituted wealth but also to environment. In medieval Europe chairs in the north were made primarily of oak, but in the south Alpine pine prevailed. This meant that northern chairs tended to be heavily carved, because oak was a hard wood, but southern chairs were more likely to be painted, because pine was a soft wood that did not hold carved edges as well as oak did. In each case, the chair could be sturdy, serviceable, and attractive, with the difference in decoration a matter of which wood was available rather than a cultural preference.

Social conditions could have a strong effect on the particular household goods people used. In much of Australia and North America people were hunter-gatherers moving from place to place. They knew where to go at different seasons to find certain ripe fruits or fresh birds' eggs, and they also knew where to go to obtain water during a drought or to escape a wildfire. The key aspect was that they moved often, sometimes daily. Their goods had to be what they could carry. Thus baskets were of special importance, because they were lightweight and could be used for fetching food. Bags of animal skins or tree bark could be sewn into bags for carrying weapons, body ornaments, totems, or objects that indicated status within a social group.

Furniture tends to be more common among settled groups than unsettled ones. Medieval Australians were unlikely to carry wooden benches with them. On the other hand, portable tables and chairs were common in medieval Europe, especially in the early centuries of the medieval era. Some archaeologists interpret the portable furniture as signs

that Europe was unsettled at the time, with people moving often because of war or other social upheavals, but portable furniture could have been just a convenience. In a medieval European home a table that could be assembled at mealtime and disassembled and set aside later meant that the center of the main room could be open for use most of the time. Folding chairs in medieval homes also could be put out of the way when not in use. Monarchs who traveled their lands to meet with people frequently used folding chairs as mobile thrones. Thus, the furniture could be a sign of unsettled daily lives, or it could be a sign that the material wealth of people was improving enough that they could afford something that they wanted just because it was convenient to use.

Cooking and eating utensils offer similar complexities of interpretation. Were the peoples of eastern Asia living primitive lives because they often used two sticks to eat their food? Even emperors used chopsticks. More interesting is to examine the interplay between what was eaten and the utensils used to prepare and eat it. In the case of chopsticks, it is possible that their use inspired a culinary tradition in which meats and vegetables were cut into bite-sized bits, easy for the chopsticks to grab. In its turn, that may have created a need for cleavers and sturdy knives for cutting food when preparing it. Thus, the pleasure in studying cooking and eating utensils may lie not in what they may say about the wealth of those who used them but instead in the complex interplay of the utensils in eating habits, food sources, and techniques of preparation of food.

AFRICA

BY BRADLEY SKEEN

Because of the relative remoteness of the areas involved and the wide dispersal of the remains to be studied, archaeological excavations concentrating on the Middle Ages have been comparatively rare in Africa away from the homelands of the ancient civilizations of the north coast and Nile Valley. For this reason archaeologists have spent little time on the remains of ordinary households compared with important monuments and significant works of art. Nevertheless, some idea of the range of household goods employed in medieval Africa can be made out from the archaeological record as well as the oral historical traditions of modern-day African peoples.

In Egypt before the Islamic conquest (mid-seventh century), ordinary household items would have differed little from other parts of the Roman Empire. Household implements would have been made of iron or bronze. The main kind of ceramic jar in use for storage of olive oil, wine, and many kinds of materials (including, for instance, carpenter's



Pottery jug in human form, Wadi Sarga, Egypt, fifth to seventh centuries (© The Trustees of the British Museum)

nails) were amphorae, elongated jugs with pointed bottoms that could not stand on their own but would fit into special racks that every house possessed. Various kinds of woven baskets and wooden trunks also would have been used for storage. In wealthier homes blown glassware would have been common.

All but the poorest households would have possessed written materials. Books were handwritten and usually took the form of a scroll. Notebooks, on the other hand, would have been bound like ordinary modern books. Loose sheets were also commonly used for writing letters and other brief documents. Scrolls usually were stored in round leather cases. Papyrus, made from reeds native to Egypt rather than linen or wood-pulp paper, was the standard writing material. Pens were also made from papyrus reeds by trimming them with a penknife. Small ceramic oil lamps, which were mass-produced in molds and usually highly decorated, provided light. In Greek- and Latin-speaking households the inhabitants ate dinner lying down on couches arranged in a square with the servers in the middle. In the countryside farmers would have kept their agricultural tools in their homes, but in the cit-

ies where apartments and houses would have been detached from workshops and shops, tools needed for work would not have been household objects.

Ironworking was well advanced in medieval Ethiopia, and many ordinary items (bowls, knives, and so on) were made of this metal. Bronze items continued to be in common use. In particular, precious metals as well as copper and bronze were used for decorative items like jewelry. Coins were minted in Ethiopia and were sometimes of a highly unusual type—bronze flans (the disk of metal used for coins) inlaid with gold or silver details. Ivory and bone were also carved into decorative objects.

Many people in Ethiopia lived by herding cattle, and whether the custom ultimately derived from the goads used to drive cattle or from a history of contact with ancient Mediterranean cultures, men of elite status in northwestern Africa typically carried walking sticks to denote their place in the social hierarchy. Ordinary domestic pottery used for cooking and storage was made of coils of clay that had been crafted without the use of a potter's wheel. However, wheel-made pottery from Egypt that had originally been used to ship wine or olive oil as trade goods was sometimes reused for storage.

To judge by the ideas of modern-day Igbo people (in Nigeria and Cameroon) about their own traditions, family compounds (where family members lived, segregated by gender) within medieval Igbo towns and cities would have contained iron knives, hoes, and other agricultural implements, and, in the case of aristocratic households, metal bells and staves as signs of the household head's elite status. By the year 1000 ironworking had become widespread in western Africa. Wooden shrines, statues, and masks and costumes (worn by men during religious festivals) of local divinities would have been kept throughout the compound. Wooden furniture would have included three-legged stools carved with elaborate decoration. Many houses would have had musical instruments. Other signs of status could have included elephant tusks, usually plain or with only the simplest carving, as well as ivory jewelry, such as bracelets and anklets. Besides a large array of pots, bed frames would also have been ceramic. Animal skins would have been displayed for decorations or sometimes made into seat cushions. Fans and fly whisks seem to have been limited to the male compound.

A royal burial from the 10th century in Igbo-Ukwu (in present-day Nigeria) contained, besides copper royal regalia, a copper fan holder and a wooden stool decorated with copper, which may have served as the royal throne. Elite status was demonstrated by using metal for purposes that cheaper materials served in ordinary households. This burial also contained sophisticated cast-bronze miniatures of human and animal figures that are actually typical of medieval west-

ern Africa, but these were probably limited to the possession of elite classes. While copper was worked locally, there was a special demand among the elite classes of western Africa for imported copper goods of all kinds as well as for imported iron knives. Copper bowls and washbasins seem to have been especially sought after. Their foreign character was a status symbol. Cowrie shells were also traded from the coast and used extensively both as a decorative material on household items and as a form of currency.

After about 1000 copper working and ironworking became more common throughout the vast region of the African interior, the watershed of the Congo and Zambezi rivers, and the lake regions in the Great Rift Valley, conditioning the introduction of new types of household goods in the Middle Ages. The area best studied by archaeologists has been the Upemba depression (modern-day southeastern Republic of the Congo). The common practice of burying people with grave goods—items representative of the kinds of objects they used in life—is helpful in determining the material culture of this region. Based on the disparity in grave goods found between individual burials, after the year 1000 society seems to have become stratified. The most common buried objects are ceramic pots, and graves that have many more pots also have imported cowrie shells and carved ivory jewelry. Water and alcoholic beverages were stored in long-necked flasks or large storage vessels with a capacity of more than 4 gallons. Food was cooked in ceramic vessels of various sizes that were shaped either like a cauldron or like a wok as well as others that included lids. The so-called *yanko* was similar to the woklike vessel but with holes for drawing in smoke for curing meat or fish. The same types of vessels were used for temporary storage. Clay pots were made from coils rather than thrown on the potter's wheel.

The mountains in Shaba Province in the modern-day Congo and its vicinity are one of the richest copper-producing areas on earth, and copper was extensively used in this region. Small cross-shaped copper ingots are commonly found among grave goods; ingots were sometimes bundled together in bunches of five and probably were used as a form of currency. Elite graves contained copper bowls, jewelry, knives, belts, and other paraphernalia that would have been made of clay, iron, or nonmetallic perishable materials (such as plant fibers) in ordinary households. Tools used in agriculture and hunting, such as spearheads, knives, arrows, hoes, and axes, were typically made of iron. Iron objects such as anvils and bells are extremely rare and seem to have been buried only with the most powerful individuals. Other common goods include woven baskets of considerable sophistication.

The typical medieval household goods of the Bambala people, also from the upper Congo region, have been recon-

structed—partly on the basis of archaeology, partly on the basis of the present-day lives of Bambala living in isolated areas and preserving archaic ways of life, and partly on the communal memory of the people as a whole. The Bambala, like most Africans, lived by a combination of farming and hunting and so would ordinarily have possessed the tools necessary for both activities, including knives of various sizes, a hatchet, an adze, a hoe, mortars and pestles, grinding stones, needles, a wood chisel, a throwing spear, a bow and arrows (including poisoned arrows), snares, and a *mvúndji*, a sharp blade used for scraping animals skins but also for use in minor surgical operations such as circumcision.

Each house would have had many baskets; some were made from woven fibers or bamboo, and others were made from wood. Baskets would have included specialized types for storage, for winnowing grain, and as strainers, fishnets, ratttraps, and lunch boxes (usually an hourglass shape). Ceramic jugs of various sizes were used for storing, transporting, and drinking water. Cookware was also ceramic. The size and shape of pot depended more on the age and gender of the person who would have consumed the food prepared in it rather than the type of food cooked. Ceramic plates were used only for children. Dry gourds were used to collect sap from palm trees and for storing dried food. Woven mats covered the earthen floors of dwellings. Chairs were often simply sections of logs, while bed frames were made of wood or bamboo.

Great Zimbabwe was a ceremonial site of the Shona people of southern Africa (in modern-day northeastern Zimbabwe) whose rulers concentrated considerable power in their hands from control of a gold trade with the Muslim cities of the Indian Ocean coast. In the late Middle Ages (ca. 1450) the population soared to as much as 18,000, and the most elaborate architecture in the interior of Africa was developed, but the site quickly collapsed owing to lack of infrastructure and other factors. Because of defects in the excavation of the Great Zimbabwe site, not much can be directly demonstrated about the lives of the ordinary inhabitants who lived in huts outside the massive stone walls, but there is no reason to suppose that their lives and possessions were very different from those of Africans in other areas. The life and possessions of the elite class that lived within the stone walls are a different matter. The range of ceramics and utensils ordinarily used in preparing food is absent within the Zimbabwe walled enclosures, indicating that those within were served by people living outside. On the other hand, fine glassware and ceramics imported from the Arab world and as far away as China have been found along with numerous gold objects within the walls, suggesting a life of luxury of the elite class.

THE AMERICAS

BY ELIZABETH MORÁN

Throughout the Americas household goods were made to suit the specific needs of the culture from materials readily available in the environment. Cooking implements were made from wood, stone, fired clay, woven baskets, and even dried gourds. Furniture typically was fashioned from wood but could very easily have been made from stone and other materials, such as animal hides and cotton.

In the Caribbean home furnishings were spare, and cooking implements were basic and made from clay, stone, and wood. Such cultures as the Taíno (ca. 1200–ca. 1500) created stools called *duhos*, which were initially used by shamans and eventually appropriated by caciques, or chiefs. These stools were ritual in use and were seen as thrones of power. In the common dwellings people sat on the bare floor of the home or on simple woven mats made from palm leaves. Cotton hammocks were used as beds.

In the North American Southwest early cultures, such as the Hohokam (ca. 500.–ca. 1400), created adobe or caliche (dried clay) architecture, yet these dwellings would have had very little or no furniture. Floors of homes often were left bare or were partially covered with animal hides or furs. Sometimes a raised wooden bench would stand in for a bed, although most often people slept on the clean floors, wrapped in hides and furs for warmth. The heart of the home was the hearth, where family groups gathered for everyday activities,

such as cooking, eating, and socializing. Cooking tools were left near the hearth, since they were in constant use and were associated with the fire. Like the furnishings, cooking and serving utensils were made from readily available materials, such as stone and wood. The Iroquois and other eastern Woodlands peoples used the bark of elm trees to make vessels for cooking and storage. Basket weaving was an important skill throughout the Americas, and baskets were used to hold, serve, and store foods. Using a technique called twining, women on the northwest coast made baskets so tight that they could hold water. Baskets were also used to trap live animals, such as eels.

In Mesoamerica the hearth was also a central location for cooking and other activities. Painted manuscripts created by indigenous Aztec artists during the 16th century shed light on the many ways in which cooking implements were created and used. One manuscript, the *Codex Mendoza*, illustrates a mother instructing her 13-year-old daughter in the art of cooking; Spanish glosses, or brief explanations, have been added to assist the European reader with interpretation. Some of the items depicted with the mother and daughter are a metate (stone grinder), an olla (double-handled jar), a *comal* (griddle), and a small tripod bowl containing a grinder. This bowl, called a *molcajete* in contemporary Spanish (or *molcaxitl*, as the Aztec referred to it), had deep incisions on the inside for grinding substances. The *molcajete*, among many other Aztec cooking utensils, is still used in Mexico today. Other painted manuscripts illustrate large tripod vessels, baskets, and a small grinder referred to as a *mano*, used in grinding herbs. These cooking and serving utensils were homemade, locally made, or available at the markets, or they came into the Aztec capital of Tenochtitlán as part of an organized tribute system.

For both Mesoamerica and South America, where groups developed from village cultures to organized states, cooking implements varied according to class associations. Elite classes required more than basic cooking implements made from the natural environment; ceramics became highly decorative and elaborate and were in high demand by the ruling class. Classic Period Mayan (ca. 250–ca. 900) ceramics were created for both ritual and everyday use. Painted pottery gives a glimpse into the kinds of household furniture that existed in the homes of the Mayan elite. Many vessels depict ruling class members sitting on elevated seats with large cushions supporting the sitter's back. Some ceramics show individuals sitting on benches. While it can be surmised that these types of furnishings existed for the upper classes, the homes of commoners would have had much simpler furnishings, such as woven mats for seating. It is also possible that these types of furnishings were linked with ritual rather than household



Stone cup, Mixteca/Pueblo style, Mexico, ca. 900–1521 (Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 204073])

use. In addition, Mayan ceramics illustrate many household goods and the ways in which they were used. Some ceramics show certain vessel types used for specific foods.

In pre-Columbian Panama red-and-black polychrome ceramics became important in such sites as Sitio Conte, Chiriquí, and other areas (ca. 500–ca. 1000). Like Mayan painted ceramics, these were often used as status symbols and were part of the elite trade system. Everyday drinking and eating ware was much simpler—unpainted clay and dried gourds. It should be noted, however, that recent archaeological work in the middens (refuse heaps) of commoners in Calixtlahuaca, in the Toluca valley in Mexico, has shown that what was once thought of as elite ware used by Aztec lords actually was considered “good china” by commoners and used only for special occasions. Commoners used their basic clay wares every day, while special pottery probably was reserved for special occasions, such as marriage celebrations and other events.

Some cultures, such as those in pre-Hispanic Costa Rica, used stone as a basic medium. Grinding stones, seats, and tables were made from stone found at nearby areas. In the site of Linea Vieja (ca. 850–ca. 1500), for example, many elaborately carved seats, tables, and grinding stones have been found. While these are associated with tombs and therefore ritual purposes, it is quite possible that simpler models were used in elite and common residences.

ASIA AND THE PACIFIC

BY JUSTIN CORFIELD

Throughout Asia and the Pacific a wide variety of household goods were used during the Middle Ages. These goods varied, with extremely elaborate items being made in China, Japan, and many other parts of the region, often for sale to other less-advanced areas. By contrast, people living in Australia and on some Pacific islands had few goods beyond hunting or fishing materials.

In much of Asia houses were generally considerably larger than in the ancient world, with most of the furniture continuing to be made entirely from wood. In China hardwoods, such as rosewood, were commonly used. *Pterocarpus* woods (such as sandalwood) were used in southwestern and south-central China, with further stocks imported from Southeast Asia. These woods were used to make tables, chairs, beds, and other items of household furniture, such as cupboards, chests, and altars for family gods. The later medieval period saw increased use of lacquerware. Some of it was inlaid with mother-of-pearl; indeed, workmanship in China, Japan, and Korea became extremely elaborate. In 1029 a Chinese imperial decree ordered that red lacquer beds

be reserved for use by the emperor; most wealthy people had black lacquer beds.

In poorer parts of China and also in much of Southeast Asia, there was heavy use of bamboo for many items in the house. Wealthier homes also used bamboo for outdoor furniture and shades. Japanese and Korean furniture shared many similarities with Chinese furniture, but Japanese and Korean homes tended to be more austere in style, with far fewer items in them; the Japanese also had a variety of other items, such as armrests, neck rests, sword racks, and, in wealthier homes, writing tables. The homes of wealthy Koreans were also well known for their elaborate chests. In wealthier homes in China “medicine chests,” with many small drawers, were used for storing medicines as well as spices; poorer people kept such items in storage vessels of differing sizes.

While most Chinese, Japanese, and Korean household items tended to be made entirely from wood, some medieval Chinese chairs started being made with a cushioned seat, and bedding became softer, with the use of cushions increasing. By contrast, most chairs in wealthy Indian homes tended to be heavily lined, with the seat of the chair itself being cushioned and the back sometimes covered in cloth.

Little is known about furniture from this period in Southeast Asia because the climate has ensured that little has survived. Much of the furniture there was probably made from bamboo or softer woods, though the writings of Zhou Daguan (1266–1346), a member of the Chinese embassy in Angkor (Cambodia) in 1296–97, mention the widespread use of matting but make no mention of furniture. Many people in the Malay world, such as in the kingdom of Majapahit, slept on mats rather than on beds, and bamboo and cane were regularly used for chairs and tables.

Pottery was used in all parts of medieval Asia for domestic tasks, such as cooking food; in most places pottery also served as household crockery for soup and rice dishes. Although there is evidence of coil pots, many potter’s wheels also have been found in excavations in China and India. Much of the pottery was sun-dried, although large settlements often had kilns. There was certainly an export trade from China. Zhou Daguan mentions the existence of much Chinese pottery in medieval Cambodia. Furthermore, significant numbers of Chinese pottery remains have been found in Southeast Asia, in such places as the kingdom of Champa in central Vietnam and also on many islands, including remote ones, such as the Spratly Islands—the shards there being used by late-20th-century archaeologists to prove Chinese ownership of the islands since medieval times. A significant amount of the pottery found on Pacific islands came from Asia; the Aborigines of Australia did not use pots.



Pillow, stoneware with white slip under transparent colorless glaze, Northern Song Dynasty, China, ca. 1056 (Freer Gallery of Art, Smithsonian Institution, Gift of Eugene and Agnes E. Meyer, F1974-2)

Besides pottery, bone china was made in some parts of Asia. Chinese-made china was used widely throughout Asia. The Japanese also ran an export industry, with kilns operating at Seto, Tamba, and Bizen. Larger pottery items, such as soy sauce pots, were also made on wheels and were often far too large to be dried in a kiln. The Chinese used china crockery for eating, and the Japanese imported Chinese ideas of pottery for use in the tea ceremony and at other festivals. Glassware was used in many parts of Asia, and glass from the Middle East was imported into parts of Asia.

Many vessels for cooking and eating were made from metal, such as the “steamboat,” around which a family would gather for a meal. Metal plates were used on ships, and iron cooking pots were used in China and other parts of Asia. Woks became increasingly common in China, and similar cooking vessels were used elsewhere, known as *penggorengan* in Indonesia, *kuali* in the Malay world, and *kawali* in the Philippines. Grills were used throughout Asia and in much of the Pacific, usually operating with charcoal fires.

Significant numbers of cooking utensils have been found throughout Asia and the Pacific. Initially, many of them were made from wood, but gradually they came to be made from metal, often with a wooden or bone handle. Wealthier Chinese and Japanese homes had chopsticks made from lacquered woodwork. In Fiji and other parts of the Pacific there were wooden forks, which became known as “cannibal forks,” and throughout Asia and the Pacific many homes used skewers to cook meat and other food. In parts of the Malay world used sticks as skewers for cooking small chunks of chicken, beef, and pork.

The Japanese often used silk-screen pictures as decorations in houses; the Chinese hung paintings on the walls. In China during the mid-13th century black and red became

the most popular colors for interior decoration, with large scrolls in either color, or occasionally both colors, dominating an entire wall. Many wealthier houses in Japan, China, and Korea had equipment for painting, which was a favored pastime; many people tried to perfect the painting of bamboo and country scenes. This practice led to the manufacturing of elaborate racks for paintbrushes, with numbers of painters preferring to make their own brushes.

Most well-to-do people in China, Japan, and Korea also had seals, or “chops,” which were used for signing official documents. Some were made from jade, with those of wealthier people having elaborate handles, often in the shape of dragons. Because these seals were important, they would often be kept in locked chests with access to them strictly controlled by the head of the household. Some wealthier houses also kept books, often in the form of scrolls, as well important legal documents.

Heavy carpets were used in parts of Mongolia and Manchuria, to try to reduce drafts as well as to decorate lodgings, often yurts, or circular, domed tents. In India carpets were also used to keep out the hot air. Around the houses in Asia there were other accoutrements needed for everyday life. There was usually a large china bowl for washing, along with soap, which was typically a liquid made from peas and herbs. Some people also had bathtubs, which in China, Korea, and Japan could be made from wood, metal, or earthenware. To warm the water, pieces of metal or stones were heated in a fire and lowered into the water. There is also an Arab reference to the Chinese in the ninth century using specially made lavatory paper and handkerchiefs to wipe their gums after a meal. Men had shaving materials, and there were also bone or wooden combs. Liquids, such as water, were stored in buckets, with fruit and other items kept in baskets made from bamboo and cloth.

Most houses in Asia also had candles or torches made from sticks dipped in tar; these were necessary to illuminate a house after dark. Wealthier people used lanterns. Opium smoking was regarded as important by many wealthier Chinese (and some Indians) and also some poorer ones, and for this purpose elaborate opium-smoking equipment was made. Because of the cost of opium and the smoking equipment, these items frequently were kept safe in a large chest, along with coins and valuable documents—the chest often weighed down by bricks before being locked, to make it impossible for a single person to carry it away. When not being worn, jewelry would also be stored in these chests.

Other household objects include trays, boxes for storing cloth or clothes, and also the equipment needed for sewing and embroidery, such as needles, thread, silk, and brocade. Fans and parasols grew increasingly popular among

wealthier Chinese and Japanese women. The vast majority of households also owned or had access to handcarts and wheelbarrows.

EUROPE

BY KIRK H. BEETZ

At the fall of the Western Roman Empire in 476, poor Roman Europeans rarely could afford furniture. Often all they had were small metal stoves in their apartments. Those who could afford furniture lay on wooden couches while eating their meals. Their dining utensils were a knife and a spoon. Chairs were rare and usually backless. Most sitting was done on stools. It was considered an honor for a guest to be invited to sit in a chair. Furniture made from wood imported from Africa brought high prices, but most furniture was made from local wood.

To the knife and spoon people in the Byzantine Empire (330–1453) added a two-pronged fork. Byzantine utensils were usually made of copper or silver, and the spoons and forks tended to have long handles. Despite the existence of eating utensils, eating with one's hands was common. Cloths covered tables for meals. On the tablecloth were set trays and bowls of food. Jugs and glasses for serving drinks were part of everyday meals.

It seems that no everyday furniture survives from the Byzantine Empire, which means that information about it comes mostly from paintings, sculptures, and written accounts. Even the humblest of homes had some furniture, at least a heavy rectangular table of wood. Tables were sometimes round, and in large dining halls they could be U-shaped, with the host and hostess seated at the peak of the U. Most households additionally had benches and stools on which people sat for meals and for many domestic tasks, such as sewing. Sewing needles have been found at many archaeological sites. Most homes had cushions that were set on benches and chairs, and quilts sometimes covered seats of chairs. Chairs with backs often had cushioned lining on the back of the seat. Wealthy households had couches and chairs. The couches were covered by heavy cloth and cushions. Most chairs were backless; chairs with backs usually had no arms, and chairs with both backs and arms were rare. In contrast to practices in the late Roman times, chairs during the Byzantine Empire were used for everyday purposes, and sitting on a chair was considered nothing special.

The Byzantines do not seem to have had chests of drawers. Chests with lids that opened on hinges were common and were used to store household goods such as pillows and sheets. Beds were inexpensive and consisted of wooden rectangular frames with thick, square legs at their four corners. Wooden

planks were laid lengthwise on the frames. Poor people sometimes slept on floors, using rags to cover themselves. Even the poor who had beds sometimes covered the planks with only sacking. Most people had sheets, blankets, quilts, and coverlets for their beds. The quality of these depended on the wealth of the household and perhaps on the skill of the seamstresses in the household. Those who could afford them used pillows and cushions on their beds. Carpets often covered floors, and draperies with colorful designs decorated walls. Cloth hangings might have separated one part of a room from another or might have covered windows.

In most of the rest of Europe in early medieval times furniture was less common than in the Byzantine Empire. Whereas in a Byzantine household furniture might be placed throughout a room, in the rest of Europe the furniture typically was set against walls, leaving the middles of rooms open. Some historians believe furniture was made portable because during the first few centuries of the medieval era societies were unsettled by political turmoil. Additionally, having furniture that could be folded and put away would be convenient if people wanted to keep their rooms open for use most of the day. In Byzantium and much of the rest of Europe some metal chairs were designed to fold; they may have been used by officials or monarchs during their travels, perhaps to sit in while holding court. The chairs' iron mountings were



Late Saxon Shelly ware pitcher, ca. 900–1000 (© Museum of London)

sometimes decorated with enamel and gold. Wooden chairs occasionally were made to fold, and early dining tables were apparently commonly made to be dismantled quickly to be set aside. These were usually made of heavy oak, so people would have needed strength to put them together, but legs and planks were made to slip into notches in frames. A dismantled table could be set against a wall but reassembled by a couple of people in several minutes. In most households diners sat on benches. Ancient northern tales recount how a king's thanes (feudal lords) would gather each evening at a large rectangular table, seated on what were called mead benches. They ate with their hands and with knives. Throughout the medieval era diners were expected to bring their own dining knives with them. Drinks were served in flagons, and food was served on wooden plates.

In the forms of medieval European furniture can be found evidence for the development of a culture that can reasonably be called European. For instance, the chair's basic form was the same in Sweden as in northern Italy, Ukraine, and England. Its seat was usually square; it had four legs, one at each corner of the seat; its back was upright and usually straight. Historians have traced the development of the European chair from crude, blocky seats of oak made in northern Europe through centuries of refinement, probably reflecting the increasing specialization of furniture makers. The early medieval chairs were probably made by the people who sat in them; perhaps when chairs could be made by specialists, the chairs became more artful, with their builders developing ever more sophisticated joints for fitting the parts together.

This is not to say that chairs looked exactly alike; there were many variations on the basic form. One variation had appeared between chairs of the north and chairs of the south by the age of Charlemagne in the late eighth century. The variation was caused by the wood that was available. Oak was readily obtainable in the north, but pine trees were more common in the south. Oak is a hard wood that holds its shape well when it is carved, so chairs in the north were carved with sharp images of plants, animals, columns, or intricate interlacing lines. Pine is a softer wood that does not hold carved designs as well, so chairs in the south were more likely to be painted with designs.

In a kitchen during the era of the emperor Charlemagne (r. 800–14) were a hearth, salt basins, and bread bins. Iron pots and cauldrons were placed over the fire. Wooden utensils were used in the kitchen to mix food, stir pots, and serve food. Although most plates were wooden, plates of lead were common. Bowls for serving food were made not only of wood and lead but also of iron and tin. Ceramic jugs, pitchers, and bottles were used to serve drinks. Some ceramic pots were probably set in fires to cook their contents. A thick, rounded pot was used not for food but to store money. Among well-to-

do people were vases made of silver, gold, horn, maple wood, and even marble.

Perhaps more common than tables by the middle of the medieval era was the chest. Europeans had been experimenting with chests for a long time, finding ways to fit them into the routines of households. Early medieval chests were often logs with a hole dug into them. The development of the plank chest made for lighter chests with more interior space; these consisted of frames of planks covered by a hinged lid of planks bound together by strips of iron. By the 1300s a chest with a rounded lid had developed, as had the clamp-fronted chest, in which its well-carved parts were fixed in place by wooden pegs.

Another development was the box chair. Originally a low chest, this was given a back and sometimes arms. It gets its name from the boxy chest among its legs. Originally rough contraptions, box chairs became elegant parts of households. The seat might have hinges at its back, allowing it to be raised to give access to the interior, or the front of the box might be hinged, allowing it to drop open to give access to its insides. Inside could be cloth, blankets, pillows, or other goods. Chests also were used like benches, perhaps set under a window so that someone could sit in the sunlight. They might be covered with cushions or soft fabrics. Very much in demand were dowry chests. By the 1300s these were available in various sizes, often large and heavy; a premium was placed on chests that were light, made either of light wood or of thinly cut wood. They were painted in rich colors.

An English home in the 1000s had tablecloths, cushions for seats, and mostly wooden plates and platters. The variety of drinking vessels suggests a strong interest in drinks. Most cups were made of ash, but others were made of horn or metal fashioned to look like horns. These were often decorated with carvings or moldings, as were goblets and tankards. Although there were spoons and knives for preparing food, the typical table was not placed with eating utensils; people ate with their hands or with the knives they brought with them. Meals frequently were served on a piece of bread, which made them easier to eat with limited utensils. By this time candlesticks were common, as were tapestries to cover walls. Although modern people might admire the beautifully finished wooden walls of many medieval homes, through the 1500s people generally preferred to cover the walls with tapestries that gave warmth to a room.

By the late medieval era a well-equipped kitchen had pots and pans with long handles, mortar and pestle, tongs, and utensils for stirring, including whisks made of bunches of twigs. The kitchen in a town or city probably did not have an oven, just a hearth. When a cook had something to bake, the cook took it to a baker or to a specialist, such as a pie maker for

baking pies. Boiling and roasting were the preferred methods of cooking. Pewter plates were common by the 1400s.

By the 1200s beds had mattresses and were covered with sheets, blankets, coverlets, and pillows. Curtains were hung from the ceiling to surround the bed, and the bed usually was provided with a lamp, allowing a person on the bed to read in privacy. A wooden cradle was placed within arm's reach of the bed so that those in the bed could rock it without getting up. The main room of a house was typically the dining room, where much of a day's activities took place. It would have an oaken table, one or more chests probably topped with cushions, a chair, and small, low stools. There was often a livery cupboard to store drink and food.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

The medieval Islamic world encompassed not only a vast territory but also a broad variety of cultures, each of which had its own variations on the basic furnishings of a household. The taste of the Arabs of the early Islamic world tended toward such furnishings as those found in the pavilions of nomadic camel herders. A typical house had few wooden or metal furnishings, except for bookshelves and cupboards. Muslims generally regarded literacy with reverence because it was through the written word that Muhammad communicated with them after his death, and a bookshelf would have had a prominent place in a home. Its contents might include a copy of the Koran and copies of the Hadith (accounts of Muhammad's life and sayings), scholarly guides to the Koran and the Hadith, books of poetry, and books of geography.

Most household life took place low, near to or on the floor. A house in a city usually had two stories and an enclosed courtyard, often with rooms for receiving guests that were separate from the quarters where the home's women and children lived. Often people who had low incomes, especially in small towns and villages, would have large curtains or drapes that they could pull across the courtyard to divide it or to divide a large room; on one side would be the women and the children, and on the other would be the male guests and their host. Even in houses where the women and children could be sent upstairs or the guests could be entertained in a separate room, curtains and drapes were common as wall coverings.

Floors were covered by carpets. Rooms typically had an abundance of cushions and mattresses placed near walls or arranged around an eating space. When a person sat, he or she usually sat on a cushion or a mattress. Some homes had sofas, which were low to the floor and covered with cushions.

Occasionally a home had chairs. These could be low to the floor but sometimes were higher. The purpose of chairs was to establish social dominance. The person who sat in a chair sat higher than those who sat directly on a rug or on cushions, symbolizing his superior status. He might be the head of a large extended family or of a clan, or he might be a high-ranking religious or government official. Often when a person wished to show his superior status, he did not use a chair but instead sat on a pile of pillows that elevated him above others who were seated in the room.

Dining tables were made of wood and were very low to the floor because diners sat on or near the floor. Very often no table was used, and dinner was served on a rug. Meals were served on large, circular trays of copper or silver, placed on the floor or on small wooden stools. Poor families might use wooden trays instead. Although city dwellers of the Near East would have been familiar with eating utensils, most eating was done with the bare right hand. Using the left hand was insulting to the others who were present because the right hand was traditionally the clean hand. This custom was common not only among Arabs but also among Indians and people of northeastern Africa. Knives were used for cutting meat, and spoons were used for eating soup. Usually people did not have their own plates but ate directly from the serving trays; however, they would have had their own soup bowls and drinking glasses. Most city households had bowls and glasses of porcelain, glass, or crystal, which might be imported from as far away as China. Eating was expected to follow a friendly decorum, and gluttony was frowned upon.

Of importance to most Muslim households was a cooking cauldron. Much of a family's food was boiled, and soups prepared in a cauldron were especially important because they represented the family's unity. Sharing soup from the cauldron was almost a ritual, binding each family member to the others. This practice was taken to extreme in the Ottoman Empire (1281–1924), where each barracks of janissaries, or elite soldiers, had its own symbolic cauldron and regiments of janissaries carried cauldrons into battle; the loss of a regiment's cauldron was considered to be very dishonorable. The cauldron seems to have been intended to represent to the janissaries their status as a family of soldiers.

Beds were a sign of wealth and social status. The poor often slept on bare floors. Most people had mats or rugs on which to sleep, and a woven carpet could be used as a blanket. A bed with legs and a frame was very desirable and was a sign of a well-to-do family. In general, the more comfortable the mattress and coverings, the higher the status they indicated. Bedrooms often included grooming supplies, such as scent bottles and wooden combs.



Table, molded, pierced, and glazed ceramic; Syria, late 12th to early 13th centuries (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA [M.2002.1.18])

Households outside urban areas tended to have fewer goods than households in cities had. Nomadic herders lived much as their ancestors had lived, with their tents furnished in rugs and cushions. In farmhouses furniture was unlikely to be found. Curtains and draperies were common, and seating was usually directly on a rug or the bare floor. Cooking utensils consisted of knives and spoons. City homes often had no oven, so food that required baking would be taken to a bakery to be cooked, but in the countryside homes were more likely to have ovens. Both city and rural homes tended to have braziers in which coals were burned to heat the homes in cold weather. Rugs could be replaced with mats of rushes in hot weather.

Rural areas were more likely than cities to retain the customs of their region from before it was conquered by Muslims, but the customs could long linger in cities, too. For example, after seizing control of the Byzantine Empire's lands in North Africa and the Near East, many Arabs had difficulty shifting from the life they had known in Arabia to a life as part of a huge Islamic empire, and to adjust, they often imitated

the lives of the people they conquered. Further, those people who converted to Islam often preferred to continue to use the furniture and household wares that they had grown up using. The many people who lived in the Islamic world but kept their old religious faiths also frequently continued with the traditions of their ancestors, behind the high, blank walls typical of houses in cities of the Islamic world. The customs of the Byzantine Empire and of the peoples of India were particularly influential.

Wooden furnishings were much more likely to be found in households of the former Byzantine Empire and in India than in other parts of the Islamic world; however, as time passed, households in Egypt and the rest of North Africa lost much of the Greco-Roman influence on furnishings, except for special items, such as thrones. During the first several centuries after the Muslim conquest of the Near East, furniture often included couches, chairs, storage chests, beds, and cooking and eating utensils similar to those used by Byzantines. Chairs were often backless and piled high with cushions. Chairs with backs were upholstered with textiles, such as quilts, drapes, and woolen cloth. These were found in wealthy households. In the residences of aristocrats and monarchs, chairs sometimes had symbolic value because the head of the household could sit on a chair and use it like a throne while receiving guests or emissaries. Wood was abundantly available to people in the northwest of the Near East, with much wood for furniture coming from eastern Europe and the Byzantine Empire. Having to import wood from Anatolia may be one reason why Egypt more fully adopted Arabian customs in furnishings than did people in the northern Near East.

In northern India, Islamic and Indian cultures had formed their own unique blend by the end of the medieval era. Much of the early rule of Muslim invaders was oppressive, featuring the desecration of holy sites, the destruction of temples, and the burning of entire cities. However, one of the duties of a Muslim ruler was to build monuments to his faith, and most of the workers available were local Indians long versed in Greek and Indian styles. One result of this situation seems to have been the infiltration of Indian furnishings into Muslim homes—part of the process that gave Islam in India its unique flavor.

As elsewhere in the Islamic world, there were differences between rural and urban households. In rural Islamic India households had few furnishings, and people usually sat on the floor. What furniture there was tended to be wooden, bamboo, or rattan, with wood usually reserved for the frames of beds. Beds could be fairly comfortable, standing on four legs of wood or bamboo, with a wooden or bamboo framework. Across the frame were crisscrossed cords that stretched diagonally. A person might sleep directly on the cords, but matting or cloth could cover the cords. Homes often had small

tables of rattan on which trays were placed. Those households that remained Hindu took care to use pots of metal or earthenware for cooking but not for serving food because once something had been used to serve food, it was impure and had to be broken and disposed of. Thus, meals were typically served on banana leaves. Sometimes cheap pottery was used and then broken—a practice that kept potters busy. On the other hand, Muslims followed more general Islamic customs, eating off trays. It was already traditional among Indians to eat only with the right hand.

In cities many imported goods were available. Wise sultans took advantage of India's geographical location between the Far East and the Near East by keeping trade routes open and respecting merchants. A typical room in a city home might have a wooden bench and an ample supply of cushions on the bench and on the floor. A room in a well-to-do household would have had rugs on its floors. Most rooms had walls decorated with hanging textiles featuring beautiful designs of plants and animals, made in Iran, central Asia, or India. A bedroom would have contained a bed with a wooden or bamboo frame with its stretched cords holding a soft mattress, along with pillows for both head and feet. The room also would have contained a small table to hold toiletries for men or women. A well-appointed bedroom would have had a sofa as well.

See also ADORNMENT; AGRICULTURE; ARCHITECTURE; ART; CRAFTS; DEATH AND BURIAL PRACTICES; FAMILY; FESTIVALS; FOOD AND DIET; GENDER STRUCTURES AND ROLES; HUNTING, FISHING, AND GATHERING; ILLUMINATION; INVENTIONS; METALLURGY; MONEY AND COINAGE; MUSIC AND MUSICAL INSTRUMENTS; RELIGION AND COSMOLOGY; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WRITING.

FURTHER READING

- Mary Jo Arnoldi, Christraud M. Geary, and Kris L. Hardin, eds., *African Material Culture* (Bloomington: Indiana University Press, 1996).
- Martyn Bramwell, "Plank and Panelled Furniture." In his *International Book of Wood* (New York: Crown Books, 1984).
- Michael Worth Davison, "Food and Finery in a Town House." In his *Everyday Life through the Ages* (New York: Reader's Digest Association, 1992).
- Jacques Gernet, *Daily Life in China: On the Eve of the Mongol Invasion, 1250–1276*, trans. H. M. Wright (London: Allen and Unwin, 1962).
- Robert Lacey and Danny Danziger, "Feasting" and "Life in Town." In their *Year 1000: What Life Was Like at the Turn of the First Millennium—An Englishman's World* (Boston: Little, Brown, 1999).
- James E. Lindsay, *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).

- Louis-Frédéric, *Daily Life in Japan at the Time of the Samurai, 1185–1603*, trans. Eileen M. Lowe (London: Allen and Unwin, 1972).
- Alice Nash and Christoph Strobel, *Daily Life of Native Americans from Post-Columbian through Nineteenth-Century America* (Westport, Conn.: Greenwood Press, 2006).
- Dorie Reents-Budet, *Painting the Maya Universe: Royal Ceramics of the Classic Period* (Durham, N.C.: Duke University Press, 1994).
- Pierre Riché, "Furniture and Clothing." In his *Daily Life in the World of Charlemagne*, trans. Jo Ann McNamara (Philadelphia: University of Pennsylvania Press, 1988).

► hunting, fishing, and gathering

INTRODUCTION

During the medieval era people pushed ever deeper into what had been wild lands. In heavily populated regions such as China, wild lands were converted to agriculture and settlements to such an extent that wild lands survived primarily in areas that were inaccessible to loggers and unsuited to agriculture. By and large people improved their hunting skills and their hunting weapons, allowing them to kill game more frequently and with more certainty. In the realm of fishing, methods tried and true for thousands of years prevailed among many cultures, but the great fishing fleets of Japan and al-Andalus already presaged a future of massive harvests of fish often from far beyond sight of land.

To look at the hunting, fishing, and gathering practices of the medieval world is to be impressed by its profound importance to almost every community, from tiny bands of nomads in central Australia to cities of sophistication with all the modern conveniences, such as Baghdad. People depended on wildlife for food, for clothing, for medicines, and for religious ceremonies. There was a remarkable similarity in the gear of hunters from place to place and time to time. The bow and arrow and the spear were used in the Americas, in Oceania, throughout Asia, in Africa, and in Europe. There were variations. The bows of the Mongols were small and light but were composite bows made of different woods that when combined gave them unusually great power. In Japan, bowmen used small bows that fired arrows rapidly.

Other sorts of skills and techniques appeared even in remote lands. The Australians had a spear-thrower, a device in which the end of a spear is placed and from which the spear may be flung with an overhand motion with great power and accuracy—enough to fell prey hundreds of yards away. There is evidence that ancient North Americans had a similar device, and perhaps medieval North Americans used it to help kill large prey. In Africa, South America, Australia, and parts of southern Asia wilderness cultures developed blowpipes. These could send darts quickly to kill small prey such as mon-

keys and squirrels. Many disparate peoples independently hit upon this idea, and some also thought of poisoning the darts to help in the hunting down of large animals.

It seems that everywhere people went, they altered the landscape. In some cases they ravaged the land with no sense of conservation. In areas such as Easter Island the results were catastrophic—the turning of wild land into wasteland. Still, during the medieval era many cultures prospered within wild environments. They did so through centuries of social adaptation. In North America this manifested in the custom of allowing forest lands to go without being hunted for a period of years, allowing them to repopulate with wildlife. In South America, India, and Japan people carefully nurtured reforestation. In South America's Amazon forests people replaced fallen trees with fruit or nut trees useful to them or beneficial to game animals. In India an entire class of worker arose, whose job was to manage game and plant new trees where others were taken down. In Japan replanting the forest became a sacred duty for many people, resulting in a populous land with thick forests, which still covered much of its territory even when Europeans began to visit.

Fishing practices had a similar division of disaster and success. In medieval cultures there seems to have been a lack of concern that the ocean's fishes would ever run out. Moreover, there was the belief among some that God had provided the earth's bounty for people to consume and that therefore it would never run out, even though on land it plainly could run out, as it did in many of the lowlands of North Africa and central Asia. Often social elites, as in China and Europe, tried to maintain remaining wild lands for their exclusive use.

Techniques for fishing included ones that were perhaps as ancient as humanity, such as the hook dangled at the end of a line. Harpoons seem to predate the last great ice age and were used to hunt turtles, large fish such as tuna, and ocean mammals such as dolphins and whales. For people living near the sea, fisheries were essential for survival. The peoples of the Pacific islands and the coast of Australia were very dependent on fish for their diet.

The exploitation of wildlife by medieval people was intense and for many of them essential. How they treated wildlife and how they used it often depended on their customs. It seems that in every case experiences in the wild figured in their storytelling, their literature, and their views of themselves as part of or apart from the natural world.

AFRICA

BY ANTHONIA C. KALU

Hunting and gathering require a great deal of work and have persisted in Africa for millennia. Hunter-gatherer groups

primarily engage in a subsistence lifestyle in which all their needs are met by hunting and foraging from their surroundings. During the medieval period many groups hunted and foraged for food in some parts of Africa. In these hunting-gathering communities men generally did the hunting, while women and children foraged. Digging sticks were used for foraging in the ground, and grinding stones were used to process foraged food items like fruits and grains. Hunters used poison-tipped arrows and spears. The poisons usually were made from natural resources like the larvae of local insects. The arrow and spear tips were made from animal bones, stone, or wood. Groups that lived near large bodies of water also fished using bone-tipped harpoons or fishhooks made from bones or other natural fibers.

The remains of wild grasses, small and large animals, land and water mollusks, and plant fibers preserved in dry or wet sites all serve as evidence that can be examined to help understand the life, survival, and persistence patterns of hunting-gathering traditions in Africa. Although the Bushmen and the peoples who lived in the central rain forest are the most studied hunter-gatherer groups in contemporary Africa, research indicates that, as in many other parts of the world, many African societies developed from hunter-gatherer groups.

There is currently no substantive evidence about hunter-gatherer groups in much of northern Africa during the medieval period. Archaeological evidence suggests that although there is no hard and fast rule to enable researchers to classify groups into cultivators, hunters-gatherers, or pastoralists, the domestication of animals took place early in the Sahel-Saharan regions of the continent. During this period groups like the Bushmen in southern Africa, the Ogiek in southeastern Kenya, and the rain-forest groups in central Africa were already struggling to retain a substantial part of their hunting and gathering traditions as external groups were beginning to enter their territories.

Archaeological and linguistic evidence show that the Khoisan (of southern Africa), the Basarwa (of present-day Botswana), and the central rain-forest peoples maintained their hunter-gatherer traditions during the medieval period. The Basarwa, the Khoisan, and the Ju/'hoansi lived mostly in the arid Kalahari, while the central rain-forest groups lived in what is today the Democratic Republic of Congo. In the Kalahari the absence of surface water for two to four months in the year made it necessary for the Basarwa to find alternative water as well as food sources. They collected moisture-containing plants, like wild melons, and dug waterholes in dry riverbeds. They also hunted wildlife, which became scarce when the animals they used as food sources moved to areas where there was water. In the rain forest the canopy also sup-

THE BUSHMEN

The Bushmen, or San people, of southern Africa are perhaps the best-known group of hunter-gatherers in world history. The general term *Bushmen* applies to a sizable number of indigenous African groups, all desert-based hunter-gatherers. They have inhabited the southern part of Africa for approximately 20,000 years. By doing so, they have flourished in conditions that later European adventurers would compare with the harsh lands of the Arctic. The southern part of Africa, although considerably warmer than the Arctic, is an equally unforgiving land. The Bushmen have survived and thrived in a region known for its wind-swept desert landscapes and its stifling heat.

The Bushmen moved frequently in the medieval period because of the limited resources, including water, necessary for survival. The same conditions ensured that the population remained small and that social groups rarely grew beyond an extended family. The Bushmen lived primarily by foraging, an activity that required an intense familiarity with the landscape, the flora, and the seasons. They hunted as well, counting on the occasional kill of small game to supplement their diet. They generally lived in caves and in shelters assembled from wood, grass, and animal skin.

While most humans lived in foraging cultures up to about 10,000 years ago, the Bushmen are distinctive because they held to this hunter-gatherer pattern until the 1950s. As other African foraging people came into contact with or under the rule of nation-states, many disappeared, were absorbed into the dominant culture, or were reduced to a marginal existence on the fringes of society. The Bushmen retained their way of life and, as a result, have been seen as surviving representatives of the foraging era or as examples of living medieval history. The days of the forager, however, appear to be numbered. The government of Botswana has attempted to push the Bushmen off their ancestral lands to open the territory to tourism and diamond mining.

ports only certain types of fauna and edible plants during the year. In addition, water levels fluctuate throughout the year. These conditions prolonged the hunting-gathering lifestyle for many groups.

Although there is not much archaeological evidence about the economic life of many African communities dur-

ing the medieval period, the different tools they used strongly suggest that hunting-gathering groups were still highly mobile. In addition to the implements they made from bones, sticks, and plant fibers, medieval African hunter-gatherer groups continued to use stone technology. Evidence suggests that although these groups moved frequently from one campsite to the next, they maintained a more or less stable diet throughout the year. They constructed hunting blinds or set traps for animals, usually preparing the animals they killed on site. For example, in their arid Kalahari homeland the Khoisan collected wild grass seeds, edible plants, fruits, and *mongongo* nuts and hunted wildlife from the surrounding environment. Some of the animals they favored most for food included the kudu, hippopotamus, and elephant.

Depending on the region, Africa's medieval hunter-gatherer groups continued to live in the open, sometimes in small movable huts, under rock shelters, or in caves. Although some of the campsites did not overlap, many groups did maintain camps in the same vicinity of the camps their ancestors had set up in past generations. This meant that each group maintained, but did not cultivate or domesticate, plants and fauna at a given site. The net result is that medieval hunter-gatherer groups continued to sustain the integrity of their environment as their ancestors had over millennia; that is, they did not exploit any given locations or resources beyond certain limits.

Many of the groups in the Kalahari used ostrich eggshells to store and carry water. Ostrich eggshell beads were also used for adornment. However, many groups—including those who lived in areas where there were no ostriches—show evidence of the use of ostrich eggshell beads during this period. This indicates that some forms of exchange existed between the different hunter-gatherer groups and their neighbors, who may or may not have been hunter-gatherers.

Farther north, rain-forest groups like the Ituri, Twa, Aka, and Baka may have begun to form symbiotic and other types of relationships with neighboring farming communities sometime during the medieval period. It is possible that their lifestyle might not have survived without the presence of nearby farming communities with whom they began to interact extensively. Husbanding of bees for the purposes of collecting honey appears to have become more intensive among these groups during this period. They foraged for wild yams and other root and stem tubers, collected palm nuts, and hunted elephants, buffaloes, crocodiles, hogs, monkeys, and duikers for subsistence. They dug game pits for hunting the larger of these animals. Most of their tools in this period were made from wood, the bones of the forest and water animals they hunted, and natural fibers.

Similarly, the Ogiek of Kenya began to interact with the pastoralist Masai and Nandi during this period. However, the

Ogiek as well as the rain-forest groups continued to maintain their distinct hunter-gatherer traditions. In both instances, the rain-forest groups and the Ogiek continued to collect honey, wild plants, and grasses and to hunt wild game in the grasslands or forests in ways similar to those of their ancestors during the later Stone Age. Most of the wild animals used as food sources remained the same as those hunted during the later Stone Age. For example, some of the bones found at the Kisio Rock Shelter in southeastern Kenya include those of animals that do not migrate. This means that hunter-gatherer groups were purposeful in their choices of sites. The animal remains found at Kisio include birds, small animals like the dik-dik, giant rats, hares, and frogs.

All hunter-gatherer groups adorned themselves with materials from their surroundings. For this they used feathers, natural fibers, and other available materials. Not much was wasted because all hunting-gathering groups saw every part of their environment as providing for and protecting them. The persistence of the hunting-gathering tradition in Africa during this period is probably the strongest indication that humans have always tended to hold on to what works for them. The frequent returns of medieval African hunters-gatherers to the same sites meant that, despite the unreliability of the seasons and the apparently hostile environment, they had figured out successful ways to use what each environment offered without destroying it. They adapted, exploited, survived, and succeeded.

THE AMERICAS

BY MICHAEL J. O'NEAL

By 500 C.E. and through the centuries beyond, most cultures in the Americas had come to rely on agriculture for a large percentage of their food needs. With some exceptions, most communities had become sedentary, so they did not move about searching for game animals or foraging for such food-stuffs as nuts, berries, and fruits, as their distant ancestors had. That said, most cultures continued to supplement their diets—some more than others—through hunting, fishing, and gathering, and fishing remained an important economic activity for people along the seacoasts and rivers. In some instances, overhunting and deforestation contributed to declines in animal populations, in turn leading to declines in human populations as well.

Modern people are likely to assume that hunting, fishing, and gathering were unreliable means of getting food and that people who lived this way led lives that were short and required unceasing labor. The reality may have been quite different. Archaeological evidence shows that life spans for many people who lived this way were relatively long. For most

pre-Columbian societies that relied on these activities for much or all of their food, food sources were relatively reliable, particularly for fishing communities. Also, pre-Columbian peoples were able periodically to regenerate their food supplies by allowing hunting areas to “rest” while game returned (along with the vegetation that game ate), adding to the reliability of the food source. Further, people who relied on smaller game as well as fish and seafood led more stable lives than those who hunted large game. While one large animal could provide a great deal of food, large game animals were harder to catch and kill, sometimes creating a “feast or famine” cycle, but a greater number of smaller animals supplied a steadier diet. Certainly people who ate insects and snakes for protein, such as jungle dwellers in South America, had what must have seemed an inexhaustible supply of food.

The people who relied most on hunting and fishing were those who inhabited the Arctic and sub-Arctic regions of Alaska and Canada, in a swath that extended from the Pacific on the west to the North Atlantic and Greenland on the east. Because of the region’s extremely long winters and cold temperatures, agriculture is impossible. Accordingly, these people, primarily the Inuit, have always relied on hunting and fishing to meet most of their material needs. On land they hunted elk, caribou, and similar large game, while trapping smaller game. A common technique was to drive the elk and caribou into corrals or ambush them at river fords or in narrow passes. At sea they caught fish and sea mammals, such as seals and whales.

To the south, the peoples of the Northwest, including the Tlingit, the Salish, and numerous others, were also unable to pursue much agriculture production. The region was wedged between the sea and mountain ranges, such as the Cascades, and summers were relatively short. However, the inhabitants of this region enjoyed abundant natural resources. Like their Arctic neighbors, they fished and hunted sea mammals in the ocean. Those along the coast fished for salmon and halibut at sea; those farther inland relied on salmon runs in the rivers. The rivers were often so dense with salmon that the fish could be caught with spears as they leapt out of the water. The forests of the Northwest also provided berries, nuts, and tubers (roots), along with mountain sheep, mountain goats, and elk. To the south, in the intermountain regions of present-day Utah, California, and Nevada, people continued to live as they had in ancient times, gathering nuts, berries, wild grains, and fruits; hunting deer; and using nets to capture migratory birds. The resources in both the Northwest and the intermountain region were able to support much larger populations than the more northerly Arctic regions.

The Great Plains of North America, extending from the middle of Canada southward to modern-day Texas, supported

BUFFALO HUNTING

The Plains Indians used a number of techniques to hunt buffalo before the arrival of Europeans and their horses. One of the most common methods was the “corral” method. A hunter dressed in buffalo robes lured buffalo into a narrow ravine. At the end of the ravine was a long corral, or pen. Other hunters were ranged along the ravine and herded the buffalo into the corral, where they were slaughtered. Another technique was the “jump” method. Again, hunters lured buffalo to the edge of a cliff. Then other hunters appeared and waved blankets and shouted to force the buffalo to jump over the cliff. At the bottom another band of hunters stood ready to kill animals that were injured but not dead. Other techniques included driving the herd into deep snow, where they could not easily move, making kills easier. Sometimes hunters waited at watering holes and killed the buffalo when they came to drink. Another method was to set grass fires, which either drove buffalo into streams or forced them into restricted areas, where they were easier to kill. For the Plains people, buffalo hunting was not just a matter of material survival. Hunting and the rituals associated with slaughtering, cooking, and consuming the buffalo were matters of great religious significance.

Plains Indians used virtually every part of the buffalo. The meat, typically around 225 to 400 pounds from an average mature buffalo, was either roasted or made into pemmican (a mixture of meat, fat, and berries) or sausage, which could be preserved over the winter. Hides were used for clothing, blankets, ceremonial robes, gloves, and the like. Additionally, hides with most of the hair removed were used for clothing, tepees, boat skins, containers, blankets, and rope. Sinews (muscle tendons) were used for thread, webbing for snowshoes, laces, and bowstrings. Bones (especially the ribs) were turned into sled runners, arrow points, hoes, shovels, pipes (for smoking), awls for sewing, and scraping tools; the skull was used for ceremonial purposes.

The list of useful buffalo parts goes on. Horns were turned into containers, spoons, cups, bowls, and even toys. Hair was used to make yarn, pillow stuffing, brushes, and rope; even the buffalo’s beard was used as clothing decoration, and the tail could be used as either a flyswatter or a whip. The buffalo’s brain was employed as a tanning substance to soften hides. Hooves were turned into rattles and boiled to make glue. Fat was used as paint or to make candles and soap. The teeth were used for decorative objects and necklaces. The stomach and bladder served as containers for water and other liquids, and the stomach could be used as a cooking vessel. Even the buffalo’s manure was used as fuel for fires (after it dried, of course).

A controversy among scientists and historians concerns the way buffalo were hunted and used. The conventional view is that the Plains Indians hunted just what they needed and used every part of the animal—acting in this way as North America’s earliest conservationists. In contrast, early European settlers, according to this view, hunted the buffalo into near extinction for their hides, often wasting most of the resources the buffalo provided. Another view notes, however, that Native Americans may not always have been the conservationists of popular myth. In many cases male animals were left to rot in preference for the more tender meat of females. Moreover, the tongue and hump were the preferred meats, so sometimes large portions of the animal remained unused, and occasionally entire herds were killed just for the tongues. In some hunts it was not unusual for as many as a thousand animals to be killed—far more than necessary to meet the group’s needs.

the last hunter-gatherer societies in the Americas, primarily the Sioux, the Cheyenne, and the Arapaho, among others. The Plains Indians survived primarily as nomadic hunting bands, moving to temporary encampments to follow herds of buffalo, their primary source of food. The Plains Indians also hunted other large game, including elk. Frequently, they traded buffalo meat and hides for agricultural produce from more sedentary neighbors.

The Plains people may have “managed” their landscape to increase their hunting success. Some historians and biologists believe that large areas of the Great Plains were created

by hunting groups who used fire to beat back the forests creating what were, in effect, game preserves. In other parts of the Americas human populations altered their environment to create habitat areas for beaver, deer, elk, porcupine, hare, turkey, grouse, quail, and other game birds, all with a view to boosting food supplies.

To the east, stretching from the eastern coast of Canada and down to the Carolinas, then westward to roughly the Mississippi River, numerous Eastern Woodland peoples relied on a mixture of agriculture and hunting, gathering, and fishing. The forests of these regions provided large game, such

as deer, smaller game, such as rabbits, and other foodstuffs, such as nuts, berries, and fruits. Along the seacoast and rivers, groups focused more on fishing and gathered shellfish. Fishing tools included hooks, nets, and spears. In the semitropical areas to the south, people relied more on fishing and gathering shellfish, and they hunted deer with bows and arrows and blowguns. They also fished by actually poisoning the rivers, killing the fish, which they then gathered at will. To the west, the people of the American Southwest and northern Mexico, most notably the Anasazi, had to rely primarily on agriculture. However, this region also offered some game meat, including the occasional buffalo, as well as native edible plants, including species of cactus.

In Mesoamerica—the region that encompassed southern Mexico, the Yucatán Peninsula, El Salvador, Guatemala, Honduras, and Belize—the primary source of food in the pre-Columbian period was agriculture. The sparsely vegetated, desertlike regions of Mesoamerica supported very little game and few wild edible foodstuffs, so crops of maize (corn) and beans were the primary foods. However, from time to time people conducted controlled burns of grasslands and sparse woodlands. The new, tender shoots attracted game, which then was hunted for food. People along the coasts, and especially those who lived on Caribbean islands, depended more on fishing and shellfish, often trading salted fish for other foods from the mainland. In the tropical forests of Mesoamerica people hunted monkeys, among other small animals, for meat.

South America presents a rich variety of terrains and climate zones, from savanna grasslands to tropical forests to deserts to high mountain ranges. In the centuries before the Common Era, agriculture, including crops and herding, became the primary mode of subsistence and remained so in the medieval period. Hunting was simply too onerous in the dense jungles of the Amazon Basin or the mountain highlands of Peru, although some cultures hunted the guanaco, a camel-like animal, as well as some species of monkeys. People who lived along the coastlines met most of their nutritional needs by fishing (usually with traps), gathering mollusks, and hunting sea mammals, including dolphins, seals, and sea lions. This mode of existence was especially commonplace among people at the southernmost end of South America, where short summers made agriculture impossible. These people relied almost entirely on marine life for their subsistence.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

The hunting, fishing, and gathering practices of medieval Asia and the Pacific regions were vast and varied, and they were af-

ected by geography, climate, and customs. In China exploitation of wild animals and plants had changed the landscape. When the earliest-known Chinese kingdom formed, which was ruled by the Shang Dynasty (ca. 1500–1045 B.C.E.), the land south of Beijing down into Indochina was composed mostly of deciduous forests, with southern and western mountains blanketed in forests. By the 500s these forests had been mostly cleared away, and during the medieval era the forests were cut back to the southern mountains, where rough terrain made logging too difficult for clearing the land. Thus, medieval Chinese hunters faced ever-changing conditions. They had to hunt in the cold forests of Manchuria, Siberia, and Korea, or in the mountains of the south, or on the eastern slopes of the Himalayas.

An alternative was to hunt in man-made parks built for the use of aristocrats and emperors. The most famous of these was Forbidden Park of Xi'an (earlier, Ch'ang-an) during the Tang Dynasty (618–907). This park had a cultivated forest, and herds of white deer ran wild in it. It was stocked with wild pigs, and its waters attracted wild birds. The emperor and his guests would set themselves in a clearing, and then beaters would drive game toward them, which they shot with arrows. Sometimes hunting dogs were used to chase down animals for the hunters to kill. The dead animals could be eaten in feasts. Many aristocrats liked to hunt in the countryside outside of parks, chasing birds as well as pigs. Most of the countryside was cultivated, which meant that farm fields were sometimes trampled.

Many Chinese who lived near surviving wildlands hunted and foraged in those areas to supplement their diets. In the south they gathered bamboo shoots, oranges, and tea leaves. There were tigers, bears, deer, pigs, and many game birds. The skins of tigers and bears could be used for clothing and their body parts for folk medicines. If captured alive, they would be sold to the government for use in parks. The imperial government sometimes sent out expeditions to gather rare plants and animals for use in gardens as well as parks. The government representatives on these expeditions were loathed by local people for mistreating them and for looting the wildlife many needed for food. On at least two occasions local governors complained—one threw the government agents in prison, and both wrote letters of protest to the emperor. In both instances the emperors involved responded favorably to the protests. In the forests of Manchuria and Siberia, Chinese hunters found huge brown bears, Siberian tigers, deer, hares, and many species of game birds.

Peasants were allowed to own bows and arrows and hunting spears, but professional hunters and aristocrats were usually superior marksmen, and the aristocrats would hunt from the backs of horses. The aristocrats often enjoyed falconry, or

the sport of hunting with predatory birds. Goshawks, which were used to hunt rabbits, pheasants, and other birds, were favored by peasants and aristocrats alike. Eagles sometimes were used to hunt large animals such as deer and wolves. Sparrow hawks were used to hunt small birds, whereas falcons were used to knock larger birds out of the sky.

Fishing was common anywhere there was water in China, and people caught fish to supplement their diets. Along the coasts villagers often made their living from fishing near the coast and shipping their catches to market, usually up waterways inland. In Korea and Japan fishing was a vital industry. There were diverse fishing societies on Korea's long coastline and on its numerous islands, but in general men fished out at sea in boats, while women fished in shallow waters. The women harvested seaweed, with girls learning to cut the plant while leaving enough of it for regrowth. Seaweed was harvested in winter, when the water was cold. In addition, women brought in abalone, crab, crayfish, and shrimp.

The forests of Korea harbored deer, wild pigs, cranes, ducks, pheasants, and swans as well as tigers, bears, and leopards. These animals were widely hunted, but the forests brought other bounties in vast quantities that could stave off starvation in hard times: apples, pears, persimmons, tangerines, grapes, walnuts, chestnuts, pine nuts, and ginkgo. The forests of Japan were also dense and rich. Early in the medieval era the Japanese developed a custom of renewing its forests. It was taken as a matter of religious devotion or as cooperative projects for college students to go where trees had been logged and plant new trees. This did much to preserve Japan's wildlife. So, too, did the Japanese aversion to living in the mountains. Most of the islands of Japan are covered in mountains, which had forests that were sometimes logged but were not cleared for settlement.

Game animals included deer, antelope, rabbits, and wild pigs. The Ainu of northern Honshū and Hokkaidō hunted bear and used bearskins in religious rituals. Game animals were driven toward hunters by beaters; the hunters used bows and arrows. People living in or near forests could add protein from animals of the forests to their diets, but most Japanese relied on fish. The Japanese had tended to live on the coastal lowlands, and they had long fished in the surrounding seas. During medieval times large fleets of boats patrolled the coasts, catching fish that would be rapidly transported inland to be served that very day at dinner in homes or restaurants. The Japanese ventured out of sight of shore, hunting for schools of fish.

Fishing was also important in Southeast Asia. In Cambodia, South Vietnam, the Philippines, and many islands of Indonesia people built houses on stilts over rivers and marshes to give themselves daily access to fish. They used hooks and

lines that they dangled from their porches. They also ventured out on water in boats. The saddle-shaped houses of the Batak of Sumatra are thought by some historians to represent the prows of oceangoing ships, signifying the boating heritage of the Bataks. Coastal fishing was common, with the Philippines alone having more than 2,000 species of fish near shore.

Among the Hindus and Buddhists of India slaying animals was supposedly forbidden, but their culture provided numerous exceptions for killing animals for food. In the case of fishing, any fish caught with a hook was thought to have chosen to bite the hook and therefore it, not the fisherman, was responsible for its death. Consequently, someone who caught a fish or two by hook could eat them without guilt. Even so, some professional fishermen operated on large rivers and along the coast, using not only lines and hooks but nets and baskets as well. They would gut and clean the fish and even cook the fish before sending it to market.

India had a very ancient tradition of replenishing its forests. A class of worker, the forester, was required to manage the forests on behalf of the monarch, who supposedly owned all the forests within his or her domain. The foresters picked what trees were to be logged, and they planted new trees where logging had taken place. They tended to plant trees that were useful to people, thus modifying India's forests to favor nut-bearing and fruit-bearing trees as well as good timber trees. There were several other classes of workers who used the wildlife resources of India. There were people who collected honey, wandering through woodlands and tapping trees to hear which ones were hollow and might contain a beehive. There were people who gathered sticks from the forest floor, bound them up into bundles, and sold them to housewives in towns for use in cooking fires.

Professional hunters lived near forests. Their tools included bows and arrows, spears, blowpipes, and traps. They hunted to sell meat in towns and to capture animals for the hunting parks of monarchs and aristocrats. Tough little hunting dogs who tracked down game often accompanied hunters in their work. Fowlers were a separate occupation from hunters, and they specialized in hunting birds. They used bows and arrows and nets. They sometimes captured birds alive to sell to the parks of the monarch and aristocrats.

A monarch's hunt tended to be a big production. If monarchs could find time free from the requirements of statecraft, they would go hunting in a royal game preserve that would have deer, wild pigs, and many game birds. The monarch would go with professional hunters, who would beat animals in his direction. Other attendants made sure the monarch was refreshed with food and drink and kept cool. The ruler would show off his skills with the bow and arrow. The animals that were killed often were used as offerings in religious rituals.

The peoples of Oceania had widely varied habitats. Small atolls might have only vines and grasses with just a few shrubs or trees. Larger ones with more freshwater available could have banana, breadfruit, and taro plants. People often brought coconut trees to atolls. Even on the large island of New Guinea people had to learn to raise crops in order to survive. For most Pacific islanders fishing was essential for survival. Atolls usually had hundreds of species of fish near their shores. There were also turtles, lobsters, oysters, snails, sea cucumbers, octopi, and squid near shore. When enough wood was available to build boats or rafts, islanders often fished far from shore, using nets to catch tuna and other large fish. They hunted dolphin with harpoons.

The climates of Australia were varied, which meant that not all medieval Australians hunted, fished, or gathered in the same way. In general, medieval Australians hunted and gathered everything they ate. Clothing, bags, and spiritual objects all derived from something found rather than cultivated. There was a division of labor reflected in their tools. Women had digging sticks, usually of hardwood with a point at one end or both ends, used to burrow out roots and delicacies such as small frogs that retained water while hiding underground during dry spells and, thus, served as sources of hydration. The roots of the mallee tree also contained water. The blood of kangaroos and wallabies were drunk by some Australians to ease thirst, although many found the blood too salty to drink.

Men had bows and arrows, spears and spear-throwers, and nets. They hunted kangaroos, wallabies, possums, flying foxes, snakes, lizards, tortoises, emus, and mallee hens. They would drive emus and other birds into outstretched nets, entangling the animals. Australians knew when different species of birds laid their eggs and would visit nesting grounds at the right time to gather them. Australians foraged for yams, peaches, figs, berries, and nuts. Mussels were hunted in inland ponds and rivers. Fish were hunted with spears, harpoons, and nets. Some Australians hunted in boats along the coast for turtles, stingrays, fish, and dugongs, and they killed beached whales. They gathered clams, oysters, lobsters, and crayfish.

EUROPE

BY GEORGE HAMBRECHT

Almost all types of hunting, gathering, and fishing were heavily regulated by medieval legal codes, with overlapping jurisdictions of unwritten customary law (tradition), secular or common law, and canon law all competing for the right to order “wild,” or uncultivated, natural resources. By the High Middle Ages many such resources were under the control



Badge showing huntsman with bow and hunting horn, British, late 1300s (© Museum of London)

of elites, whether noble or ecclesiastical, leaving few uncontested “wild commons.” The word *forest* had a specific legal definition in many medieval law codes that designated such areas, whether wooded or not, as those where all game belonged to the king or to local secular or ecclesiastical nobles. Moreover, several parties could each have rights of collection for different materials within the same area. Forests, for instance, were multi-use places where herbs, fruit, nuts, mushrooms, building materials, firewood, medicinal materials, and food were gathered. Wild animals were also hunted there, and even domestic animals, especially pigs, were allowed to graze forest areas (a practice known as pannage in English law). Each of these rights could have been, and probably would have been, held by different people, households, and communities.

The activities of hunting, fishing, and gathering in the European medieval period were generally directed toward two ends: for the “pot,” or the use of wild resources for personal or household consumption, and for trade, or the provisioning of larger households and towns. It is harder to find documentary evidence for the former, although archaeologi-

cal evidence can be of help in understanding the extent and quality of such activities. Activities of the latter type, however, show up in both documentary and archaeological evidence.

Pot hunting was obviously widespread in the medieval period and, with the exception of relatively small urban populations, was practiced from the Byzantine lands in the Balkans to Islamic and Christian Spain. Given its popularity, hunting both reflected and revealed certain ideological and social conditions in medieval Europe. The hunting of big game, such as deer, European bison, and elk, was thought of as the preserve of the nobility and was an important part of the aristocratic self-image. Scenes of the nobility hunting are portrayed in countless tapestries and paintings and on decorative objects. In addition to supplying the noble table with meat—believed, especially by the nobles of Christendom, to be the appropriate diet for the aristocracy—hunting was thought to keep martial skills sharp in times of peace as well as offering recreation.

Zooarchaeological analyses of middens (refuse heaps) from medieval Belgium reveal that hunting and fishing reflected the medieval European social order of the three estates: the nobility, the ecclesiastics, and the commoners. Archaeofaunal assemblages, or groupings of the remains of animals, associated with the nobility show a preponderance of wild game, especially big game such as red deer. Assemblages associated with the ecclesiastic estate, or clergy, show great numbers of fish and next to no big game at all. Assemblages associated with commoners, though few in number, contain very little game at all, and what evidence of meat is present comes from domestic animals.

Forests and other nonagricultural lands often were reserved specifically for the noble hunt. In almost all medieval law codes poaching and other non-noble encroachments had severe punishments attached to them. These lands frequently were protected physically as well. In England before the Black Death (bubonic plague), for example, where growing populations resulted in an increase of cultivated land and a converse shrinking of the “wild” lands, several forests were literally walled off in order to preserve timber and game for the nobility. The Robin Hood stories might be a reflection of the growing tension between noble hunting and forestry prerogatives and the common encroachments upon them.

Hunting was also used to gather valuable trading goods. Archaeofaunal assemblages and documents both show that the republic of Novgorod was actively engaged in fur hunting for trade in networks stretching from the Arctic regions of Scandinavia and Siberia to western Europe, Byzantium, and the Islamic lands to the south. The Norse Greenland colony was likewise very active in walrus hunting to obtain ivory, a prized material for decorative art throughout medieval Eu-

rope. So important was the substance to the Greenland colony's economy that some have hypothesized that it was the increased and cheaper availability of ivory from Novgorod and Africa that made the Greenland colony no longer economically viable and hastened its fatal isolation from continental Europe.

Fishing was a ubiquitous activity for many people living near water in medieval Europe. Freshwater fishing was a basic part of medieval household subsistence for most (though surprisingly not all) of those near such resources. Many monasteries established fish farming ponds on their properties. Marine fishing and shoreline gathering were important elements in the subsistence of many coastal populations. In many areas there was a difference between what a community saved for its own consumption and what it processed for export. Fishermen in medieval Iceland, for instance, consumed haddock while saving cod for export, just as they generally do in the 21st century. In northern Norway halibut generally was consumed domestically, while cod was saved for export.

Intensive fishing for export took place in both the medieval Mediterranean Sea and the Atlantic Ocean. The Mediterranean saw tuna fishing in Sicily, Catalonia, and the Ionian islands, when the tuna happened to appear, with much of the catch pickled in brine or vinegar for export. Other, more humble fishing operations, such as the eel fishery at Lake Bolsena in Italy, were possibly more dependable. These eels were salted and then exported, some for great distances, such as those that were sold to the 14th-century papal court in Avignon. Garum, a fish paste beloved by the ancient Romans, continued to be produced in the medieval Mediterranean region.

The Atlantic Ocean was even more fertile than the Mediterranean in terms of exploitable fish populations. As early as the eighth century in Arctic Norway, the catching and drying of fish, mainly members of the cod family, has been seen through archaeological research. This fishing and processing supplied large chiefly households in the Arctic region around the Lofoten Islands. Dried fish, along with beer, allowed chiefs to attract and sustain large groups of retainers, who functioned largely as private armies, with which they broadcast their own power. This fishing and processing knowledge was carried with the Scandinavian settlers of the Viking Age to Iceland, the Faeroe Islands, and the British Isles. Coastal settlers of Iceland, for example, were clearly processing cod and trading them far inland. It can be argued that these initial trading networks are the origin of the medieval trade in stockfish, which was such an integral part of the Hanseatic League and the later early modern European world trading systems. The Hanseatic League likewise controlled the herring fisheries in the Baltic and North seas.

Gathering was ubiquitous in medieval Europe, as it is today in any rural community. Seasonal berries, fruits, nuts, and mushrooms were collected by people throughout medieval Europe for the purposes of food, medicine, and, very likely, recreation. Archaeological and documentary evidence, in the form of medieval cookbooks, herbariums, and books on medicine, illustrate this. For example, the plant *Angelica officinalis*, a species found from Iceland through Scandinavia and into the Baltic regions, was gathered for culinary and medicinal uses. High in vitamin C, it was a valuable in preventing scurvy in northern regions, where the diet might make people vulnerable to the disease.

Salt was a highly prized resource in the medieval period. In the Mediterranean it was collected in estuarine areas that also contained large and exploitable numbers of fish. This pairing allowed for the preservation of fish through salting, leading to the export of salted fish as a trade item. This pairing of salt extraction and fish preserving also was found in the Black Sea region after the sixth century, around the mouth of the Danube, and at the mouths of the Russian and Ukrainian river systems in the Black Sea. Salt was later collected in the coastal regions of the Atlantic as well.

Wood, of course, was valuable as a resource for building materials and fire. Charcoal burners are noted in documents as well as in archaeological remains throughout medieval Europe. Charcoal was used both for domestic consumption and as fuel for metallurgy and other craft industries. Forestry rights were often legally defined. Commoners might have the right to gather certain amounts of fallen wood for domestic purposes, while others might hold the right of live timber harvesting. In areas where wood was scarce, the right to collect driftwood was regulated strictly. In Iceland, where such debris can come in the form of large, whole Siberian trees, the medieval Icelandic Church retained the right of ownership to driftwood appearing on many specific beaches throughout Iceland.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In much of the medieval Islamic world, hunting was not important for supplying food. In general, people much preferred the foods they could find in markets. Such foods were almost always inspected and approved as *halal* ("that which is permitted" in Islamic law). The farther away from cities people lived, the more likely they were to depend on hunting for some of their food. In some areas hunting was essential to supplying protein in people's diets.

The rules for hunting were much debated by religious and legal scholars who tried to define what was *halal* and

what was *haram* ("that which is forbidden"). In different places at different times the rules varied, but in general hunters were mindful of an injunction in the Koran against wasting what God provided. God provided all the world's blessings for humanity and therefore should be thanked for what he made available. This meant, for example, that a sultan hunting with his falcon or hunting dogs were required to invoke God's name when dogs were let loose or a falcon was released. Failure to speak God's name made whatever was killed *haram*.

There were rules for how hunters were to conduct their kills. Hunting weapons were supposed to be decisively effective. Bows and arrows and spears, for example, were permissible because they were designed to penetrate a vital organ and thereby kill quickly. Hunters should focus on taking the animal only for good use, and it should have as merciful a death as possible. If hunters used hunting dogs, they were to be only trained dogs that understood their duty. Animals killed by untrained dogs were *haram*.

The rules could be very detailed. For instance, if a hunter came upon prey that had been bitten by his hunting dog, he could use it for food if it had plainly been killed by his dog, even if the dog had eaten some of it. If the prey was still alive and the hunter waited for the prey to die, then he could not use it for food. To make the prey *halal*, he had to kill it himself with a blow that fatally penetrated an internal organ of the animal. Authorities were divided on the matter of an animal found soon after it was wounded and then quickly slain. Most seem to have believed that the prey would still be *halal* provided the hunter did not hesitate but quickly dealt the fatal blow. Others thought the prey was already *haram* because of its suffering and because it had bled. Failure to penetrate a vital organ, thus sometimes allowing prey to bleed to death, made the animal unacceptable as food. Prey that was killed by a hunting dog but lay overnight before the hunter found it could not be eaten.

Many passages from the Koran and the Hadith (the record of Muhammad's sayings and proscriptions) were cited by scholars to support this point, but in sum it was considered wrong for the prey to suffer a lingering death. The same rules applied to the use of falcons and hawks. Prey that was knocked out of the air by trained falcons or hawks or that had been taken down by hunting dogs had to be killed the instant the hunter came upon it. Again, hesitation could make the prey *haram*.

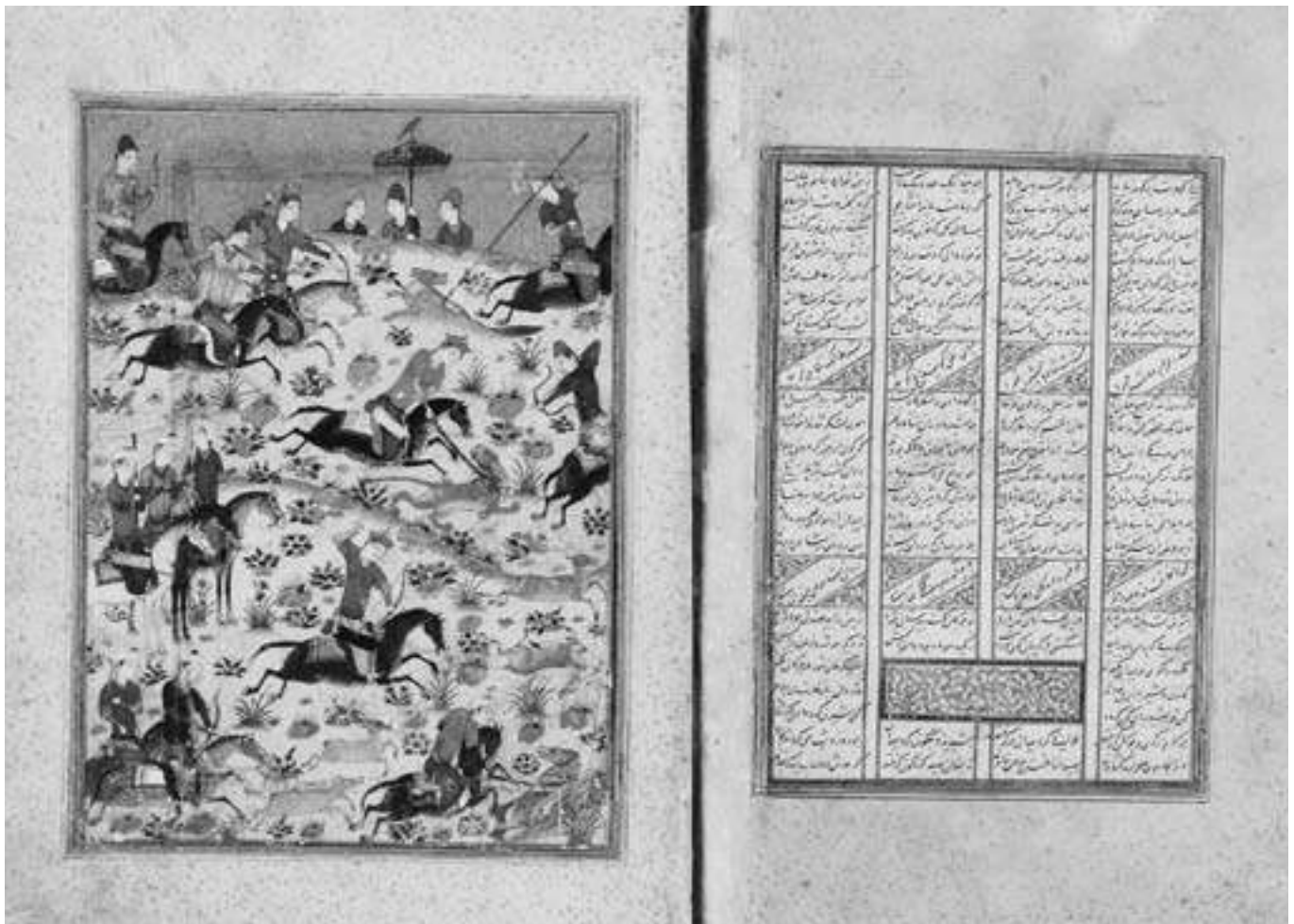
Unlawful prey included all pigs at all times. Animals that had once been domesticated but had become wild, had died of disease, or had been killed by wild animals were *haram*. A distinction was made for animal skins. Pigskin was unlawful to touch. Some scholars believed that it was *haram* for

Muslims even to handle a container holding any parts of pigs. Most, however, seem to have believed that as long as Muslims did not themselves actually touch the parts of a pig, handling the container was acceptable, although the person might have to fast for a day as penance. For animals that were forbidden as food, it was acceptable to use the wool or skins. The tanning process was thought to purify animal skins, except for those of pigs.

During the hajj (the pilgrimage to Mecca that was the religious duty of all Muslims) it was forbidden for pilgrims to eat wild game but acceptable for them to eat fish. Animals from rivers, lakes, and the sea fell under different rules from animals of the land and air because, in the Koran, God declares all things from the sea to be pure. Thus, even carrion of a sea animal washed onto shore could be lawfully eaten, whereas carrion of land animals and birds could not be lawfully eaten.

Lines and hooks and nets were used to fish. These could be used in any stream or body of water, provided it did not lie in lands belonging to someone else. Professional fishermen plied the waters of the seas surrounding the Islamic world and large rivers, most significantly the Nile. The common fishing boat was a dhow, which had the classic triangular sail that is still found on boats in the Middle East and Africa. Small fleets of boats owned by merchants or groups of investors used nets to troll for fish in the eastern Mediterranean Sea; sometimes they were protected by galleys against pirates and fleets from rival European lands such as Italy.

The grandest Muslim fishing fleets may have been those of Morocco and Andalusia. The first fishing boats of these fleets were dhows. Their sailors were truly intrepid, sailing into the Atlantic to find fish out of sight of land. In the medieval Islamic world, the Atlantic Ocean was known as the Sea of Darkness, and it was the locale for tales of the



King Khusraw and Princess Shirin in the hunting field, by Nizami, ink, opaque watercolor, and gold on paper; Iran; 15th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1931-33)

supernatural and terror. Even during the first centuries of the development of Andalusia, however, Muslim boats sailed as far as the Canary Islands, and daring explorers sailed to Ireland. During the 1300s the boats with triangular sails were slowly replaced by much larger ships equipped with square-rigged sails, better suited to big ships than was the triangular sail. Fleets set sail from fishing ports in Lisbon in western Andalusia and Morocco and seem to have so regularly sailed far out to sea that trips to places such as the Azores, Canary, and Cape Verde islands were almost routine. The Muslim fishing fleets sailed north to fish in the ocean west of Brittany and south to fish off the African coast south of the Canary Islands. They brought back huge hauls of fish that were then cooked, dried, or salted for transport throughout much of the Mediterranean.

Hunting as a pastime was a favorite sport of the wealthy and the well connected in the medieval Islamic world, and hunting took place in wild places in mountains and deserts. Medieval Islamic literature often depicts the hunter as an adventurer astride his horse. Although hunting for sport could involve the usual weapons of bows and arrows and spears, most sportsmen seem to have preferred using trained falcons and hawks. In the 1100s the wealthy elite of Syria hunted in mountains near the coast, where some lands were known to be good for hunting hares and others for game birds such as partridges, geese, and quail. Although hunting dogs could be used to scare prey out into the open, falcons and hawks brought the prey down. The hunter typically sat on his horse, spoke the name of God, and released his bird of prey.

Gazelles were native to much of the Near East and often were hunted for both food and sport. Among the social elite far from cities, the hunting of gazelle could be a festive affair, with the animals slain by arrow or spear from a rider on horseback whose race at breakneck speed, often over obstacles, impressed onlookers. Slain gazelles would be prepared, cooked, and eaten on the spot after retainers moved tents and other gear to the grounds where the gazelles were slain.

One hunting animal popular among the wealthy was the cheetah. It was native to Africa and was exported from Africa to much of the Islamic world. In areas where lands were fairly open with few trees and shrubs, trained cheetahs were set loose on swift prey such as deer and hares. Their kills seem to have been treated like those of hunting dogs.

The use of trained falcons and hawks by hunters for sport was popular throughout most of the medieval Islamic world, with possible exceptions being sub-Saharan Africa and southern wetlands in southern Asia, where little is known about Islamic hunting practices. Wealthy hunters sent emissaries to Istanbul, Italy, and other exotic places to find the best-

trained, most-capable birds for use in hunts. The falcons and hawks were shipped with a supply of pigeons to feed them. People in the country often used nets to capture falcons and hawks, caged them, and took them to market or sold them outside their homes or along roads.

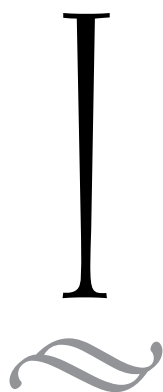
Among the most favored birds were those that came from the Bulgars—Muslim Turks who lived along the Volga and Kama rivers near the northern extremity of the Islamic world. Beginning perhaps in the late 900s the Bulgars had a major industry of forest products that they traded for the manufactured goods of the Islamic world to the south. They exported falcons, honey, and nuts, but they mostly hunted for furs. As long as they did not transgress the rule forbidding waste and killed the animals for a useful purpose, the hunting was halal. The animal's furs were to be used in clothing, and in some cases, such as squirrels, the meat of the prey could be eaten. The Bulgars hunted foxes, sables, martens, and beavers for their furs.

See also AGRICULTURE; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; ECONOMY; EXPLORATION; FOOD AND DIET; FORESTS AND FORESTRY; GENDER STRUCTURES AND ROLES; HEALTH AND DISEASE; HOUSEHOLD GOODS; LAWS AND LEGAL CODES; LITERATURE; METALLURGY; MINING, QUARRYING, AND SALT MAKING; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SEAFARING AND NAVIGATION; SOCIAL ORGANIZATION; SPORTS AND RECREATION; STORAGE AND PRESERVATION; TRADE AND EXCHANGE.

FURTHER READING

- Charles Benn, "Hunting." In *China's Golden Age: Everyday Life in the Tang Dynasty* (New York: Oxford University Press, 2004).
- Ronald M. Berndt and Catherine H. Berndt, "Exploitation of Natural Environment." In *The World of the First Australians: Aboriginal Traditional Life: Past and Present*, 5th ed., eds. Ronald M. Berndt and Catherine H. Berndt (Canberra, Australian Capital Territory: Aboriginal Studies Press, 1996).
- Jean Birrell, *Common Rights in the Medieval Forest: Disputes and Conflicts in the Thirteenth Century, Past and Present* 117 (November 1987): 22–49.
- Georges Duby, *Rural Economy and Country Life in the Medieval West* (Philadelphia: University of Pennsylvania Press, 1998).
- "Game," *USC-MSA Compendium of Muslim Texts*. Available online. URL: <http://www.usc.edu/dept/MSA/fundamentals/hadith-sunnah/muwatta/025.mmt.html>. Downloaded on September 23, 2007.
- Susan Kent, ed., *Ethnicity, Hunter-Gatherers, and the "Others": Association or Assimilation in Africa* (Washington, D.C.: Smithsonian Institution Press, 2002).
- Sibel Barut Kusimba, *African Foragers: Environment, Technology, Interactions* (Walnut Creek, Calif.: AltaMira Press, 2003).

- David L. Lentz, ed., *Imperfect Balance: Landscape Transformations in the Precolumbian Americas* (New York: Columbia University Press, 2000).
- James E. Lindsay, "Entertainments." In his *Daily Life in the Medieval Islamic World*, (Westport, Conn.: Greenwood Press, 2005).
- Janet Mathews, "Hunting by Magic" and "Nets for Hunting." In her *Wurley & Wommerra: Aboriginal Life and Craft* (New York: Collins, 1979).
- David Nicolle, "Mystical Islands and Whales," "The Far North," and "Islam of the Defensive." In his *Historical Atlas of the Islamic World* (New York: Checkmark Books, 2003).
- Catherine Panter-Brick, Robert H. Layton, and Peter Rowley Conwy, eds., *Hunter-Gatherers: An Interdisciplinary Perspective* (Cambridge, U.K.: Cambridge University Press, 2001).
- B. H. Slicher van Bath, *The Agrarian History of Western Europe A.D. 500–1850* (London: Edward Arnold Ltd., 1963).



► illumination

INTRODUCTION

Managing light was of concern to many medieval cultures. With some variations, there were five main sources of light: the sun, fires, candles, oil lamps, and lanterns. In China people sometimes placed fireflies into lanterns, but lanterns usually had candles inside them. Lanterns were made of bamboo, wooden, or metal frames, around which paper or cloth was wrapped and glued. Decorated coverings would shine when the candle was lighted.

Oil lamps consisted of two main parts: a vessel for holding the fuel and a notch or nozzle for placing a wick. Oil lamps were used in many different parts of the world, and as a consequence the sorts of fuels varied according to available sources. North Americans sometimes used tar or petroleum that had risen into pools on the surface. Most people used either animal fats or oils from plants. In the Americas and eastern Asia fish oil was often burned. In India oils came from cinnamon and other plants, in Africa it came from palm nuts and animal fat, in the Islamic world it came mostly from olives, and in Europe it came from animal fats, grain, and olives.

Candles were not as widely used as were oil lamps. They were made from boiled animal fat or from molten beeswax into which a wick was dipped. When lighted, it was the burning fuel that provided the flame. A pool of oil or wax would pool at the candle's peak, and it was this that was burned.

Sometimes candles were used to tell time; the candle would be marked with numbers or other indications of the time. In religious institutions it was important that the person in charge of the candles replaced it each day, usually at dawn, just after he or she awakened.

Fires played central roles in many people's lives. In Indian homes married couples had fires in their hearths that were meant never to be allowed to go out, because the fire represented their marital union. If it did go out, the married couple had to go through several rituals before the fire could be relit. For people living outdoors, fires could be the centers of their community. For instance, Australians would tell stories and pass on information about their religion or their daily techniques of survival to the young. In Europe travelers would gather around campfires and share their stories.

Sunlight was both friend and enemy. It provided much better light than did lanterns, lamps, candles, or fires, but its light could become oppressive and could be so bright as to be blinding. Many cultures tried to find ways to manage sunlight to their benefit. In the Near East people often used latticework in their windows to soften the sunlight that passed through. Other people built courtyards that would be bathed in sunlight, but the people would do their business in shadows cast by overhanging eaves or verandas.

All these sources of light often had religious significance. For those people who believed that the sun was a god, finding ways to incorporate the sun into their religious rituals was important. Many religions used sunlight to heighten the effects

of temples and shrines. Buddhist temples often had a statue of the Buddha in an otherwise dark room, with shafts of light from windows or entryways cast directly on the statue. Muslims used sunlight to create an air of mystery in many of their mosques; by allowing light to be cast in the center of a prayer room with the rest of the room in darkness, they created the effect of a room with no walls, as if it were an expression of the infinite spirituality of God.

In homes and private businesses artificial lighting meant that people could make use of hours when the sun was not in the sky. They built niches for lamps into their walls, had metal stands to hold their candles or lamps, and hung lamps, lanterns, and candles from the ceiling in metal frameworks. These methods of lighting after dark were hazardous. They could strain the eyes of people trying to read or work. Another hazard was fire. In Europe and China there were instances when the careless use of a candle or lamp resulted in fires that burned large sections of cities. In China the imperial government created a curfew, after which all lights were to be extinguished on pain of criminal prosecution. Nevertheless, medieval people found artificial lighting so valuable for extending the days into the night that they pressed on with its use despite the dangers.

AFRICA

BY AMY HACKNEY BLACKWELL

Throughout most of medieval Africa the main source of illumination was the sun. The hours during which the sun shone varied from place to place. At the equator days were the same length as nights year-round, and the sun shone with more or less equal intensity regardless of the month. Farther south days varied according to the calendar, with days growing longer during December, January, and February and shorter in the months that correspond to summer in the Northern Hemisphere. People did most of their work outside by the light of the sun. Cooking, farming, hunting, fishing, building, and other jobs were mostly done in daylight hours. The light of the sun was essential for growing plants, which need sunlight to perform photosynthesis.

Medieval Africans had no sources of nighttime light as bright as modern electric lighting, but the lack of lighting did not pose a major problem for them. Human eyes are quite adapted to seeing in low light, and medieval Africans were accustomed to functioning with available light. Artificial light sources, including fires, disrupt the eye's natural adaptation to dark, so people who had to travel at night often preferred to move with no light sources at all.

The moon and stars provided a natural source of nighttime light. In open areas without trees the full moon could



Bronze lamp, Coptic, ca. 500–1000 (Los Angeles County Museum of Art, Gift of Robert Blaugrund, Photograph © 2006 Museum Associates/LACMA [M.80.196.74])

be quite bright. The number of visible stars in the night sky was much greater than in modern areas with large amounts of artificial light. The Milky Way and the planets Jupiter and Venus shone brightly enough to cast shadows on the ground.

Some parts of Africa were very dark at night, and people could not take advantage of the light of celestial bodies. The dense forests of central Africa, for example, contained tall trees and thick undergrowth that blocked the light of the moon and stars. The small people who inhabited these forests, such as the people now known as the Mbuti, were accustomed to functioning with little light, walking forest paths without any artificial assistance.

Medieval Africans used natural light sources as a foundation for religious belief and as a topic of study. In southern Africa, for example, people used the moon's phases to create a calendar. Farmers throughout Africa used the light of the stars to determine the seasons and to predict the likelihood of rain. Because it provided light to grow crops and live, the sun assumed great spiritual importance for some African peoples. Many Africans recognized a sun god, often as the father god or the supreme deity of their cosmology. In many cases the sun god was said to be married to the moon goddess. In Sudan ancient people erected stones in alignment with the sun's placement at different seasons. The !Kung believed that all celestial bodies, including the sun, the moon, the stars, and the planet Venus, were symbols of the deities. In medieval Mali scholars observed the moon and the stars and used their findings to write books about astronomy. They also engaged in astrology, using the stars to make predictions about the future.

The main source of artificial nighttime lighting throughout sub-Saharan Africa was fire. Most African peoples used open fires for cooking, and if they were to have any light at all at night, it had to come from the fire. Each family might have its own fire, usually burning outside the house, and the group might build a larger central fire as well.

Fire had several disadvantages as a source of illumination. It was smoky, making it inconvenient indoors. It was also dangerous, and children had to be watched constantly to ensure that they did not fall into it. Gathering fuel for fires was a daily operation. In order to keep the fire going day and night, people had to collect wood or other sources of fuel, picking up dry wood that had fallen in the forest or cutting down trees as needed. Depending on a person's location, gathering wood could take nearly all day and required hard work. !Kung women, for example, would sometimes walk for hours looking for wood and carrying it home in their leather bags.

To start a fire, medieval Africans might use friction of wood on wood, using a device to make a pointed rod spin rapidly and create heat. They might also use flint and steel, hitting the stone and metal against each other to create sparks. Because starting fire was difficult, many people tried to keep their fires going constantly, banking the hot coals when they went to bed and stirring them up again in the morning.

In many cases the fire became the geographic center of social life. Families gathered around their own fires at mealtimes and during relaxed evening hours. An entire band or village might gather around a fire for a festival, music, dancing, or storytelling. Fire was so important as a source of heat and food as well as light that many African peoples considered it the province of a deity, such as the Yoruba warrior god, who was also the god of fire. Among the !Kung people of the Kalahari Desert, the fire was the gathering place, where people came together to sing, dance, tell stories, and socialize. When the group suffered misfortunes, the !Kung healers performed a "healing dance" around the fire, dancing around the fire until they fell into a trance and began performing healings for everyone sitting around the fire. In western Africa people believed that ancestors became fire spirits.

The small people of the central African forests typically kept a large fire burning in the center of their temporary camp, gathering wood to fuel it every morning. This fire would burn all night, serving as a source of warmth and light and defining the boundaries of the encampment. Often the central fire was considered the territory of men only, and men and boys sang and danced around it while women and children stayed in their own huts.

Fire was an important component of the Ethiopian festival known as Meskel, which commemorated the finding of

the True Cross by Helena (ca. 248–ca. 328), mother of the Roman emperor Constantine the Great (r. 306–37), and its arrival in Ethiopia during the 15th century. People celebrated by building pyramids of poles covered with flowers and then setting them on fire. Revelers carried torches through the streets and sang, danced, and drank around the giant bonfires. The high point of the night was the moment when the bonfire collapsed.

Most medieval African dwellings did not make much provision for illumination, artificial or natural. Maasai women, for example, built small, temporary huts whenever they settled in one place; these huts had no windows, so the only light that entered came through the doorway or the small hole in the roof that functioned as a chimney. Somali houses were made of animal skins and likewise did not contain windows. Even in areas where people built more permanent houses, such as the mud hut settlements of the Hausa people of northern Nigeria, not much light entered dwellings. A window in a house was by necessity simply an opening in the wall, allowing rain to enter, so it was not entirely desirable. Consequently, people did much of their work outside their houses. In many areas women cooked in the yards in front of their houses.

Aside from open fires, the main sources of artificial illumination were lamps and torches. These had the advantage of being portable but still could not produce large amounts of light. A lamp could produce a flame about as bright as that of a modern candle. Like fires in fireplaces or on the ground, lamps and torches could be smoky and required a source of fuel.

To make a torch, a person would soak a rag in some sort of flammable material, such as pitch or oil, and wrap it around the end of a stick. Medieval lamps typically consisted of a small reservoir that held oil and a place for a wick made of flax, rushes, or any other fibrous material that could hold a flame. The simplest lamps were clay bowls with pinches on the sides that could hold wicks. More elaborate lamps featured handles, spouts, and decorations. Yoruba women specialized in making lamps to burn palm oil. In Nigeria historians have found a number of iron lamps consisting of bowls set atop stands or tripods. Africans who traded with North Africa, Europe, and Asia occasionally acquired lamps from those areas. Most oil lamps were made of clay, though expensive imported ones could be made of bronze.

Many types of fats will burn to create light. In areas where olive oil was available through trade, people used that in lamps. Other people used animal fats. Palm oil was the only lamp fuel and ointment available in most of western and central Africa, and the trade in palm oil was brisk. Caravans traded salt and cotton cloth for oil and transported the fuel throughout their trade routes. During the late 1400s Europe-

ans discovered western African palm oil and began purchasing it as a provision for sea voyages.

To make palm oil, people would first collect palm nuts and then follow one of two main methods. In one approach they would ferment the nuts for several days, adding water as necessary to keep the mixture moist. Then they would pound the nuts in a mortar to remove the fibers and mix the mash with water. The oil would float to the surface of the water, where it was skimmed off and boiled to remove all water. The other method involved first drying the nuts in the sun and then boiling them until they were soft. The people would then pound the nuts in a mortar, mix the pounded nuts with warm water, strain the liquid to remove solid pieces of shell and fiber, and boil the liquid to separate the oil. Once the oil was extracted, it was poured into bottles and allowed to cool to room temperature, at which point it became solid.

THE AMERICAS

BY MICHAEL J. O'NEAL

The technologies that pre-Columbian Americans used to illuminate their world differed little from those their distant ancestors had employed in ancient times. Without electricity, early Americans shed light on their surroundings with fire at night and relied almost entirely on the sun during the day. When the moon was full, it also provided a certain amount of illumination.

Illumination was a vital issue, particularly for people who lived the farthest away from the equator. The Inuit, the sub-Arctic people of the North, lived in a region where the amount of daylight differs dramatically depending on the season of the year. During the summer the Northern Hemisphere is tilted toward the sun. The days are so long that it never really becomes fully dark at night and the sun shines long after it has become dark in more southerly regions of North America. At night the sun barely dips below the horizon, so a kind of twilight persists until the sun begins to rise just a couple of hours later. During the winter, though, the opposite occurs. The Northern Hemisphere is tilted away from the sun, so daytime is short, with the sun barely peeking above the horizon for at most a couple of hours and then setting to begin a long night.

While people who lived close to the sea were able to burn driftwood to help them through these winter nights, the supply of driftwood was limited. Some southerly groups burned wood for fires, but since the territory of the Inuit has historically been north of the tree line, wood was not a widely used commodity. The Inuit obtained most of their resources from the sea. Among those resources were whales, which provided food, bones used to make tools, and the oil for cooking and

heating as well as for illumination in the long Arctic winter. Whale oil, along with oil from walruses, seals, and other sea mammals, was the most widely used fuel. These sea mammals typically have a thick layer of fat, called "blubber," that conserves body heat and provides buoyancy. Oil was extracted from the blubber and burned for both heat and light in shallow stone bowls with moss wicks around their edges. Seal oil was particularly valued because it gave off a warm, honey-colored light. A seal-oil lamp was called a *kudlik*.

To make maximum use of natural light, houses made of snow, commonly called igloos, had windows of sorts. These windows consisted of sheets of clear ice taken from the tops of bodies of water. The sheets of ice were inserted into the walls of igloos and functioned like clear panes of window glass to admit light.

Native Americans throughout North, Central, and South America burned whatever was available. The Eastern Woodlands nations of North America had no shortage of firewood, for the regions they inhabited were generally dense with forests. On the Plains, where wood was somewhat less plentiful, animal dung was a primary fuel. Among the Indians of the Southwest and Mesoamerica, firewood was available, but in many desert areas firewood was in short supply. Sometimes sticks from low-growing plants and trees, such as juniper, could be used for fuel, but this type of firewood would have to be scavenged over a wide area. Thus, corncocks were also burned for heat and light. Typically, fires were started by spinning a spindle in a block of hard wood until enough heat was generated by friction to ignite tinder. It was common for fires to be maintained perpetually. In the American Southwest food was stored in caves and fires had to be maintained in them so that those accessing the food could find their way around. It was also common for a communal fire to be maintained; individual families in a community could then take live coals from the fire to start their own fires for light and cooking.

People had to deal with the smoke given off by fires used for illumination. Many Indians, especially those on the Plains, lived in tepees, or conical tents made of animal skins and supported on a framework of poles. These tepees had an opening at the top that functioned much like the flue of a chimney. As heat from the fire rose, it carried the smoke out through the hole. Even among those tribes that lived in more permanent structures, such as the Woodlands tribes, smoke was carried out through a hole in the roof.

Fires for lighting were typically built in one of two ways throughout the Americas. One way was to build the fire in a fire pit, a depression in the ground surrounded by a ring of stones. The fire provided illumination, and the rocks retained heat for warmth; hot rocks could aid in cooking when food was covered by them. The ring of rocks also ensured that

hot embers would not blow about, posing a fire danger. The other way was to build a fire on a flat stone hearth. This was the method used primarily indoors. Again, the stone hearth could serve a dual purpose, not only supporting the fire but also retaining warmth, which it would give off during the night as the fire died down.

Fuels also included fish oil, fat from game animals, and various vegetable oils. Vegetable oil had the advantage of not being as smoky as oil from animal sources. In some places people burned tar and crude oil that had risen to the surface—the same crude oil modern engineers pump out of the ground to make gasoline and other petroleum products. These fuels were burned in lamps made of stone and sometimes copper. Additionally, evidence suggests that North American tribes, as well as the Aztecs, discovered petroleum and burned it and also used it for medicinal purposes. The Aztecs likewise found seams of coal that were exposed and burned the coal for light and heat.

People did not always illuminate their personal living spaces, at least not on a regular basis. Often they relied on communal, ceremonial fires, built to honor the gods, and these fires were a source of community for people, who gathered around them to dance, celebrate harvests, listen to stories and legends about their ancestors, and take part in similar ritualistic activities. The bonfire was the community's hearth, a place where people found a sense of belongingness to the group and to its history, gods, and ancestors. The flames of a bonfire, flickering in the dark, were a source of great comfort to those who gathered around.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

Both historical and archaeological records for illumination in Asia and the Pacific are spotty, with the continuity of development during the medieval era murky even for such places as China, where there are historical records for some eras but not for others as well as archaeological discoveries of lamps in some parts of China from different periods. Historical records can be frustrating because if they mention illumination at all, they do so usually to praise a city or a palace for its lights without describing what the lights were like.

Medieval Chinese people used oil lamps, candles, lanterns, and torches to bring light to darkness. Oil lamps were common in China from ancient times, and bronze lamps in the shapes of animals and fantastic creatures, such as dragons, are known from medieval China's cities. Oil lamps were used to illuminate rooms and halls, and usually burned hemp oil or oil from the fat of whales and seals as well as fish oil. These were typically clean-burning fuels; other animal fats

were believed to produce smoke that would damage eyes. Fish oil seems to have been preferred to produce light bright enough to see details, because it was used to illuminate looms when women were weaving at night. Those who could not afford fancy bronze oil lamps had shallow metal or ceramic pans into which oil was poured. A rush wick was placed in the oil with part of the rush hanging over the side to prevent it from sinking into the oil.

Candles were made from animal fats mixed with beeswax, with berries or fragrances sometimes added. The fragrant candles were affordable only for the wealthy. These candles were placed in holders made of metal or wood and often were burned in a bedroom while its occupant slept, providing a pleasing smell during the night. Some candles were marked so that as they burned down, they would show the passage of time. These candles were narrow because the flame of candles came from a pool of melted wax or fat at the top; wide candles, with their bigger pools, burned more fuel faster than narrow ones, making the burning of narrow candles easier to control for long periods of time.

Lanterns had wooden or bamboo frames around which silk or paper was wrapped and glued. Candles were placed within the lamps. Wooden torches were used to illuminate streets and outdoor festivities, and military units carried them on nighttime patrols. Those who used boats to patrol waterways often used oil lamps. All of these means of illumination had in common the use of fire. Buildings in Chinese cities tended to be made of wood, and fires caused by someone's carelessness sometimes devastated them. This vulnerability resulted in laws that forbade people to have lights in their homes after certain hours of the night. Police patrolled cities at night, looking for light coming from windows.

This curfew was lifted for the Lantern Festival, held for three days on the 14th through the 16th days of the first



Oil lamp, unglazed earthenware, Southeast Asia, sixth to 11th centuries (Arthur M. Sackler Gallery, Smithsonian Institution, Gift of Osborne and Gratia Hauge, and Victor and Takako Hauge, S2005.182)

moon. The festivities in Ch'ang-an were wonderful to watch, with the emperor, aristocrats, and the wealthy competing with each other to display the best lamps. The lamps were decorated with silk, jade, and gold. In 713 one emperor had a 200-foot-tall wheel of lamps set up outside Ch'ang-an. It contained 50,000 lamps. Another display was an 80-foot-high tree blanketed with lamps. Lanterns were painted with images of landscapes, bamboo, flowers, birds, animals, and people and were hung outside homes and shops.

Religious institutions made extensive use of lamps and candles. Buddhist monasteries burned devotional lamps and candles night and day in their shrines. For instance, in Tibet monks placed candles made from yak butter before images of the Buddha. Pilgrims would give yak butter to the monks for making candles. The flames of the candles represented the spirit of light in a person as well as the driving of darkness out of one's heart. Buddhists would bring flowers and burn incense as well, with the aromas serving as reminders that the light is nurtured by moral behavior. During prayer the candlelight, flowers, and incense served to help focus the worshipper's mind on the verses to be recited. In Chinese homes lamps would be lighted in front of tablets bearing the names of deceased family members as a way of honoring the dead. This practice was especially important during festivals in which the dead were celebrated.

Korea seems to have followed the illumination practices of China, but Japan went its own way. Candles were uncommon in Japan in medieval times. They were usually made of pine resin, which did not burn well or give off much light. The Japanese did not use wax, not even beeswax, for their candles. Much preferred in medieval Japan were oil lamps, which shone more brightly than candles. These typically were plain pans for oil with a rush wick hanging over the edge or a cotton wick floating in the oil. Camellia seed oil and sesame seed oil were most often used for the fuel in the lamps, although other vegetable oil was sometimes used. Oil sellers were like traveling salesmen, hauling their oil in cylindrical tubs. An oil seller would carefully measure out the volume of the oil and then pour it into a kettle or another container for a purchaser.

Medieval Japanese lanterns had wooden frames covered with paper, which could be coated with lacquer. The lanterns displayed during festivals were decorated with images of temples. Lanterns with wooden frames could be folded up for storage. The Japanese made another sort of lantern out of stone. Stonemasons manufactured these lanterns in their workshops for use in temples, monasteries, and gardens. For nighttime processions, torches were used for light. For large gatherings of people for festivals, bonfires were used to provide light. Shintoists believed that a bonfire during a festival could be inhabited by a spirit.

Many Japanese could not afford candles, lamps, or lanterns and therefore did without artificial light at night. In general, Japanese houses were built to take advantage of daylight. They not only had windows but also walls that could slide open, allowing both light and air into a home. Shops were often outdoors to take advantage of sunlight. These would have overhanging roofs held up by posts, with workers underneath.

In contrast, medieval Indian housing was designed to keep out sunlight. An ordinary home in a country village would have only one window or no windows at all. The window, when there was one, tended to be narrow, with latticework making the light cast into the house shadowy. City houses were usually more than one story tall. The top floor typically had windows under the eaves or gabled windows called *kapotapalika*, meaning "pigeon cote," a reference to pigeons' habit of roosting in the windows. These windows had frames that were painted bright colors. The windows were covered by wooden latticework, curtains with bright patterns, or mats. They typically had solid shutters. The light of the windows illuminated a space where the family kept its valuables and food reserves.

Most houses had niches in the walls for the placing of oil lamps. The lamps tended to be small, with wicks dipped in ghee placed in them. Ghee was clarified buffalo butter. Sometimes lamps were hung from the ceiling in metal frames. This practice seems to have been more common in large areas, such as halls in monasteries or palaces, than in ordinary small homes. Interior lighting was also supplied by torches. Used mostly at night, the torches were held by servants in the households of the wealthy. Few palaces survive from medieval times because they were made of wood, but some stone fortresses survive, and the importance of torchlight for them can be seen by examining them. The outer walls and the walls of interior buildings were very high, with windows dozens of feet above the ground; the lower reaches would have been very dark without torchlight. Lamps and torches were used to illuminate city streets. The light cast from some city palaces was sometimes said to be dazzling.

Lamps were important to the spiritual lives of Indians. An Indian would typically awaken before sunrise and would ignite a lamp in a niche in the bedroom. If he was a man allowed to read the Vedas, he would sit cross-legged before the lamp and rest in his lap a copy of the Vedas, from which he would read passages. Lamps themselves could carry symbolic power. For instance, some bronze lamps had bulges in the middle representing male and female sexual organs. The light of such a lamp represented the life force. Small, circular lamps called *diyas*, which were made of terra-cotta, had cotton wicks and were shaped to be cupped in a hand. *Diyas*

were used for many religious ceremonies and were placed in shrines.

Deepastambhas were lighted in front of temples. These were metal frames in which many lamps were placed. *Deepastambha* means “tower of light.” Very popular for homes that could afford them were *deepavrikshas*, meaning “trees of light.” These were metal frames with arms like branches with lamps held in them.

Lighting elsewhere in Asia and the Pacific is harder to account for, perhaps because wood was used for lamps and wood is perishable, and candles, after all, disappear during their use. Most of Southeast Asia seems to have imitated Indian uses for lamps, except for northern Vietnam, where Chinese practices prevailed, and for the islands of Indonesia and the Philippines. On these islands the use of torches seems to have been common, although some cultures on Java and Sumatra adopted the ways of India.

It seems that for the Pacific islands, the intrusions of Europeans may have affected customs of illumination so much that the practices of the historical era may have had little to do with the practices during the medieval era. For instance, illuminated wooden masks may have been created more for sale to outsiders than for actual illumination. Torches may have been common. They were used by fishermen to attract fish to their boats at night and probably were used for people to see their way onshore or at sea at night.

Medieval Australians used fire sticks. These were sticks kept smoldering all the time. They were carried while Australians traveled, often held by children. These sticks were used to ignite campfires, to ignite torches to light the way at night, and to start range fires that would drive game animals out of hiding and toward Australian hunters.

EUROPE

BY JULIE-ANN VICKERS

Lighting technology underwent few advances in the Middle Ages. All the forms of illumination used in this period had been known to the ancient world. The source of every type of artificial light was the flame, produced by burning various fuels. Although the basic technology changed little over the course of the period, the types of light used varied from region to region. These differences were dictated by the local availability of fuels and the poor performance of some fuels under certain climactic conditions. Individual wealth also affected the quality and quantity of light in each household. Illuminating a room after sunset was an expensive task, and for the very poor it remained an infrequent extravagance. Regardless of social class, artificial lighting at this time was often polluting, messy, and dangerous. The most easily and



Oil lamp with six spouts, similar to the traditional Jewish Sabbath lamp, Britain, 12th century (© Museum of London)

readily available forms of light were still the sun and, to a lesser extent, the moon.

Medieval society was structured to make optimal use of natural light. Daylight was the only light source in which most forms of productive labor could be performed. The number of hours that could be worked in a day, therefore, varied from season to season, with the advent of summer heralding long days of work. In wintertime monastic rules allowed for monks to sleep longer, in recognition of the limited hours of daylight available to them for work. The wealthier groups in society designed their buildings to maximize the amount of daylight entering rooms. For instance, monastic scriptoria, the rooms where monks copied manuscripts, were built with a large number of windows and often were situated around an interior sunlit courtyard. People also took note of the waxing and waning of the moon, as a full moon on a clear night was another viable source of natural light, particularly for travelers. Such was the dependence on natural light at this time that for many of the poorer people sunset signaled the time to go to bed.

For those who could afford them there were two different ways to artificially light their rooms, enabling them to extend

their waking hours. The largest source of illumination was the hearth fire, which also acted as the primary source of heating for warmth and for cooking. Although the fire could light a fairly large area, the quality of light it emitted was poor. Spot-lighting was the other main type of illumination. This method used the light of a smaller flame, for example a candle flame, that provided a higher intensity of light but only for a very small area. The relative limitations of both main area lighting and spotlighting meant that people's activities at night generally were restricted to the most basic and routine tasks. In the later Middle Ages some guilds went so far as to ban craftsmen from laboring after dark because of the deterioration in the quality of the work produced then.

The hearth fire was for many the sole source of lighting, with spotlighting used only on rare occasions. In the earlier Middle Ages the fire was a bare, open hearth located in the center of the room to ensure the maximum dispersal of light and heat. Since many buildings were made of wood, the central location of the fire away from the walls also acted as a safety measure. A hole in the roof helped guide some of the smoke out of the room, while open windows provided an extra form of ventilation. Nevertheless, soot and smoke accumulation were constant problems. In the 11th and 12th centuries the construction of buildings with an upper story led to the shifting of the hearth fire to the peripheral wall. The hearth in this period was typically made of stone, brick, or tile. In time the hearth was incorporated into the peripheral wall itself and developed into the chimney fireplace. The type of wood burned in the hearth fire greatly affected the quality of light it radiated. Older, dry wood was the best and was in high demand. Poorer people often had to make do with green, moist wood, which burned less brightly and created far more smoke.

Gradations in quality and affordability in the different forms of spotlighting available meant that some were more widely used than others. Candles were one of the least common types of small-area lighting employed in the Middle Ages. They were made either of beeswax or tallow. Beeswax candles were highly valued as they produced a bright flame, were not smoky, and smelled sweet. The wax for making these candles was collected from the cells of honeybee hives. However, demand for this material far outstripped supply, making the beeswax candle a luxury item that even the wealthy used sparingly. By far the largest consumers of these candles were the medieval clergy, who used them extensively in church ceremonies. Throughout the Middle Ages the light of a beeswax candle was endowed with important religious significance.

Far more common than beeswax candles were tallow candles. Tallow was produced by rendering animal fat, usually from sheep or cattle. Rendering was a process of boiling

and straining fat in order to produce a more purified form. Compared with beeswax candles, the light from tallow candles was of poor quality. Tallow candles also burned with a strong, acrid smell; sputtered hot fat; and produced a lot of smoke. In the warm climate of southern Europe they were never commonly used because they had a low melting temperature. In addition to these disadvantages of tallow candles, the cost of the rendered fat remained higher than the price of meat, so they did not constitute a viable source of lighting in the homes of the poor.

Medieval peasants turned to more readily available forms of lighting that could be produced very cheaply. Rushlights were one of the most popular forms of illumination in peasant households. These lights were essentially a type of candle in which the wick was replaced by a rush. Rushes were plants that grew abundantly in marshy areas. Once they were harvested, usually in late summer, the outer skins were peeled to expose their pith and they were then laid out to dry. When sufficiently dry, the rushes were coated in tallow or grease. The great advantage of the rushlight was its low cost. Rushes were free, and enough fat could be gleaned from family meals to supply the coating. Their main disadvantage was that they required constant attention. The burning time of a rushlight was maximized by holding it at an upward angle. To accomplish this, rushlights had to be supported in clamp holders and manually shifted forward to ensure continuous burning.

Another cheap variation of the rushlight was the splinter. Splinters were sticks of resinous wood such as boxwood, birch, or pine. They were coated in tallow and then burned either in clamp holders or simply wedged into an appropriate surface. The use of rushlights and splinters was determined largely by geography. England, for instance, had a plentiful supply of rushes, ensuring that rushlights were the most commonly used form of lighting there throughout the Middle Ages and into later centuries. In contrast, resinous wood was easily found in parts of continental Europe making splinters a common form of lighting there.

Lamps were widely used to light the homes of both the wealthy and the poor. The most basic type of lamp was produced by placing a wick in the mouth of a fatty or oily animal, which was then burned. Oily birds, such as stormy petrels, were used in this way. A more sophisticated lamp consisted of a vessel with a lip that could hold a reservoir of oil and a wick. The lamp itself was typically made of ceramic, metal, or stone; glass was sometimes used as well but was very expensive to produce. Like other forms of lighting in this period the type of fuel affected the quality of the lamplight. Olive oil, fish oil, and grain oil were the main lamp fuels. Olive oil provided the cleanest flame but was readily available only around the Mediterranean. Wicks for lamps, as well as candles, were usu-

ally made of linen, hemp, or cotton. Of these, cotton burned the best and soon became the dominant material. To use the lamp the wick was floated or secured in the oil and set alight. Lighted lamps were then placed on the table in dishes or hung from the ceiling by chains. Lamps were used everywhere in Europe during the Middle Ages. However, the low melting point of candles and other tallow-coated lights meant that in the warmer areas of southern Europe lamps were the main source of lighting after the hearth fire.

Outdoor lighting during the period was extremely limited. It was difficult to produce a light bright enough to illuminate a sizable area for any length of time. Firelight provided the best source of light but lacked portability. The other main types of outdoor light were torches and cressets. Torches were made from bundles of dried grasses and dried sticks that were then set alight. They were highly combustible and sent off dangerous sparks. The extent to which they were used remains largely speculative, as they left no trace in the archaeological record. Cressets were baskets made of metal or stone, which were then filled with fuel such as resinous wood or oil. The baskets were mounted on poles so that they could be carried around. These portable forms of light were commonly used by night watchmen on guard in villages and towns.

In the Middle Ages artificial light sources not only were of poor quality, they were also messy and dangerous. Soot and smoke were constant pollutants, while hot oil and molten animal wax were capable of causing serious injury. In addition, most domestic dwellings were made of wood. This meant that there was a constant risk of local or widespread fires. In order to minimize the damage to property and life from unattended flames, hearths had to be covered or extinguished at a certain hour of the evening. A bell was rung to signal this hour, which was known as the curfew. The name derives from the Old French *covre-feu*, meaning literally “cover fire.”

THE ISLAMIC WORLD

BY KIRK H. BEETZ

People of the medieval Islamic world had an ambivalent relationship with sunlight. On the one hand, they depended on the sun to provide light for working and reading, but for much of the Islamic world, sunlight brought with it wearisome heat and blinding glare. For nomadic Muslims, these conditions meant that they spent much of their time in their pavilions, out of direct sunlight. Women did much of their work within the tents, cooking and weaving. Both of these activities required an ability to see small details, implying that lamplight was almost certainly used within the tents.

The development of Islamic architecture reflected various efforts to come to terms with sunlight. Homes in the country

often were walled enclosures with buildings within them. The buildings, which were homes and storage houses, might have no windows at all, allowing for people to escape inside from direct sunlight, or they might have small windows that allowed enough light inside for people to avoid bumping into each other or furnishings; these windows could be covered by curtains or shutters. In early Islamic cities homes usually consisted of courtyards around which the living quarters were built. Most daily activity took place in the courtyard, which could be shaded on the edges by eaves or verandas. In large homes of well-to-do people the courtyards were surrounded by roofed colonnades, among which people could enjoy the benefits of shade while having enough sunlight by which to work or to read. Medieval Muslims valued family privacy highly, and their cities developed multistory houses, each house with only a single door facing the street or alley outside. There were no windows on the outside walls; instead, windows were in the walls facing the inner courtyard. Thus, lighting emphasized the importance of the family home over the outside world.

The relationship of sunlight to religious observances was similarly ambivalent. For many builders, lighting the prayer hall was important so that people could see the direction to Mecca and see the cleric leading prayers. The oldest great Islamic monument, the Dome of the Rock in Jerusalem, had five windows for each side of its octagonal lower story, making a total of 40, and another 16 windows in the drum of the dome, allowing sunlight to bathe the designs on the walls of the interior. Lamps were added for further illumination of the interior. Another approach was that of the Great Mosque of Damascus (706–15). It was one of many courtyard mosques. In these a courtyard surrounded by walls or colonnades served as the prayer hall. Nevertheless, some designers seem to have wanted an air of mystery in their mosques. The Great Mosque of Córdoba is the most famous example. Its prayer hall is a forest of pillars of varying designs. In sunlight from high windows these pillars cast numerous shadows, darkening the walls and producing the effect of a wall-less interior, with people inside being surrounded by infinite space.

The Koran asserts that “God is the Light of the heavens and the earth” and compares the light of God to a lamp encased in glass in a niche, with the glass shining like a star. Thus, lamps could symbolize the light by which God attracts the spirits of people who wish to be good and moral. When the Islamic world began, lamps were already the preferred form of artificial illumination in the Near East. In Egypt candles made of beeswax had long been made, but under the Byzantine Empire oil lamps predominated in homes and public places. At first Muslims used the sort of lamps that were already being made, mostly those of the Samaritans and of

the Byzantines, before going on to create lamps that were not only serviceable but also often wondrous works of art.

By the seventh century the use of molds had long been the primary method of producing lamps. Ceramic lamps could be made on potter's wheels or shaped by hand, but molds allowed for mass production of metal lamps. Molds were made of plaster, clay, or stone. Stone molds were difficult and time-consuming to make; therefore, they were rare. Plaster molds dried quickly and retained their size and shape during drying, providing potters with molds that would reproduce exactly what they had modeled. One drawback was that plaster contained numerous small bubbles that appeared as speckles on the finished product. Because plaster molds deteriorate quickly, many more clay molds have survived from the medieval Islamic world than have plaster molds. Archaeologists can identify lamps made with plaster molds by the speckles on them, so it is known that plaster molds were often used. Clay molds were much more durable than plaster molds, and they were easier to make than stone molds, but clay molds sometimes shrank while drying or being fired, at times resulting in distorted shapes for finished products.

Typically, an archetype—a model—would be carved into stone or modeled in clay and fired. Plaster or clay would be pressed around the archetype. Most molds were made in two parts, one for the lower half of the lamp and another for the upper half. Into the completed mold would be poured molten metal; the upper and lower halves of the mold could be separated from each other after the metal had cooled. The lamp

could be sold as it was, but it was often smoothed with files and rubbed with sand. Lamps of copper, silver, and gold were most popular, but lamps of tin, brass, and iron were made as well. Almost all lamps of the medieval Islamic world were fueled by olive oil, except in India, where other vegetable oils, such as sesame oil, were more commonly used.

From 500 to about 700 probably the most popular lamps in the Near East were made in Samaria, part of ancient Palestine in an area now in the west of Jordan. Even though Jews, Christians, and others lived among the Samaritans, the Samaritans had their own culture and decorated their lamps with their own religious symbols as well as with the images of plants. The lamps from Samaria were used in temples and homes. The use of lamps in mosques is undocumented and may have contravened Islamic injunctions against pagan images. Samaritan lamps almost always had nozzles that were somewhat like spouts on jugs, into which wicks were inserted. The wicks soaked up oil from the lamps so that the flame burned more of the oil than the wick. When first sold, a lamp from Samaria usually had a closed nozzle that would require opening by its new owner; the closing of the nozzle's hole apparently symbolized the purity of the vessel of the lamp. Jews of the region especially valued Samaritan lamps that were decorated with plants and that had two nozzles. For the Jews of the medieval Islamic world, grapes on their lamps symbolized the entrance to the long-dead second temple of Jerusalem, the center of the Jewish faith.

Byzantine lamps were typified by their slipper-shaped style. Elegantly simple, these lamps were often highly polished. They typically had more than one nozzle and had handles. This style lingered for centuries, perhaps because Byzantine craftsmen set up shop in Muslim cities. These lamps were found in ordinary homes. The Byzantine-style lamps of the first two or so centuries of the Islamic world featured images of the cross, flowers, trees and other plants, and birds and other animals. These images were gradually replaced by geometrical designs, probably so as not to irritate iconoclasts, who objected to living things being portrayed in art.

Early Muslim variations in lamps included narrow nozzles, broad bases, and elegant, sometimes flared, handles or handles shaped like knobs. Writing in Arabic sometimes appeared on early Islamic lamps but does not seem to have become common until the era of the Mamluk Dynasty (1250–1517). The mature form of Islamic lamp tended to be large and rounded, somewhat pear shaped or sometimes slipper shaped. The nozzles of these lamps tended to have grooves in them. Lamps with pear shapes and flared handles were made in the 12th century. In the Near East these were followed by lamps with twisted handles, which were followed by lamps with long, twisted handles that were common during and after the 13th century.



Candlestick, brass inlaid with copper, silver, and black organic material; Afghanistan; ca. 1150–1200 (Freer Gallery of Art, Smithsonian Institution, Purchase, F1951-17)

In Muslim homes such lamps were placed in niches in the wall, not only for convenient lighting but also as a subtly symbolic act in which the lamp in its niche reminded one to seek God's light. Lamps were sometimes placed on stands. It is likely that lamps were also hung from ceilings in a manner reminiscent of Indian customs. Such lamp holders could have several branching arms, each holding a small lamp. In palaces and mosques lamps were often ornate and could be hung singly or in groups over hallways and prayer rooms. The palaces of caliphs and sultans were dazzling sights at night, aglow with thousands of lamps cared for by dozens of servants.

Candles may have seen more use in the eastern reaches of the Islamic world, as is evidenced by the many fine examples of candlesticks that survive from Afghanistan and Iran. They often gave metalsmiths the opportunity to display their skills. From Afghanistan came candlesticks of hammered brass in the shape of a drum with a candleholder on top. The record of candlesticks from Iran is more complete, with specimens including sticks of bronze with gold and silver inlay. Such ornate candlesticks could be afforded only by the wealthy and may have been intended either for their homes or as gifts to mosques.

See also ARCHITECTURE; ART; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CLIMATE AND GEOGRAPHY; CITIES; CRAFTS; FESTIVALS; FORESTS AND FORESTRY; HOUSEHOLD GOODS; INVENTIONS; RELIGION AND COSMOLOGY; SACRED SITES; TRADE AND EXCHANGE.

FURTHER READING

- Noam Adler, *A Comprehensive Catalog of Oil Lamps of the Holy Land from the Adler Collection* (Jerusalem, Israel: Old City Press, 2004).
- Charles Benn, *China's Golden Age: Everyday Life in the Tang Dynasty* (New York: Oxford University Press, 2004).
- Bryan Bowers, *Lengthening the Day: A History of Lighting Technology* (Oxford, U.K.: Oxford University Press, 1998).
- John Caspall, *Making Fire & Light in the Home pre-1820* (Woodbridge, U.K.: Antique Collectors' Club, 1987).
- Maureen Dillon, *Artificial Sunshine: A Social History of Domestic Lighting* (London: National Trust, 2002).
- Hema Guha, "Stunning Variety of Indian Lamps," *India Perspectives* 16 (November 2003): 22–23.

► inventions

INTRODUCTION

Many inventions of medieval times have no known inventors. Much of the technology and economic and spiritual life of the medieval era were created by people working without notice or credit, improving their tasks in many small ways and oc-

asionally large ones. The rope bridges of the Andes may have been group creations, inventions developed by communities rather than individual people. Many other inventions may have developed out of earlier practices in a manner that from the hindsight of hundreds of years of history seems logical, almost inevitable, although the inventors may not have found the developments either logical or inevitable. Indeed, they may not even have noticed that they had invented anything new.

For example, was the North American tepee the inspiration of one person, who contemplated the mobile society's need for portable shelter and came up with the idea of a frame of wood around which animal skins were wrapped? As simple as the tepee may look at first glance, it was the composite of many technologies as well as improvements that may have come with use. The choosing and cutting of poles may have evolved out of techniques for building huts. The skins came from skills in skinning animals and tanning their skins. These skills, in turn, required skills at making the knives used in the skinning as well as for identifying and applying the tannins for the tanning process.

Was the hole at the peak of the tepee obviously required from the first, or did people suffer from smoky tepees until they hit on the idea of allowing the smoke from a hearth inside to escape upward? Perhaps people originally made fires only outside, and the making of hearths and holes in the roof occurred simultaneously. Looking at all that it took for people to figure out how to secure a tepee and make it portable must inspire awe at the inventiveness of its creators, or at least admiration for how they solved many problems to make their technologies succeed at the tasks they set. Looking at invention for the thousand years of the medieval era, we see the wonderful ability of ordinary people as well as geniuses to invent what they needed to make their lives better.

That last may be crucial to understanding medieval inventiveness. Pure scientific inquiry as it is known today was rare in medieval cultures. It is possible to see times and places where people pursued knowledge just out of the desire to *know*, as in the case of many Islamic astronomers in the first 500 years of the Islamic world, but even during those centuries of invention, most astronomers were motivated by religious faith—the belief that they were pursuing the wishes of God, who created a universe for people to know.

In general, invention had a purpose. In the medieval Islamic world, though, inventors faced a problem. There were people who object to their inventions on religious grounds, arguing that the world of Muhammad was the ideal world and that change was therefore bad. Even though invention seems to be a fundamental part of human nature, so is a desire to keep the world familiar, to discourage changes that make one feel uncomfortable or out of place. In China the magnificent

sailing expeditions of perhaps the greatest ocean-going vessels of the medieval era were ended just as sailors were on the verge of discovering a way to the Atlantic south of Africa. Imagine what the world might have been like had Chinese ships sailed into Lisbon in al-Andalus. It is often noted by historians that the voyages of discovery, which involved many small and large advances in the technology of shipbuilding, ended because factions in the imperial government argued that the Chinese empire had everything it wanted and therefore voyages of discovery were a waste of time. A more fundamental reason was that the voyages were costly and the money spent on them was wanted for other projects in the empire.

This touches on another aspect of invention: Not even the most famous of inventors acted alone. They required help. During the medieval era can be seen the development of centers of invention. These required three elements: the inventors, the skilled workers who aided the inventors, and people to pay the inventors and protect them. Having a patron was common in much of the world. Inventions such as that of the crankshaft made by al-Jazari in the 1100s were not organic developments naturally arising out of older practices. They required thought and the application of mathematics. Thus, in the medieval world, the mixing of cultures played a vital role in inventions. The early Islamic scholars thirsted for knowledge, usually believing that every morsel of truth they uncovered was a testament to their faith in God, because God wanted them to seek the truth of his world. They translated Greek books on science and engineering; they absorbed the mathematics of India; they incorporated the technology of China, such as papermaking, into their everyday lives. Yet they were practical people, motivated like inventors elsewhere in the world by the desire to solve problems.

Support often waxed and waned for inventors and their inventions. Wars or changes in governmental leadership could shut down the work of engineers. Indian mathematicians went to China to find work, where they were honored. Arabs looked for work as far away from home as England; Syrians moved to Europe and made glass, advancing European glassmaking with their innovations as they did so. The inventions of the medieval era did not arise in vacuums; they came out of the complex interactions of creative minds and their societies.

AFRICA

BY BRADLEY SKEEN

Anyone living in the 21st century has been conditioned to expect life to change constantly because of new inventions and the advancement of technology. But this expectation is very different from the reality of life during the Middle Ages

in sub-Saharan Africa. In that time and place, life was static, and its rhythms and character might not change for generations. When change did come, as, for example, when a new invention was introduced, it was likely to be something from one of the cosmopolitan civilizations that existed in North Africa rather than something entirely new created in the isolation of southern Africa. The greatest stimulus of change in Africa was contact between cultures. For instance, many of the Khoisan peoples of Africa made the most sweeping, fundamental cultural change in human history—from being hunter-gatherers to being farmers and herdsman—but it happened because they took up the ways of their Bantu neighbors, not because they invented new technologies.

It is important to keep in mind that inventions are rarely entirely new. More often someone sees something in a new light or is able to put together existing things in a new way. An example can be seen in a new type of architecture invented in medieval Ethiopia. According to biographies of the emperor Gebre Mesqel Lalibela (r. 1189–1229) written later in the Middle Ages, after he had been recognized as a saint, he was inspired in a dream to invent a new kind of architecture, and there is no denying that he did so. After the Christian crusaders lost the city of Jerusalem, Lalibela was constructed a new version of the city at his hometown of Roha, which he renamed after himself. In it, he constructed several churches, all of which were carved out of solid rock. Huge outcroppings of stone had trenches cut down into them to reveal the square shape of the buildings, which were then carved out room by room so that they were in every way like ordinary buildings—except that they were made of solid stone forming a single piece with their foundations in the mountainsides, rather than constructed in the usual way.

This was a completely new style of architecture, but it was not without precedent. Some of the rock-cut churches originally may have been carved out of the mountainside for use as fortresses by the earlier Axumite kings of Ethiopia. Also, some of the Ethiopian royal tombs in the city of Axum had tremendously large tombstones carved to resemble the facades of buildings. These existing structures and designs must have been in Lalibela's mind when the inspiration for the new form of the rock-cut church came to him. Thus Lalibela created something quite new out of traditions that were available to him.

Another innovation coming out of medieval Ethiopia was the domestication of the coffee bean. No one knows any details about how this was done, but it seems to have been completed not earlier than the ninth century C.E. In general, domestication of a new variety of plant takes many generations of patient breeding to move from a wild variety to one that can be grown as an agricultural product. The coffee

plant, with its bright red berries, originally grew wild in the Ethiopian highlands. Its domestication probably took place in the Ethiopian kingdom of Kaffa—hence the name *coffee*; in Ethiopic the bean is called *buna*. There is, however, a commonly told legend that a simple goatherd named Kaldi first noticed the properties of coffee by observing that his goats begin to dance after eating the distinctive red berries of the coffee plant. Despite this colorful discovery story, the domestication of the coffee plant was a process carried out by generations of Ethiopian farmers. The beans, however, were eaten raw by native Ethiopians. They did not roast them or brew coffee with them.

Sometimes inventions and discoveries must be made in order to adapt new technology acquired from elsewhere to local conditions. Sub-Saharan Africa received the process of iron smelting through cultural diffusion from North Africa and the civilizations of the Nile Valley. A very early form of iron technology penetrated into Africa. It was centered on a type of smelting furnace called a bloomery. The iron ore was smelted inside a large ceramic jar, in which it was mixed with charcoal and clay to produce a pure wrought-iron bloom, a mass of iron that “grew” from the chemical actions of the iron inside the furnace. This mass later had to be hammered into shape to make tools, weapons, and other ironware. The wrought iron did not have a sufficient carbon content to harden when quenched or to form an outer layer of steel.

Iron smelting probably did not become very widespread in southern Africa until the Middle Ages. African iron technology was for the most part limited to the northern Bantu-speaking region from Lake Victoria west into Nigeria along the equator. It was by far the most advanced technology mastered by the peoples of sub-Saharan Africa. Although it was an acquired technology (the process was probably developed in the ancient Near East), Africans made certain refinements that can be considered inventions. These had to be made to improve the process, which developed in different ways than it did in the Mediterranean or Asia, and to adapt it to African conditions.

The African inventions in iron-smelting technology begin with the process of finding and processing ore. Without a systematic understanding of geology, miners had to look for traces of iron ore on the surface of the ground. The Toro people (in the mountains west of Lake Victoria) did this by examining the balls of cow and elephant dung made by the dung-beetle or scarab. These beetles often combined soil excavated from their burrows with the soil on the surface of the ground. If iron ore was present in the immediate vicinity, the balls most likely would contain small, shiny black granules of iron ore that could be seen easily. Once these were discovered, the miners could start digging for iron ore.

This technique appears to be a unique invention of sub-Saharan Africa.

A more readily accessible source of iron ore is the black sand that accumulates in riverbeds. This consists of particles made up of minerals that have a high iron concentration. The particles tend to gather together, especially after floods, because they are heavier than ordinary quartz particles. Black sand cannot be smelted in a bloomery furnace. It is usually necessary to melt the sand in a crucible so that the impurities can be skimmed off the top, but this is possible only at very high temperatures. (Iron melts at 2,795 degrees Fahrenheit, while a bloomery rarely reaches temperatures above 2,192 degrees Fahrenheit.) Thus, black sand ore could not have been used in Africa. However, if the black sand contains hematite, or magnetic iron, the mutually attractive magnetic iron particles can be separated and concentrated by washing the ore to produce an aggregate of iron that can be smelted at lower temperatures. This process was not known in antiquity and appears to have been an African invention. It may have been suggested by the relatively shiny, metallic appearance of hematite particles compared with ordinary black sand ore. Although no one knows who is responsible for this process, it is especially common in cultures where the collection of ore is assigned to female family members of the smith, such as the Mafa people in Cameroon.

An innovation in iron smelting among the Haya who live on the western shore of Lake Victoria was the use of a blow-pipe in the production of wrought iron. Ordinary iron-smelting furnaces of the bloomery type are given drafts of air from bellows, blown into the furnace through a pipe (tuyere) leading into the bottom of the furnace chamber. The bellows used in African ironworking are very inefficient. They consist of simple leather bags mounted inside clay pots that are pulled up and down by means of an attached stick. This type of bellows goes back to ancient Egypt and was originally designed for working copper, which requires much lower temperatures than iron. The bellows must have been disseminated up the Nile Valley before the invention of ironworking. For whatever reason, when sub-Saharan Africans began to receive ironworking technology, they did not use the more sophisticated bellows associated with it. They instead improvised a system by which the smith would use a second pipe at an earlier stage of the process than the bellows to blow air into the furnace with lung power. This preheating allowed the furnace to reach the necessary temperatures for smelting.

Some anthropologists have suggested that iron smelting was not borrowed by sub-Saharan Africans from the culture of the Mediterranean but was invented independently. Their reasoning is that the African practice was culturally integrated into African civilization (meaning that it was ac-

accompanied by a social network based on iron production and possessed a number of ritual links to the worldview of African culture at large) and that it was technologically adapted to the African environment by the inventions mentioned as well as others. The persuasiveness of this argument is diminished, however, by the observation that iron-smelting technology (which originated in the Near East) was certainly borrowed by European cultures, and yet by the medieval period it had been culturally integrated into European civilization and been technologically adapted to the European environment. The technological process of using a bloomery furnace to make wrought iron was essentially the same in both African and European cultures with minor variations and improvements made on the original iron-making process developed in the ancient Near East.

THE AMERICAS

BY LAWRENCE WALDRON

By the first millennium of the Common Era the native people of the Americas had developed numerous inventions to suit their unique needs and environments. Still isolated from contact with the peoples and technologies of the other continents, American Indians sometimes devised machines, techniques, and materials that could be either startlingly different or surprisingly similar to those of Europe. It is difficult to say exactly when many of these inventions, processes, and technologies came about because most American peoples carried their history verbally. Tragically, written records that American Indians did keep of their histories were lost in the bitter struggles that characterized the European conquest of native lands. Nevertheless, many original inventions in the fields of medicine, sports, and agriculture have been passed down to the modern world from the people who inhabited the American continents before the European conquests.

The Aztec city of Tenochtitlán is in many ways an ideal sample of preconquest American achievements in architecture and urban planning. To Spanish conquistadors, Tenochtitlán must have seemed like a floating city, with water surrounding it on all sides; raised causeways connecting the city to the lakeshore; and islands of food growing in the nearby *chinampas*, the raised earthen beds emerging from the lake bottom. The city proved to be just as inventive within as without. It had many of the conveniences, virtues, and vices of a modern city, including grid-patterned streets; monumental buildings; and plazas full of performers, vendors, and even barbershops. The Aztec city also had waterways teeming with prostitutes, who were identified by their unusual hairstyles and their habit of constantly chewing chicle, the original form of chewing gum. The emperor Mon-

tezuma I and his ancestors had established various facilities either for his or the public's enjoyment, including botanical gardens, a zoo, and public schools. Indeed, schooling was mandatory for Aztec children. There is evidence that both boys and girls were required to board at "youth houses," where they were instructed in arts and letters.

The Aztec's Inca contemporaries devised a census system that worked in conjunction with taxation based on both goods and labor remittance. Citizens of the Inca realm were required to pay their labor tax by working on various public works projects. The Inca are also known to have had a legal code that recognized and protected the rights of disabled citizens. Taxes were used to offer assistance to those and other disadvantaged people, but the disabled also were selected for jobs that fit their disabilities so that they too were taxpayers. The Inca had a less-egalitarian system of public schooling in that only nobles received an education in mathematics, literacy, and martial arts.

In the Inca Empire couriers and messengers maintained communications among distant population centers. They sometimes faced perilous river and valley crossings. With their characteristically advanced textile arts, the Inca devised several kinds of cantilevered, suspension, and pontoon bridges. Most spectacular were the large suspension bridges that spanned more than 100 feet. Such bridges were anchored into posts driven 20 feet into the ground and suspended from enormous ropes. Incan law protected bridges with the threat of the death penalty for anyone who tampered with one. Be-



Ceramic vessel with glyphic text, Mayan culture, Guatemala, 400–550; the Mayans developed a complex pictographic system of writing. (Los Angeles County Museum of Art, Museum Acquisition Fund, Photograph © 2006 Museum Associates/LACMA [AC1992.129.1])

cause of their fine construction and their protection by Indian and later colonial authorities, many of these bridges have survived into the modern era.

Indigenous Americans are known to have originated several unique architectural forms in the first millennium of the Common Era. Exact dates are impossible to ascertain because of the lack or loss of written or traditional accounts. The tepee of the Plains Indians and the igloo of the Alaskan Inuit may have ancient antecedents, but the connections are difficult to prove because both structures are made out of highly perishable materials that could not survive in the archaeological record. A tepee was a large tentlike structure, some 15 to 20 feet across, made of animal hide stretched over a somewhat conical frame of wooden poles. It featured an adjustable vent hole and smoke flaps to circulate and clean the air inside. The tepee could be assembled or dismantled in a few hours and could be carried by an able-bodied teenager when folded up.

Igloos were the ultimate in ephemeral or disposable architecture in that they were made of snow cut into sloping blocks. These blocks were arranged in circles of decreasing size until they resolved into a dome. With the installation of a keystone-shaped snow block at the top, the structure became extremely stable. If igloos have a prehistoric ancestor, then their domical construction predates the Roman dome. Inuit Igloos could be 6 feet tall and 10 to 15 feet in diameter. They could be built by two men in an hour, with one worker on the inside adjusting the installation angles of his partner outside. The temperature on the inside of an unheated igloo was still considerably warmer than it was outside. But when Arctic Indians lit fires within the igloos the interiors became quite comfortable. Since the entrance to the igloo was a smaller dome creating an indirect passage inward, it remained warm inside even as blustery winds blew outside the insulated structure.

Pyramids are perhaps the most acclaimed architectural invention of Native American peoples, culminating in the grand construction complexes of Cahokia, the Yucatán Peninsula, the Andes, and central Mexico. Based on even earlier prototypes, some being the oldest pyramids in the world, Common Era pyramids like those at Tenochtitlán, Palenque, and Chichén Itzá were used either as temples or as burial places. The function of the structures depended on the religious affiliations of the kings who commissioned them. On these impressive pyramid structures Mesoamericans inscribed a vast range of imagery. Some inscriptions were not merely pictorial representations but written language.

Like temples and stelae, pyramids often featured mythic, religious, or royal hieroglyphs. Classic Mayan scribes used a complete system of hieroglyphic writing with syntax, grammar, subjects, objects, and most other devices needed to

make sentences. This written language used pictographs that represented sounds. Hieroglyphs were inscribed on pyramids from Copán to Yaxchilan and at dozens of other sites during the apogee of the Maya civilization. The hieroglyphs spoke of military exploits, lines of heredity, or mythic episodes. This phonetic form of writing was not the only kind of hieroglyph, however. The later Aztec employed a more logographic form of hieroglyph (symbols representing entire words) that did not translate into any particular pronunciation but whose meaning was recognized visually.

Mesoamerican writing was not only inscribed in stone but also painted in beautiful calligraphy in bark-paper books, almanacs, calendars, accounts ledgers, and sacred scripture. Unfortunately, most of these documents were burned during the Spanish conquest and Christian evangelization of the Americas. However, archaeologists can still guess the wealth of Mesoamerican writing arts from the thousands of painted and inscribed ceramic vessels that remain from the classic civilizations of that region.

The Mesoamericans also seem to have originated forms of sign language that spread northward to the Great Plains and Pueblo Indians, such as the Kiowa, Comanche, Cheyenne, and Lakota. North American Indians used sign language for trade with other linguistic groups but also employed this quiet means of communication in the pursuit of animals, where it enabled hunters to communicate without frightening the quarry away.

Perhaps the most unique form of recording information came from the great civilizations of the Andes. The 11th-century Incan method of recording information employed a system of different-colored strings tied into various kinds of knots, each representing a number, noun, or verb. These encoded knot bundles, or quipus, illustrate the ingenuity of the preconquest Indians. Free from the homogenizing effects of their neighbors, the Inca or perhaps their Quechua-speaking ancestors developed this revolutionary method of encoding and retaining data. Recent research suggests that quipus, in fact, not only were used to record numbers and other aspects of mercantile accounts but also may have contained the grammar and syntax necessary to write fully detailed government documents, histories, and even poetry.

While ancient Indians had many elaborate religious rituals that took the form of athletic events, their Common Era descendants seemed to have enjoyed many sporting activities in a more secular setting. Many American sports played today originated in these games. Early versions of both soccer and lacrosse were played by the Indians of eastern North America. Although the games varied considerably in terms of the number of the players, they bore distinct resemblance to their modern versions. Many ball games were played by

women. Games like hackey sack and various forms of kick-ball were played by teams of Plains Indian women strenuously competing for accolades and prizes.

Inventions that might be more readily associated with Asia, Europe, and Africa were sometimes developed separately in the Americas. The abacus, a counting machine usually attributed to the Chinese, was used by both Mayan and Aztec mathematicians. Similarly, various sleds, snowshoes, and toboggans developed by Arctic American peoples had their analogues in other parts of the world. The sled pulled by teams of trained dogs remains a uniquely American vehicle. Because riders of these sleds could become snow-blind on their long journeys across white expanses, Indians of those climes devised goggles to cut down on the glare from the snow. The goggles fit over the eyes and let light through only a long, narrow slit.

Another ingenious Arctic American invention was the bow drill. This small tool consisted of a string looped around a friction stick, and it was used to start fires with the rapid back and forth motion of the stick being turned by the string. Bow drills could also function like early power tools, in that they enabled the user to rapidly make holes in other tools and weapons. The Maya used bow drills in sculpture and even in dental procedures.

In the field of weaponry South American warriors developed an impressive array of projectiles. Amazonian Indians possessed a frightening arsenal of poisoned blow darts, which, fortunately for their enemies, they used mostly on birds, monkeys, and other prey high in the rain forest canopy. Besides the standard arrows, spears, clubs, maces, and fighting sticks, soldiers in the Andes and southern South America used bolas to fell or strangle their adversaries or prey. These stones on strings opened like propellers when flying through the air but then rapidly tangled once they hit the legs, arms, or necks of their intended victims. Bolas were made famous by Argentine gauchos in later colonial history.

Inca warriors also heated stones until they glowed red, wrapped them in tarred cloths (which caught on fire), and hurled them at their enemies. The detrimental effect of these burning missiles was equaled only by their fearsome appearance raining through the air like meteorites. With their invention of metal casting in ancient times, the Andeans might have ensured that they had among the hardest and sharpest weapons used in close combat. However, Andeans used their metallurgy mostly to produce art, not weaponry. In any case, the Aztec battle-ax would have surpassed any metal implement the Inca could make since it was edged with obsidian, a hard volcanic glass that could be more than razor sharp. In the Great Basin states of Idaho, Oregon, Utah, and Wyoming, prequest Indians devised a bow laminated with

animal sinew that greatly increased the tensile strength of the weapon. This bow sent arrows flying as much as twice the distance of enemy arrows.

Many scientific and medical innovations arose from the Americas following the beginning of the Common Era. While Native North Americans developed a wide range of antibacterial and antiviral medicines, Mesoamericans created a system of vigesimal math, mathematics based on cycles of 20 rather than 10 that fostered increasingly complex astronomical and calendrical computations. Advanced obstetrical practices were developed, probably based on already sophisticated ancient techniques. Prenatal care, methods of inducing labor, gravity-assisted birthing, sedation and pain killing, regulation of uterine bleeding, and induced expulsion of the placenta were part of North, Central, and South American obstetrics. Additionally Mesoamericans had techniques for correcting breech presentations and even performing cesarean sections.

Central and South Americans developed several tools to aid in their medical procedures. For instance, the Inca created stretchers for carrying disabled patients, and both the Aztec and Inca developed surgical forceps for removing bone fragments. In fact, such forceps may have been used in brain surgery, a technique independently invented in several American native societies and known to have been performed in triage conditions after warfare. Aztec surgeons also attached wooden nails deep into the center of broken bones that were difficult to reset.

In a unique use of unmodified natural tools, Amazonians used the jaws of large leaf-cutter ants as surgical staples to close wounds. The insects were held and made to bite the opposite edges of the patient's wound so that their strong jaws would contract and close the laceration. Once these powerful pincers were locked in place, the surgeon killed the ant, breaking off his body and leaving the locked jaw in place as a surgical staple. These natural clasps were removed once the wound had healed. Much of prequest American medical knowledge seems clustered around emergency and obstetric procedures. However, a wide range of preventive medicines, quarantines, holistic health foods and herbs specifically chosen for the patient, and even plastic surgery and talk therapy were practiced by the Aztec and some North American Indians, including the Chippewa and the Iroquois.

Among the medicines invented or discovered by Native Americans in the prequest Common Era were quinine from the bark of the *quina* (cinchona) tree, used by the Andeans to treat fevers (and later malaria in the colonial period); coca, primarily used by Andean workers as a stimulant to increase resistance to fatigue and cold but also used as an anesthetic in surgery; stone seed and dogbane, used by the Sho-

shone, Potawatomi, and other Great Basin North American groups as oral contraception; kelp, used by Indians throughout the Americas to treat goiters and other iodine deficiencies; and ipecac, used by Mesoamericans and Amazonians to induce vomiting and cleanse the intestines of parasites.

The American peoples were generally conscientious in their observance of personal hygiene. Locating their residences near fresh or running water was an intentional decision, but Indians went far beyond bathing in their daily cleansing rituals. Most North American peoples washed and removed stains from their clothes using various forms of vegetable and herbal detergents; Mesoamericans used both copal and fragrant oils as underarm deodorants; and both the Inca and Aztec used frayed, fibrous tree cuttings to brush their teeth. People on all the American continents used some manner of toothpaste, usually made of a mildly abrasive mineral, such as salt, charcoal, or ash.

From maple syrup to salsa and tortillas, most modern Americans are familiar with the legacy of Native American foods to the colonists that followed. Less familiar are the facts that Caribbean Indians invented the barbecue method of cooking meat sometime in the first millennium and that the indigenous people of Canada and Alaska were the first seafarers to engage in open-sea whaling. Fishing methods were particularly unique in the Americas. Many Indians from California to the Caribbean used poisonous chemicals to capture fish. Derived from plant sources like yams and manioc, the poisons had no effect on people, making this chemical fishing technique both expedient and safe. Ice fishing, with spears through holes in the Arctic ice sheets, was yet another unusual method of fishing pioneered by Native Americans.

Some Indian agricultural innovations, such as the domestication of corn, were already millennia old by the advent of the Common Era. But Native Americans continued to experiment with plant species, not always to increase their food supplies. Many centuries after domesticating corn, American Indians began to domesticate cotton. The Mexican variety would go on to out-compete all other varieties of cotton on the modern world market. Other Native American innovations were in methods of cultivation rather than the crop itself. Increasingly, archaeologists have begun to speculate that perhaps the Amazon rain forest, for all its wild, “virgin” appearance, may be partially anthropogenic, that is, influenced by humans. Indians may have selected certain tree species for planting in specific areas of the Amazon, thereby increasing the density of useful species while maintaining the appearance and ecology of the original rain forest. Concentrations of fruit-bearing species or trees that attract certain types of animals favored in hunting would be made to grow together, all for the harvesting convenience of the Indians who lived

nearby. These deliberately planted trees are discernible only when counted, which is precisely how some scholars have concluded that certain groups of Amazonian trees are the result of human agency.

Other recent studies provide evidence that precolonial Amazonians manipulated their environment in this inconspicuous way. *Terra preta* is a dark soil with extremely high fertility that Amazonian farmers seem to have developed through a process of phased mulching, whereby a reproducing bacterial cycle is set in motion, causing the soil to remain perpetually fertile. Modern farmers have located sites that repeatedly yield this rich soil and have begun either selling the *terra preta* or trying to reproduce its mysterious recipe. Because pottery and other centuries-old human products have been found in *terra preta* deposits, archaeologists are without doubt that this self-replenishing soil was purposefully engineered by Indians for use in the raised-bed agriculture of the Amazon.

ASIA AND THE PACIFIC

BY CARYN E. NEUMANN

Arguably the most important inventions of the medieval era originated in Asia and the Pacific. These inventions appear to have been entirely empirical rather than rooted in scientific theories—ad hoc creations and not the products of large numbers of technicians dedicated to the process of invention. Until Europe advanced after the 13th century, China led the medieval world in technological advancements. The compass, mechanized printing, and gunpowder all are Chinese inventions that proved critical to the growth of the modern world. As Chinese culture spread throughout Asia and the Pacific, these major Chinese inventions spread as well.

One of the greatest Chinese inventions, the compass, removed much of the power of weather from travel. With the compass a mariner could set sail at any time, since clouds that obscured the sky were no longer a factor to consider. The compass could always identify the position of Polaris, the primary star used in navigation. The device is built on the magnetic power of the lodestone, which had been identified by both the ancient Greeks and the ancient Chinese. The lodestone consists of magnetite, a natural oxide of iron that exhibits magnetic properties. By the sixth century the Chinese scientifically passed the Europeans by discovering the phenomenon of induced magnetism. A piece of metal could be magnetized by stroking it periodically with a lodestone. The Chinese discovered the declination as well as the polarity of the magnet by the eighth century. These developments made the invention of the compass possible. By the 11th century the Chinese were using the compass for navigation. This

early form of compass consisted of a magnet inserted into a piece of wood cut in the shape of a fish and set afloat on water. The Chinese compass spread by travel and trade throughout the Pacific, thereby aiding mariners in Japan, Indonesia, and Korea, among others.

Merchandise and technological ideas spread freely throughout Asia. The Chinese developed boats propelled by paddle wheels in the seventh century. A musical instrument called the fiddle bow appeared first in Java in the late eighth century and migrated through India before reaching Europe in the 10th century. Other musical instruments that were invented in Asia include the transverse flute and the two-ended drum. The Malay blowgun, or *sumpitan*, followed a route similar to that of the fiddle bow. When Buddhism came to Japan in 552, Chinese culture and science followed in its wake. Chinese balances for weighing and tiles for the roofing of temples were introduced into Japan about 590. The paternoster pump (a type of pump using a chain), the vertical-axle windmill, the horizontal loom, the spinning wheel, and the trebuchet all are Chinese inventions that subsequently became popular in medieval Europe.

Several Chinese military inventions enjoyed enormous worldwide popularity. The trebuchet first appeared in China in the third century. This military weapon consisted of a long beam pivoting on a frame. A sling rested at one end of the beam to hold a missile. Ropes at the other end of the beam would enable soldiers to pull downward simultaneously upon a signal, thereby raising the sling and hurling the missile toward the enemy. The Chinese first used gunpowder in the seventh century for fireworks. By the end of the 10th century gunpowder was well established as a propulsive agent in war weapons in China. The earliest references to its use in war occur in the 1044 *Wu ching tsung yao* (Compendium of the Military Arts), by Tseng Kung-Liang and others. The first projector using bullets, the *t'u huo ch'iang*, had a bamboo barrel and was made in 1259. Metal gun barrels were developed soon thereafter. The medieval Chinese were the first to use rockets as signals and as weapons.

The dissemination of all of these newly discovered inventions was aided by the advent of mechanized print. The first references to the use of block printing in China are found toward the end of the Tang Dynasty, about 900, in the *Chia hsun hsu* (Family Instructions) of Liu Pin. A Chinese version of the Diamond Sutra, a Buddhist text, dated May 11, 868, is long thought to be the earliest extant printed book. The book appears to be the result of a long experience in block printing; consequently, the skill must have originated years before its printing. A Buddhist charm printed in Japan about 770 and a charm printed in Korea about 751 also have been located, giv-

ing further support to early medieval origins for mechanized printing.

About 1040 movable type printing began in China. According to the 11th-century *Meng ch'i pi t'an* (Dream Pool Essays), written by the Chinese scientist and government official Shen Kua (1030–93), sticky clay was cut in characters as thin as the edge of a copper coin. The characters were then baked to be hardened. The printer then prepared an iron plate by covering it with a mixture of pine resin, wax, and paper ashes. When ready to print, the printer set an iron frame on the iron plate. The type was placed on the frame, set close together. When the frame was full, the whole made one solid block of type. The printer then placed the frame near the fire to warm it. When the glue was slightly melted, the printer took a perfectly smooth board and pressed it over the surface so that the block of type became even. As a rule, two frames were kept going continuously to speed the printing process. While the impression was being made from one frame, the type was being set on the other. Type of burnt earthenware was sometimes replaced by type made of other materials. Tin type became popular in the early 14th century. Koreans were known to use bronze in the early 15th century. However, because of the large number of Chinese characters, block printing survived despite the advent of movable type.

Papermaking is another Chinese invention that developed before the eighth century and spread throughout Asia. The Chinese were the first to invent a printed paper currency, and such money was in common use by the 12th century. The circulation of Chinese currency to Europe probably served as the first introduction of printing to Europeans.

After enjoying a period of enormous invention, China effectively entered a state of scientific hibernation soon after the 13th century. With the engine of Asian science stilled, the development of inventions through Asia and the Pacific precipitously declined. In the 16th century China began to acquire scientific instruments from the Europeans, the new leaders of invention.

EUROPE

BY SHANA WORTHEN

The Middle Ages was a time of widespread technological development. Many inventions were developed in Europe, including the heavy plow, the mechanical clock, and guns. Others, including gunpowder and the magnetic compass, were imported from the Near East, India, and China via traders and travelers and adapted to new uses.

Falling population numbers led to the end of slavery over the fifth to seventh centuries and thus encouraged the development of more-efficient methods of farming. The heavy

plow opened up new lands for cultivation in the early Middle Ages, especially in northern Europe. It was three tools in one: The coulter was a vertical blade that broke the soil ahead of the plowshare, the plowshare cut through the earth behind it, and the moldboard turned over the cut earth, loosening and aerating the soil for planting. The earlier form of plow had only a plowshare.

Other agricultural technologies that were either medieval inventions or at least rarely used earlier include the scythe (to cut hay) and the pitchfork (to move hay around). Hay became a much more important crop after use of the heavy plow and the resulting large number of oxen became widespread. The wheelbarrow first appeared in China in the third century and in Europe in the 13th century.

Greater efficiency in farming, among other factors, led to population growth starting in the 10th century. More people living in northern Europe's colder climates increased the need for supplies of warm clothing. Wool from sheep became a prime commodity. But the process of turning raw wool into wearable clothing was long and labor intensive. Two 13th-century innovations hastened some parts of the process. The metal-toothed comb sped the task of carding, or combing, the wool, but the cost of efficiency was quality; it produced shorter fibers and a rougher feel. The spinning wheel, brought to Europe from the Near East in the late 13th century, helped make quicker work of turning raw wool into thread.

The versatility of the horse was heightened by several medieval inventions. The padded horse collar enabled farmers to hitch horses to plows, although horses were never used as widely for plowing as were oxen. Nailed horseshoes were first imported into Europe from Asia in the eighth century, around the same time as the stirrup. The stirrup made possible a new style of combat. With their feet securely braced in stirrups, riders in combat could use battle-axes and, when it was later developed, the heavy lance. The heavy lance was used in jousting, a sport that employed the mass of the horse, rider, and lance as a weapon to knock the combatant off of his horse. It is not clear whether the lance was ever used in actual combat.

The medieval crossbow was developed in Italy in the 11th century to pierce metal armor. Unlike earlier, rarely used versions, the medieval crossbow was loaded by bracing the bow against the ground with a footrest and pulling back the bowstring with a hook attached to the archer's belt. It fired arrows at faster velocities than could a regular bow, although it was slower to reload. Likewise, the trebuchet, a weighted lever used for hurling stones several hundred yards, was developed to do damage to the heavy masonry walls surrounding fortifications. Originally powered by human force, a revised trebuchet developed in Europe around the end of the 12th century replaced human effort with a heavy counterweight.

The lack of a cheap labor supply led to widespread adoption of the water mill, a late Roman invention, and the development of the windmill. Both tools enabled millers to grind grain, or meal, more quickly than they could with the quern, the most basic kind of hand-operated mill. The typical upright post mill, a kind of windmill, was developed in the 12th century in England, although it may have been adapted from a seventh-century Persian variant that had a vertical axis for the sails and was used in tunnels to funnel the wind. Windmills, water mills, and querns all were used over the course of the Middle Ages, none ever fully replacing the others and each used in a unique location. Water mills were the most widely employed; windmills were put on the tops of hills and in other places without a regular watercourse, where water mills could not operate; and querns could be used cheaply at home to produce small batches of meal.

By the 14th century the trip-hammer, a Chinese invention, was being used in European mills to power machines for forging iron. The blast furnace, another Chinese innovation, employed waterpower to blow air via bellows into a thick-walled hearth to superheat the temperature within, allowed European iron production to increase dramatically starting in the mid-14th century. The new supplies of iron were used for making farming tools like scythes and spades, domestic tools like pots and baths, and combat technologies like cannons and guns.

Gunpowder was first imported from China to Europe around 1260. Used for fireworks and rockets in China, gunpowder in Europe became a tool of war. The first record of a cannon in Europe is from Florence in 1326. The earliest cannons were small, on the scale of guns rather than the wall-battering giants developed and widely used in the 1400s.

In the 13th century the mechanical clock was developed in Italy, France, or England. The earliest mechanical clocks were large, heavy devices, and because they were used only in church towers to ring bells, they did not need faces. Clock hands and faces became increasingly common in the 14th century, but it would be several centuries before they became standardized: most only had an hour hand; some ran counter-clockwise; some started at the top, others at the bottom; some showed 24 hours, others 12. Mechanical clocks spread rapidly across Europe. Towns erected their own bell towers, competing with churches for control over their citizens' work schedules. As clocks became more common, smaller and smaller versions were made. By the 15th century wealthy families were buying clocks for their households. Hourglasses and other kinds of sand timepieces are also medieval inventions; none are known of before the middle of the 14th century.

Spectacles, or eyeglasses, were invented in the late 13th century, approximately 30 years after the magnifying glass.



The Hurbuck hoard of knives and tools used in farming, including four scythes, Anglo-Saxon, ninth to early 10th centuries (© The Trustees of the British Museum)

Reading glasses were originally made with horn or boiled-leather frames and rock crystal lenses, although ground glass soon replaced the crystal. Glasses for nearsightedness were not developed until the mid-15th century. Among other wearable goods, buttons dramatically changed fashion in Italy in the 13th century and made necessary another innovation, close-fitting underwear.

The eating fork was first developed in the Byzantine Empire and started to appear in Europe by the 11th century, although it was not a common implement until the 14th century. Alcohol distillation was invented by Persian or Arab chemists in the eighth or ninth century, enabling for the first time the regular production of spirits. By the 12th century stills were in use at the medical school in Salerno, Italy. Both in the Near East and in Europe spirits were initially used as a base for perfumes and for medicinal purposes.

The fireplace was developed in the 12th or 13th century, helping to direct the smoke rising from domestic fires away from people using the fire. Before the fireplace and its chim-

ney, smoke was vented with a small hole in the roof. Another household change occurred in the late 14th and 15th centuries, when glass windows were first used. Individual windowpanes were small but were pieced together with lead to form larger windows that let in more light than the waxed cloth previously used.

Not all medieval inventions were practical in nature. Playing cards were invented toward the end of the 14th century in western Europe. The elaborate designs of the four suits—scimitars, polo sticks, cups, and coins—would become the basis for tarot cards later used throughout Europe for divination.

The magnetic lodestone, long known in China and the Near East, was used by 13th-century European navigators in the form of the compass. Sailing by compass directions, dramatically opened up trade and travel options, by obviating the need to sail within sight of coastlines. The earliest-known canal locks date from the 14th century in what is today Belgium and the Netherlands.

The first carriages started to be used from the 1370s, possibly earlier. Rocking carriages originated in what is today Hungary; the body of the carriage was suspended by leather straps from the frame, a design that helped smooth out bumpy rides. By the 15th century they were common in western Europe.

The numerous technological developments that occurred over the course of the Middle Ages were primarily the work of unknown inventors. People were only just starting to focus on contemporary inventions as something of interest in their own right. This lack of interest in the subject of invention means that the identities of very few medieval inventors are known.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In the medieval Islamic world there was a tremendous desire to learn about the world. Learning about nature and how it worked seemed to many people to be a godly pursuit, because it involved understanding God's creation. In the process of making discoveries about nature, Muslims learned how aspects of the physical world worked, and out of this knowledge came new ways for keeping time, new methods to move water efficiently, and perhaps new sciences, such as pharmacology and agriculture. Medieval Muslims would not have used the term *science*, which they reserved only for the study of religion and religion's application to living; nevertheless, Muslims developed what modern people would call natural science. From the 10th century to the 12th century Islamic inventing flourished: Numerous mathematicians, astronomers, and chemists hit upon fresh ways of thinking about and seeing the world.

In the Islamic world there was always conflict between those who wished to invent and those who resisted change to their way of life. This conflict manifested itself in two major ways. One manifestation was in a division between theologians and philosophers. In general, the philosophers viewed the secular world as existing apart from the religious world. They believed that the Koran applied only to spirituality and that the Hadith (comprising accounts of Muhammad's life and sayings) was too fragmentary to supply guidance to research into the natural world. They were opposed by theologians, who insisted that all of life was religious and that the study of the natural world and the study of God were the same thing, indivisible.

The other division had become a powerful social force by the 12th century and came to dominate much of Islamic teaching. This division involved the belief that just as the Koran was the final revealed word of God, given to God's last

prophet, Muhammad, and just as Arabic was the one language in which to read and understand God's word, so too the world in which the word was revealed was the only proper world in which to live. In sum, this point of view held that nothing not existing in the age of Muhammad—that is, the seventh century—should exist in the world thereafter.

These views—that there was no secular world, only a religious one, and that the seventh century represented the ideal level of human advancement—had real-world consequences. Great observatories were torn down because clerics declared them to be too secular. Financial support by governments and private donors was often withheld from inventors, and some scientists and inventors had to travel from place to place to find sites where they could do their research and even teach in schools. It is because of the general, but not complete, curbing of invention in the Islamic world after the 12th century that some historians refer to the period from 900 to 1200 as a golden age for Islamic science and invention, and historians also use it to account for why the civilization of the Islamic world outshone many other cultures in scholarship and invention in the 12th century but eventually fell behind Christian Europe in technology and scientific research.

There were also divergent views on medicine, creating a long-term tension within Islamic medical circles. One view was *tibb nabawi*, meaning “prophetic medicine.” This philosophy developed as a reaction against ancient Greek learning, which in translation had spurred much growth in medical practices in the Islamic world. *Tibb nabawi* looked to what the Hadith said about how Muhammad and those close to him dealt with health and medical issues. In general, it disregarded what the ancient Greeks, Indians, and Chinese had to say about medicine. The majority of Islamic physicians followed another point of view—that they as medical professionals were searching for truth and that it did not matter where the truth came from. These physicians were notable for their keen observation of symptoms. One such physician, Ibn al-Khatib (ca. 1313–74), through empirical observation, learned how contagious diseases spread, especially plague. His work may have led to the invention of inoculating people against diseases, which peoples of the Near East seem to have been doing before Europeans took up the practice.

Although the Islamic world may have lagged behind the Far East in surgical practices, its inventors created numerous surgical instruments, including types of saws and scalpels that are similar to instruments of modern surgeons. In other ways, physicians of the Islamic world may have been unsurpassed in the medieval era because they invented a way of thinking about treatment of patients, based on observation. Rather than relying on tradition, even the tradition of the ancient Greeks, they observed and noted how medicines affected

ARABIC POETRY

Not all inventions, and certainly not all Arabic inventions, fall within the sphere of engineering and the physical sciences. Some of the most important and most influential Arabic inventions were made in literature. Rhyming poetry, and even the sonnet, perfected in English by William Shakespeare, all begin in Arabic. Although rhyme has been downplayed in English poetry in modern times, it was an important element in the poetry of all the European languages during the Middle Ages and after. But it was not always so. Poetry written in ancient Greek and Latin did not rhyme. In Old English poetry the device of head rhyme, in which the beginnings of words at the beginning of poetic lines had the same sound (alliteration), was actually the main stylistic ornament.

The tradition of poetry in Arabic took a unique form. Going back even to the oldest Arabic poetry in pre-Islamic times (from the sixth century C.E.), the poetic line consisted of a particular pattern of stressed and unstressed syllables. Lacking in Greek and Latin, versification based on stress is a precondition of rhyming poetry, since for two words or phrases to rhyme their stressed syllables must have the same ending and all following syllables must be identical: “quickly” and “prickly” rhyme, but “quickly” and “swiftly” do not make a good rhyme because the stressed syllables are too different. Rhymed verse in Arabic consisted of a series of couplets (a group of two lines). Originally the last word in the second line of the couplet was the same throughout the poem. Over time, this requirement was loosened so that the couplets only needed to rhyme.

This form of stressed, rhyming poetry was picked up by the troubadours, an influential group of poets in southern France during the 11th to 14th centuries. Moving between the courts of different noblemen in many countries, they encountered Arabic verse in Spain at the same time that European scholars were traveling to Spain to translate Arabic scientific literature into Latin. Using Arabic verse as their model, the troubadours soon made the rhyme schemes they used more varied. They developed new forms, such as the sonnet, which became popular all over Europe and dominated poetry in the vernacular languages down to the 21st century.

people. By carefully observing which substances affected people in which specific ways, they created a large pharmacopoeia, a catalog of medicines. An Islamic engineer's invention of a distillation process expanded the kinds of medicines that could be used. In distillation, substances were separated by using their different boiling points to evaporate one substance while leaving the other behind. This process is now well known in the manufacturing of alcoholic spirits, but in the medieval Islamic world it resulted in the identifications of the precise active ingredients used in many medicines, allowing physicians to prescribe ever more precise treatments for their patients. Another engineering feat was the development of the syringe by Ammar ibn Ali al-Mawsili in Iraq in the ninth century; this instrument was developed to extract cataracts from the eyes.

Among the most famous fields of invention in the Islamic world were astronomy and mathematics, two disciplines that in Islamic practice were almost inseparable. The early motivation to find better ways to look at the sky and to use numbers to quantify what was seen stemmed from the desire to be able to identify the exact direction of Mecca from anywhere on earth, because facing Mecca was an important part of daily prayers. Better ways for telling time

stemmed from a similar desire, in that prayers were supposed to be said at certain times of the day. For instance, the sundial had been in use since ancient times, but Muslim mathematicians used what they had learned from Indian trigonometry to calculate tangents to the circles on sundials, making it possible to calculate small divisions of time; in the process they added to and further developed trigonometry as a mathematical science. They adapted the Greek astrolabe, used to calculate the altitudes of celestial bodies, and in the 14th century they invented spherical astrolabes for more precise calculations. By the 12th century circular astrolabes that were small enough to fit in a pocket had become available North Africa.

The most precise astronomical measuring devices were big—the bigger the device, the more finite the calculations could be—and these were built as parts of large observatories. Many historians of science credit the Islamic world for inventing the first true observatories, places where scientists could gather to observe the heavens and record what they found. The observatory built by Ulugh Beg (1394–1449) in Samarqand was particularly famous, with part of its huge sextant dug into the ground. Little of the observatory survives because it and other places of learning were destroyed at the

behest of clerics who saw such places as too secular. In about 1015 in al-Andalus, Abu Ishaq Ibrahim ibn Yahya al-Zarqali (1028–87), known to the Western world as Arzachel, invented the equatorium, a device for finding the positions of celestial bodies.

Probably the most famous inventor in the medieval Islamic world was Ibn Ismail Ibn al-Razzaz al-Jazari (1136–1206). He was the chief engineer for the sultan Nacer ed-Din Muhammad Ibn Qura of Diyarbakir, who commanded al-Jazari to write a book about what he knew. In this book, the *al-Jami Bain al-Ilm Wal-Amal al-Nafi Fi Sinatat al-Hiyal* (*The Book of Knowledge of Ingenious Mechanical Devices*, 1206), al-Jazari describes approximately 60 mechanical devices, most of them derived from other inventors but with modifications of his own, with the others probably being his creations. Among the best known are his water clocks, including portable ones. These were portable not in the sense that they could be carried in a person's pocket but in the sense that a couple of people working together could wheel or carry them from one place to another without harming the mechanism. Perhaps the most significant invention of al-Jazari from an engineering point of view was the segmental gear, which appeared in his timepieces and in another of his inventions, a programmable robot consisting of humanlike figures that resembled musicians. It was intended to entertain the sultan's guests at parties and was a boat that floated in a lake or a pond. Gears in it had pegs that could be removed and moved. During operation these pegs struck levers that moved the automaton. The tunes varied according to the placement of the pegs.

Another of al-Jazari's inventions was one of many the Islamic world created to help move water for agriculture. The Islamic world's contributions to agriculture tended to be in many small aspects that may have been inspired by developments in India, China, and ancient Egypt. The changes were practical, created by anonymous people who probably hit upon modifications of such lifting devices as the block and tackle (pulley blocks with cable for lifting) as part of their everyday work. A nettlesome problem was moving water from one level, perhaps a low river, to a higher level, such as an irrigation canal. This process tended to be labor intensive. For example, along rivers people built recessed tiers into the riverbank. On each tier stood men, each man controlling a large bucket swaying from a crossbar that was attached by a hinge to an upright post, allowing it to sway up and down and to be turned to face the river or the next tier up. Water was dipped out of the river by a man on the first tier, who pivoted his crossbar to pour the water from his bucket into the bucket of the man next higher up, with this process continuing until the water could be poured in the canal.

An alternative was the Archimedes' screw, a screw-shaped device in a tube or a tunnel that when turned would raise water upward. Al-Jazari was probably inspired by the Archimedes' screw when he invented the crank mechanism and the crankshaft. This device took rotary motion and turned it into linear motion, much the way an automobile's crankshaft converts motion from an engine into motion that turns wheels. This invention has many applications in the modern world, but in al-Jazari's time it allowed people or domesticated animals to turn a wheel by walking against it or pulling it; their force was transferred to a wheel outfitted with scoops or buckets that continuously dipped into a source of water, such as a river or a lake, and carried the water up to be poured into an irrigation ditch or a canal. The flywheel, invented in al-Andalus, smoothed out this transfer of force, making the turning of the wheel with scoops smooth, even if the turning of the rotary wheel was uneven.

See also AGRICULTURE; ARCHITECTURE; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CITIES; CRAFTS; ECONOMY; EDUCATION; FOOD AND DIET; FORESTS AND FORESTRY; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; LANGUAGE; LAWS AND LEGAL CODES; METALLURGY; MILITARY; MILLS AND MILLING; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; MUSIC AND MUSICAL INSTRUMENTS; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SCIENCE; SEAFARING AND NAVIGATION; SLAVES AND SLAVERY; SPORTS AND RECREATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WEAPONRY AND ARMOR; WRITING.

FURTHER READING

- S. Terry Childs, "After All, a Hoe Bought a Wife: The Social Dimensions of Ironworking among the Toro of East Africa." In *The Social Dynamic of Technology: Practice, Politics, and World Views*, ed. Marcia-Anne Dobres and Christopher R. Hoffman (Washington, D.C.: Smithsonian Institution Press, 1999).
- Chiara Frugoni, *Books, Banks, Buttons, and Other Inventions from the Middle Ages*, trans. William McCuaig (New York: Columbia University Press, 2003).
- Georg Gerster, *Churches in Rock: Early Christian Art in Ethiopia*, trans. Richard Hosking (London: Phaidon, 1970).
- Frances Gies and Joseph Gies, *Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages* (New York: HarperCollins, 1994).
- Jean Gimpel, *The Medieval Machine: The Industrial Revolution of the Middle Ages* (New York: Holt, Rinehart, and Winston, 1976).
- Peng Yoke Ho, *The Swinging Pendulum: Science in East and West with Special Reference to China* (Hong Kong: University of Hong Kong, 1982).

Emory Dean Keoke and Kay Marie Porterfield, *American Indian Contributions to the World* (New York: Checkmark Books, 2003).

Lewis Pyenson and Susan Sheets-Pyenson, *Servants of Nature: A History of Scientific Institutions, Enterprises, and Sensibilities* (New York: Norton, 1999).

Peter R. Schmidt, *Iron Technology in East Africa: Symbolism, Science, and Archaeology* (Bloomington: Indiana University Press, 1997).

Jack Weatherford, *Indian Givers: How the Indians of the Americas Transformed the World* (New York: Fawcett Columbine, 1988).

Lynn Townsend White, *Medieval Technology and Social Change* (Oxford, U.K.: Clarendon Press, 1962).

Henry James Jacques Winter, *Eastern Science: An Outline of Its Scope and Contribution* (London: John Murray, 1952).

Entries L to R



► language

INTRODUCTION

Two factors account for the changes in world languages during the Middle Ages: migration and conquest and isolation. Arabic, along with Bantu and Turkish languages, were spread across continents as their native speakers left their homelands. Other languages, most notably the Romance languages descended from Latin, developed because populations found themselves cut off from contact with the larger world.

The Middle Ages saw three great migrations. One was of the Bantu-speaking peoples from the region of the upper Congo. They swept across southern Africa, bringing a new culture marked by agriculture and ironworking technology as well as the proto-Bantu language, and they supplanted or absorbed local cultures, many of whom were hunter-gatherers. After this expansion, the forces of isolation differentiated proto-Bantu into many of the modern languages of central and southern Africa. In another wave of conquest Arab groups occupied the Near East and the Mediterranean coast of Africa, replacing many local languages with Arabic. Speakers of Altaic languages (Turkish and Mongolian) poured out of inner Asia at the beginning of the Middle Ages in raids and conquests fueled by the invention of the stirrup and the military supremacy this brought to their cavalry. Turks dislodged Hunnic peoples to the west, who in turn brought pressure to bear on the Germanic tribes that as a result broke into and

destroyed the Western Roman Empire. Mongols conquered China and India as part of the same outward migration. While these migrants absorbed the languages of their subject peoples, a later wave of Turkish tribesmen conquered much of the Islamic world and established the Ottoman Empire, bringing Turkish as the new dominant language of Asia Minor (Turkey).

The most profound linguistic effects were felt in the West. The political cohesion of the Western Roman Empire was destroyed, and regional dialects were allowed to develop in isolation, becoming within a few hundred years early versions of the modern Romance languages: Portuguese, Castilian, Catalan, Provençal, French, Italian, Romanian, and others. The Germanic languages of the conquerors were also quickly lost (except in Britain). Even these languages existed as smaller groups of dialects. Only with the invention of printing at the end of the Middle Ages did the modern national languages emerge in western Europe.

Isolation was also the main factor in the development of language in the Americas. Whether or not the initial Asian immigrants who populated America across the Bering Strait all spoke languages of the same family, by the Middle Ages the isolation of small populations and the restless movement of tribal groups had given birth to an amazing diversity of languages with nearly 150 distinct language families (each equivalent to Indo-European or Semitic), not individual languages, in South America alone and nearly 100 more in North America.

Scholarly languages exerted their influence. In the West, Latin was no longer spoken as a primary language but was studied and used as a display of learning and social position. In China there were many native Mandarin speakers, but the writing system of that dialect was adopted for reasons of prestige by speakers of other dialects and even by Japanese speakers. In Korea, Mandarin enjoyed a status more like that of Latin in the Western world, and no serious literature or important documents were composed in any other language.

The dispersal of the Jewish people throughout Asia, Europe, and Africa, living everywhere in isolated minority communities among speakers of radically different languages, had interesting linguistic consequences. Jews' their sacred text, the Bible, is written in Hebrew, which was a spoken language in early times. But already in antiquity Hebrew had ceased to serve as a living language for everyday use (though a form of it has been revived recently in the modern state of Israel). Most Jews in the Roman Empire, for instance, spoke Aramaic or Greek. At the same time, the learning of Hebrew was a cultural ideal of scholars (rabbis) and indeed of the entire Jewish community. In particular, Jewish boys had to learn the Hebrew alphabet and at least some Hebrew, since they were required to be able to read and interpret certain portions of the Bible in Hebrew during religious ceremonies. As a result, in the Middle Ages, Jews spoke the language common to wherever they happened to live, but they developed their own dialect (with many Hebrew loanwords and a Hebrew accent) and their own form of writing the language in the Hebrew alphabet. Thus, throughout much of the Arab world, Jews spoke Arabic but transcribed the spoken language into Hebrew, rather than Arabic, letters, creating the language known as Judeo-Arabic. In Spain, too, Jews wrote Castilian Spanish in Hebrew characters, a combination known as Ladino (from Latin). Likewise, Jews in the Rhineland developed Yiddish, a Germanic dialect written in the Hebrew alphabet. Oddly, when the Spanish and German Jewish communities fled anti-Semitic persecution, they kept Ladino and Yiddish as their languages rather than adopting the Turkish or Slavic languages of their new homelands.

AFRICA

BY HAIG DER-HOUSSIKIAN

With regard to medieval Africa the lack of a written tradition or archaeological evidence indicating times of dispersal of language families makes a historical discussion of these families and the subgroups within them difficult, if not impossible, to fully verify. Nevertheless, certain instances of dispersal are clearly verifiable, and others are supported either by circumstantial evidence or by educated assumptions

drawn by the scholarly community. (Notably, since comparative studies intended to reconstruct parent languages and establish chronologies of expansion and dispersal no longer preoccupy the discipline of linguistics, little was added to this historical discussion through the end of the 20th century.)

The one concrete case of dispersal is the spread of Arabic, a major Semitic language, from the Arabian Peninsula into North Africa concurrent with the spread of Islam and Arabization in the eighth century. The countries involved are now known as Egypt, Libya, Tunisia, Algeria, and Morocco, including the western Sahara. In this region Islamization and Arabization progressed concurrently, although indigenous languages were not completely eradicated. Nubian, a Nilo-Saharan language, continues to be spoken as a community or home language in southern Egypt and northern Sudan despite efforts by the Egyptian and Sudanese authorities to discourage its use. Coptic, a member of the Afro-Asiatic family and a derivative of ancient Egyptian, disappeared as a language of communication sometime in the 19th century. Another such language that remains in use in modern times is Berber, a Semitic language with several dialects. Beyond the countries of North Africa—including through southern Sudan, Chad, and Mauritania—Islamization progressed, but Arabization gradually slowed and ended.

Cases of dispersal that depend on circumstantial evidence for candidacy during the medieval time frame include the spread of Fulani, a western Atlantic language, eastward from Guinea to Nigeria and the westward spread of Yoruba, a member of the Kwa family, from southwestern Nigeria along the coast to the southeastern corner of Ghana. The evidence for the medieval spread of Fulani is circumstantial in that the Fula are known to have partially Islamized the Sahelian countries as they moved east from their home base of Fouta Djallon, in Guinea; since the eastward movement involved Islamization, the spread of Fulani must have occurred after Islam arrived in Guinea, which must have occurred after the Islamization of North Africa. Yoruba evolved through its dispersal into distinct but verifiably closely related languages, including Fon in Benin and Ewe in Togo and southeastern Ghana, while also leaving small pockets of Yoruba-speaking communities in Benin and Togo. Although the very close relationships among Yoruba, Fon, and Ewe are well demonstrated, the timing of this movement also remains uncertain.

The most prominent case of language dispersal in sub-Saharan Africa was the spread of Bantu languages into regions south of the equator. Three competing hypotheses attempt to locate the geographic point of origin of these languages. Harry H. Johnston, who finished publishing his study in 1922, placed the probable origins of Bantu in two distinct geographic locations. The first is on the modern-day boundary



The Shenute Codex, an account of the life of a holy man, written in the Sahidic dialect of Coptic; Egypt, seventh century (© The Trustees of the British Museum)

between northeastern Cameroon and northwestern Central African Republic. The second, a much larger point of dispersion, is in the northeastern corner of the modern Democratic Republic of the Congo, very close to northwestern Uganda. The first probable origin attests to Johnston's early assumptions regarding a connection between the sub-Saharan western African languages and the Bantu languages. He provides an elaborate map of migratory patterns but fails to give either a time frame or a chronology.

Malcolm Guthrie, writing in 1962, placed the origins of Bantu in the central and southern regions of the Democratic Republic of the Congo. Guthrie engages in a very elaborate examination of word roots to verify a common Bantu ancestry for those languages presumed to be members of the Bantu family. Through these examinations, he discovers that languages spoken in central and southern Congo and in northern Zambia, adjacent to the Congo, have the highest percentages of common Bantu roots (in the range of 50–54 percent). Time alone would play a role in degrading the lexical integrity of the parent language; on this basis Guthrie considers central-southern

Congo to be the geographic source of the Bantu languages, but he, too, fails to provide any reference to a time frame.

Joseph H. Greenberg, writing in 1966, placed the source of Bantu in the general area of southeastern Nigeria and southwestern Cameroon, to the east and south of Johnston's locations. Greenberg fully develops Johnston's early references to a relationship between the Bantu languages and the sub-Saharan West African languages, under the broad family heading of Niger-Congo. He places Bantu under a subfamily called Benue-Congo, one of six subfamilies. He does not deal with the issue of how Bantu spread southward.

Guthrie questions the possibility, implicit in Greenberg's hypothesis, that the speakers of Bantu languages could have physically moved through the prohibitively large and dense forest region immediately south of Greenberg's location. Guthrie also presents a second argument against the dispersal implications of Greenberg's hypothesis. The northernmost Bantu languages have very low percentages of common Bantu word roots (in the range of 14–20 percent). Guthrie argues that these are Bantu-speaking communities that spread northward and in the process lost large percentages of their Bantu word roots. He makes the same claim for the southernmost Bantu languages, including Zulu and Xhosa, which demonstrate very low common Bantu word roots (in the range of 26–30 percent). The implication here is that the source of a language family would presumably contain the highest proportion of the lexical and grammatical characteristics of the parent language. As individual speech communities disperse in various directions, they continually lose these characteristics. In the case of Bantu the loss is highest at the extreme peripheries of the northwest, toward the southern Cameroon-Nigerian border, and the south, at the southernmost tip of South Africa.

Circumstantial evidence suggests that a significant movement of Bantu speakers into southern Africa, specifically modern-day South Africa, displaced the vast majority of Khoi-San speakers. The circumstantial evidence in this case consists of the controversial and conflicting histories of the respective arrivals in South Africa of the mix of European immigrants (including Portuguese, Dutch, Belgian, French, and British) during the 15th century and of Bantu speakers. During the conflict to end apartheid, the system of racial discrimination established under white European dominance, both sides claimed to have arrived in South Africa before the other. These claims appeared important in attempts to establish "native" status for one group and "settler" or "colonist" status for the other; however, these claims were in fact entirely inconsequential because the anti-apartheid argument was based on the need for democratically elected majority rule. Regardless, it is reasonable to conclude that the Bantu

arrival in South Africa took place before the 15th century, based on the reliable hypothesis that speakers of Bantu languages replaced the predominant Khoi-San speakers over a very vast area, covering much of southern Africa beyond the borders of present-day South Africa. The hypothesis that Bantu replaced Khoi-San is reinforced by the continuing presence of two small Khoi-San-speaking communities in central Tanzania called Hata and Sandawe. It is reasonable to conclude that this linguistic transition must have taken quite some time and continued into the period of European arrival in South Africa.

THE AMERICAS

BY MICHAEL J. O'NEAL

Several challenges prevent the compilation of an accurate inventory of the languages in use in the Americas during the centuries before the arrival of the Europeans. The first is that with the exception of Mayan, from Mesoamerica, none of the languages of North, Central, or South America was written down. The second challenge relates to the definition of a *language* as opposed to a *dialect*, a definition that is based on the degree of difference between sets of spoken words and is thus often a matter of judgment. Third, as communities spread throughout the Americas, they were separated by distance and geographical barriers that isolated them from one another—to the extent that peoples who lived just 100 miles apart could not understand each other's language. Nonetheless, linguists can trace similarities between the grammars and vocabularies of languages, and these similarities suggest that languages can be grouped into families. Languages belonging to a family descended from the same earlier community of speakers and then developed differences in much the same way that American and Australian English diverged from that of England.

A fourth challenge in the tallying of American languages is that no sharply defined borders separated language speakers. Rather, the outer edges of the territories in which peoples lived were ill defined and often overlapping; over the centuries, communities of speakers moved to new territories. In a number of cases, language families spread out over areas that were not geographically continuous; a good example is the Muskogean language family, which is spoken in much of the southeastern United States, including northern and southern Florida but not the central part of the state. Finally, while most of the languages spoken by Native Americans early in the second millennium continue to be spoken in the third millennium, the number of people who speak them is small and shrinking, with often only hundreds or dozens speaking a given language. Until recently, one such language was spoken by only two surviving people who happened to be sisters.

Historians estimate that late in the pre-Columbian period, about a thousand languages were spoken in the Americas—perhaps 220 or so in North America, nearly 300 in Mesoamerica and Central America, and almost 500 in South America. In North America, Mesoamerica, and Central America were some nine major language families (with linguists disagreeing about the precise number) as well as an assortment of other smaller families and individual languages that have yet to be classified and may have been unique. The northernmost one is called Eskimo-Aleut, spoken by people who inhabited the Alaskan coastlines and a band of coastal land that stretched across northern Canada into Greenland. To their south was a large area of modern-day Alaska and Canada (including the Northwest Territory, the Yukon, and the northern portions of British Columbia, Alberta, Saskatchewan, and Manitoba) that was home to speakers of the Athabaskan languages, a group of at least 45 languages generally divided into the northern, central, and southern branches. The northern group has been a particular challenge for linguists because the people were largely nomadic.

The largest North American language family geographically was Algonquian, a group of 30 languages spoken by numerous groups in a large swath that extended through most of southern Canada to northeast Canada and down through the eastern half of the American Midwest and large portions of New England. The speakers of languages in this group included the ancestors of numerous peoples whose names are well known, including the Cree, Algonquin, and Blackfoot. This language region surrounded a region in which the Iroquoian languages were spoken, a group of 11 languages spoken by such nations as the Iroquois, Mohawk, and Cherokee primarily in western New England, parts of lower Canada, and small regions of the upper American South. Largely in the western portion of the Midwest and into the Rocky Mountain region, 17 Siouan languages were spoken by the Sioux, Crow, and numerous other groups. The most prominent of these languages remains Dakotan. A more eastern Siouan branch included languages spoken as far to the east as the Ohio Valley and as far south as Mississippi.

In northwestern America and southwestern Canada the Salishan (or Salish) languages predominated, a name taken from a specific language spoken in Montana. These languages, some dozens of them isolated from one another by the region's rivers, inlets, and islands, were spoken by numerous other peoples, including the Coeur d'Alene and Spokane. To the south were the Uto-Aztecan languages, spoken by groups in parts of California and throughout Nevada, Utah, and other portions of the American Southwest into Mexico.

The names of numerous U.S. states are taken from these Native American languages and language families. These

states include Alabama, Alaska, Arizona, Arkansas, Connecticut, Illinois, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, North and South Dakota, Ohio, Oklahoma, Tennessee, Texas, Utah, Wisconsin, and Wyoming.

The final widely recognized language family in North and Central America is Mayan, spoken in the regions of southern

Mexico and Central America dominated by the Maya—and spoken still by some 6 million people. Because the Maya used a system of hieroglyphs to write the language down, Mayan is the best documented of the pre-Columbian American languages. Much of this writing was produced during the Maya Classic Period, from about 250 to 900. Mayan, which descended from a common language that linguists simply

THE MAYAN LANGUAGES

Describing a language that evolved during the pre-Columbian period is a difficult undertaking. Linguists—those who study languages—have their own set of tools and their own vocabulary for analyzing and discussing the languages they study and preserve. Moreover, the fundamental structure of non-European languages is radically different from European languages such as English. The Maya, in common with other peoples throughout the world at this time, perceived and considered their world in ways that may be unfamiliar to those living in the 21st century. Thus, the grammar and vocabulary of their language was markedly different.

One aspect of the Mayan language that merits discussion is word order. In modern English, the usual order of an action-oriented sentence is subject–verb–object. This order reflects a basic sense of “a person (or thing) does something to someone (or something) else.” In the Mayan languages, though, the basic word order was verb–object–subject, making the emphasis more on “what was done to whom (or what)” and reducing the subject to a subordinate role in the sentence. Also, word endings were used to mark relationships, so that in sentences such as “The man has arrived” and “The man saw the boy,” the grammatical ending of “the man” would be different. In the first, “the man” would be regarded as the receiver of the action of “arriving”; in the second, “the man” would be regarded as the initiator of the action of “seeing.”

Another fundamental aspect of the Mayan language was the relative absence of prepositions. Prepositions include words such as *in*, *on*, *over*, *under*, *to*, *inside*, and others used to indicate where and how things are located in relation to one another in space and time. Thus, a dish is *on* a table or dessert is eaten *after* dinner. The Mayan languages did not use prepositions. Rather, they used positional words that in many cases were based on the human body. Thus, a phrase such as *u-wach ulew* is usually translated into English as “on the earth,” but a more literal translation would be “its face the earth,” indicating that something “on” something is literally its “face.” Similarly, the word *ti’ na* is translated as “door,” but it literally means “mouth of house.” In the same vein, *chirupam* is translated as “inside” but literally means “mouth its stomach.” Thus, the notion that something was “inside” something else was expressed by reference to the stomach, which is “inside” the mouth.

Counting in pre-Columbian Mayan also had unique characteristics. In English a number word such as *one* or *two* can stand alone or can be used to enumerate any noun, such as with “one dish” or “two trees.” The Mayan counting system was more complex. First, the number word could not stand by itself; it had to be attached to the “class” of the noun that was being counted. Classes might include such characteristics as animate, inanimate, flat, round, or human. Thus, for example, English speakers would say “one jahuacte tree.” Mayan speakers said *untek wop*, which literally means “one-tree jahuacte,” with *un-* meaning “one,” *-tek* meaning “plant,” and *wop* referring to the specific type of tree. A speaker who wanted to refer to a branch of the tree said *unts’it wop*, literally meaning “one (*un-*) long, slender object (*ts’it*) jahuacte tree (*wop*).”

Yet another noteworthy characteristic of Mayan relates to the concepts linguists refer to as alienable and inalienable possession. In English the phrase *my photo* can have two meanings: “a photo of me” (inalienable) or “a photo that I possess” (alienable, or able to be taken away). The Mayan language distinguished between the two forms of “possession” grammatically.

These are just a few of the differences between pre-Columbian Mayan (as well as Mayan languages as they continue to be spoken) and modern-day English. Numerous others could be cited, including distinct grammatical forms that indicate such things as verb tense, commands, and the direction in which objects are moving.

call Proto-Mayan, comprised numerous dialects and languages spoken throughout the region. Through painstaking comparative analysis, linguists have been able to reconstruct Proto-Mayan and trace the changes the language underwent in many of the dialects.

South America was much more linguistically diverse than were North America and Mesoamerica. While these areas had nine major language families, South America had at least 37 as well as at least 70 languages that have yet to be classified. While the number of distinct languages spoken in North America was some 220 and the number in Mesoamerica and Central America was nearly 300, the number spoken in South America was at least 448.

Scholars offer a number of possible reasons for this greater linguistic diversity. One is that during pre-Columbian times, no empire in South America extended its influence, and therefore its language, over a large region. Another reason is geographical: While North America and Mesoamerica provided terrain that generally allowed people to move about freely, South American language communities were isolated from one another by dense and impenetrable jungles, high mountain ranges, and immense rivers. These factors, combined with the absence of written records, have made it difficult for linguists to determine how South American languages are related, whether they all descended from a common tongue, and whether or not certain “languages” are really just dialects of the same language. Partly offsetting these difficulties is the fact that a great many of these languages are still spoken alongside the official state languages—Spanish and Portuguese—of South America.

At least 10 South American language families included 10 or more languages. Some 64 Arawakan languages were spoken throughout regions of northern South America and the Caribbean and even in a portion of Florida. The Carib family consisted of 32 languages spoken in northern South America and by some communities in the Caribbean. The Chibchan family, comprising 22 languages, was spoken in the border areas between Central and South America. The largest family was Tupi-Guarani, comprising 78 languages spoken in the southern part of the continent. Other families with 10 or more languages included Choco (12), Macro-Ge (32), Panoan (28), and Tucanoan (25). Additionally, 46 languages made up the Quechuan language family, spread later by the Incan Empire.

ASIA AND THE PACIFIC

BY KENNETH HALL

Frequent migrations of many ethnic groups before and during the medieval era and the cultural mixing that resulted

from these migrations produced diverse oral and written linguistic traditions in Asia and the Pacific. Written languages developed as a mixture of pictorial and symbolic representations of concepts. In India as well as in Southeast Asia these early written forms gave way to an alphabet in which each character represented a spoken sound. In China, Korea, and Japan pictographic and ideographic scripts evolved from characters representing entire words and ideas to a system that included characters representing sounds. A pictograph is a pictorial representation, whereas an ideogram is a symbolic representation.

South Asian languages are written and read horizontally from left to right. In contrast, Chinese and other Chinese-derived East Asian language characters are printed vertically and are read top to bottom, starting from the right-most column and moving left. Therefore, vertically printed books start from the “back,” from the point of view of a Westerner, and each column of text is read until the book finishes at the “front.” If, however, the Chinese language characters appear in horizontal lines, they are read left to right, as in English.

Scholars believe that the foundational languages of southern Asia, Southeast Asia, and the Pacific were versions of Proto-Austronesian, a tongue still spoken by pockets of aboriginal populations in India, Southeast Asia, Taiwan, and Australia. By the medieval era there were two dominant southern Asian language families. Most northern Indians spoke regional languages (which included Marathi, Gujarati, Bengali, Urdu, and Hindi) that had evolved from the Indo-European Sanskrit language spoken by Aryan seminomads from central Asia, who migrated into northern India from roughly 1600 B.C.E. In southern India, however, as well as among isolated populations throughout central and northern India, earlier Dravidian languages (which by the medieval era included Tamil, Kannada, Malayalam, and Telugu) prevailed. Inclusively, during the medieval era the Aryan and Dravidian language families matured from spoken languages into sophisticated written languages. In the foothills of the Himalayas on southern Asia’s northern borders, medieval populations spoke a mixture of indigenous Sino-Tibetan, Tai-Kadai, and Austronesian languages.

Southeast Asian and Pacific island languages had their origins in a series of migrations into and within the region that were continuous through the medieval era. As in southern Asia, spoken languages developed writing traditions during the medieval age. Tagalog (in the Philippines), Malay, Indonesian, and the languages of the Pacific basin belong to the language family called Austronesian (which used to be called Malayo-Polynesian). Mainland Southeast Asia had three language families: Austroasiatic (Khmer, Mon, and Vietnamese), Tai-Kadai (Thai and Lao), and Sino-Tibetan (Burmese).

By the medieval era central Asians spoke mixtures of Indo-European (Turkish and Afghan) and Ural-Altaic languages. The Chinese spoke languages in the Sino-Tibetan family, but the roots of Japanese and Korean languages are subject to debate. Some linguists consider Korean to be an Altaic language, derived from early migrations from or contact with northern central Asia. Others categorize it as an independent language, not affiliated with any other language group. A similar debate surrounds Japanese, with some scholars arguing that it has Altaic roots and others claiming that it is a unique language. The latter group label Japan a “Japonic” language, along with the Ryukyuan language, named for the southern Japanese island on which it is spoken. During the early medieval era the Japanese, Korean, and Ryukyuan languages became separate and unique. The Japanese and Korean languages selectively incorporated Chinese loan words and Chinese written script, in contrast to the Ryukyuan language, which did not incorporate these elements. Ryukyuan did not develop an independent written script tradition but selectively borrowed the variety of scripts used by its Japanese neighbors.

Sanskrit and Pali, the Sanskrit-derived language of Buddhism in south Asia, were used in the recording of India’s most important early literature in the Gupta Period (ca. 320–ca. 480). Like the people in Korea and Japan, during the medieval era Southeast Asians modified the languages and scripts from the variety of Indian and Chinese options to meet their own cultural needs.

Written script was late to develop in India because religious texts were memorized and recited orally (with an elaborate instructional methodology to assist in the memorization and recitation of these texts), making written language of little importance initially. Through the medieval era each Brahmin priest was required to memorize one of the classical Sanskrit (the language of Hinduism) and Pali (the language of Buddhism) religious texts. In the third century B.C.E. the Mauryan king Asoka (r. ca. 265–238 B.C.E. or ca. 273–232 B.C.E.) posted his pillar inscriptions using a version of Sanskrit known as “Old Magadha,” which was written in Brahmi script. Brahmi script became the basis of the regional scripts used in India through the 12th century. In the 12th century the numerous variations of the Brahmi script were replaced by the universal Devanagari script, which is the script still used in the writing of Sanskrit.

The eighth-century Pallava rulers in southern India, who selectively drew on the cultural achievements of their northern neighbors as their new state emerged, adapted the northern Indian Brahmi script in their Grantha script Tamil language inscriptions. Grantha script has remained the standard among subsequent southern Indian language family

writings that proclaim the achievements of regional southern Indian dynasties and civilizations.

Both northern Indian Devanagari script and southern Indian Grantha script, in common with the earlier Brahmi script, distinguish between consonants and vowels. In Devanagari script a symbol for the vowel is added to the consonant symbol, or failure to use a “stop” symbol attached to a consonant adds an “ah” vowel sound to the consonant. In such southern Indian languages as Tamil, the vowel characters are added before or after a consonant. Like northern Indian languages, Tamil uses a “stop” symbol to denote no vowel ending; failure to use a stop symbol adds a final “ah” vowel sound.

Chinese writing evolved from pictographs into more linear representations coincident with the emergence of China’s first functional dynasties in the first millennium B.C.E. The *lishu* (clerkly) script became the norm after 500 B.C.E. because it was better suited for rapid sketches using fewer strokes. The new script was more efficient for government bureaucrats, in an era that marked significant increases in governmental authority and bureaucracy. Then, as today, China’s regional spoken languages used different words in association with common script representations. For example, the southern Chinese might speak Cantonese, while the northern Chinese spoke Mandarin—the spoken language of Chinese government—but both used common script symbols to express the spoken Cantonese and Mandarin words that had the same meaning. Chinese script in compound represented phonetic sounds. Additional symbols, called “radicals,” further clarified these sounds.

The continuing evolution of Chinese script was consequential to the development of Chinese calligraphy, which emphasized a disciplined and continuous brush style in a contained space. By the medieval era *kaishu* had become the standard script. *Xingshu* (running script) was a cursive version of *kaishu*, and *caoshu* (grass script) developed among calligraphers as a continuous flowing brush script.

Korean language script was heavily influenced by the Chinese language, reflecting China’s strong cultural influence in the region. The earliest Korean script (*hanja*) came into existence in the first centuries C.E. as an adaptation of Chinese characters in association with local language sounds as well as meanings. This ambiguity was rectified in the 13th century, when *kugyol* script distinguished between sound and meaning. However, at that time classical Chinese was the preferred language in Korean literary culture. King Sejong (r. 1419–50) of the Yi Dynasty (1392–1882), in his attempt to reassert an independent Korean culture, commissioned the development of a new Korean script, *hangul*, which used signs in segments of consonant and vowel combinations. In writing words the

hangul signs were grouped by syllables into squares. Despite the king's attempts, Korean literature was still composed almost exclusively in Chinese until 1945, and if hangul appeared at all, it was paired side by side with Chinese.

Writing came to Japan from China during the fifth century, as Chinese characters (*kanji*) were used in a system called *kanbun*, "Chinese writing." This system used Chinese characters to represent both ideas and syllables. Eventually the *kanbun* system used Chinese characters as representations of Japanese words using Japanese rather than Chinese grammar. When the Japanese imperial state came into existence, to facilitate communication between the court and the countryside in the seventh century, a new writing system, *kana*, developed, which continued to use Chinese characters (*kanji*) in representations of things or ideas; a simplified version of Chinese characters was used to represent sounds.

In *hiragana* writing, which developed in the eighth century, *hiragana* characters better represented Japanese words. Often literate Japanese continued to use the older *kanji* system (as the language of government and as a statement of cultural and intellectual superiority), while *hiragana* was associated with less philosophical women's compositions, such as the *Tale of Genji* (ca. 1010), the world's first novel, written by Lady Murasaki Shikibu (ca. 978–ca. 1014), a resident of the Kyoto court (795–1192). *Katakana* ("part *kanji*"), which used a Japanese script to depict syllables, was another option. It was originally developed in the ninth century to aid in the pronunciation of Chinese Buddhist scriptures, but by the 14th century it was in common use in representing suffixes, particles, and postpositions in compound with *kanji* root words, or in simplified representations of exclusively *katakana* single syllables, which were used in compound to sound out words.

Medieval Southeast Asian societies drew from either the southern Asian or the Chinese language tradition. The Vietnamese modified Chinese ideographs into their own Sino-form (Chinese-like) script, known as *chu-nom* or *nom*. Other Southeast Asian societies adapted either the northern Indian Brahmi or southern Indian Grantha script into their syllabic rather than Chinese ideographic characters, because of the lesser number of Indian script symbols, their better representation of sounds, and their association with the sophisticated Indian cultural tradition. Commonly, the southern Asia-derived scripts depict consonants that have the inherent vowel "ah," with the exception of Cambodia's Khmer, which has two sets of letters, one that carries the vowel sound "ah" and the other the vowel sound "oh" (for example, *ka*, *ko*).

Burmese and Thai languages are tonal, meaning that the speaker raises or lowers the voice when pronouncing words, thus allowing any word to be pronounced a different way and

have its own unique meaning. For example, in Vietnamese the same syllable can mean "mother" or "ghost," depending on the tonal emphasis. Thai letters associate tonal sounds with the letter appearance at the start or end of a syllable. Burmese tones are represented by diacritical markings that are added above or below the written consonant.

In the eighth century the Java modified the Pallava Grantha script in their Old Javanese Kawi court script and then in the 13th century developed a new Brahmi-derived Javanese script, which was the model for neighboring Philippine Tagalog populations in their 14th-century Baybayin script.

EUROPE

BY ANNE BERTHELOT

As the medieval era began, Latin was the common language of western Europe, and it remained so for centuries. In fact, Latin was almost the only factor of unity that remained in a world fractured by the fall of the Roman Empire. By the close of the Middle Ages Latin still had a dominant place as the language of the church and affairs of state. It was only in 1539, for instance, that Francis I (r. 1515–47) of France passed the Ordinance of Villers-Cotterêts, making French instead of Latin the official language of France. For centuries there were no grammar books for any language other than Latin, and even the first English and French grammars were written in Latin.

Nevertheless, the Latin of the 16th century would not have been recognized by Latin speakers of the early medieval era. Very early on, probably well before the fall of Rome, Latin started to change under the influence of new people entering the Roman Empire. Furthermore, church Latin rapidly became a language in its own right. New languages began to emerge from Latin in most of the Western Roman Empire (France, the Iberian Peninsula, Italy, North Africa, and the Mediterranean islands). Older languages, which had been stifled by Latin as the official language of the military and civilian power, reemerged in both oral and written forms.

The turning point may be located in the ninth century. In 842 the kings Charles II (r. 840–77) of France and Louis II (r. 843–76) of Germany entered an uneasy alliance against the emperor Lothair I (r. 840–55) of Italy, and the oaths they took on this occasion, known as the Oaths of Strasbourg, represent the first written testimony of two vernacular languages, French and German, in addition to the official Latin version. Each king pronounced the oath in the language of the other's soldiers, thereby suggesting that Latin was no longer understood by the people.

Latin was still, however, invaluable as the language of the church. For centuries most people believed that the Bi-

ble, known only through the Vulgate version translated by Saint Jerome (ca. 347–419 or 420), was originally written in Latin. Additionally, until the 16th century Renaissance Latin remained the learned language of schools and universities. Scholars and students from every part of Europe could communicate in Latin—hence the name Latin Quarter given to the area around the Sorbonne, the Parisian university.

Philosophy, theology, and the sciences were expressed only in Latin; vernacular languages were not considered noble enough to address serious issues. Translations of these texts from Latin were rare before the 14th century. After the Great Schism of 1054, when the Eastern Orthodox Church and the Roman Catholic Church separated, access to and knowledge of Greek were very limited in western Europe; to some extent, philosophers like Plato (ca. 428–347 or 348 B.C.E.) and Aristotle (384–322 B.C.E.) were rediscovered through Arabic translations during the 13th century, after the conquest of Constantinople by the crusaders and the contacts with the eastern world through the Crusades. If there were debates about and comparisons of the three “philosophical” languages—Latin, Greek, and Arabic—they were reserved to some intellectual circles and did not have any influence on the evolution of languages in Western Europe.

The vernacular forms of language arose in varying manners. The first languages of western Europe were of Celtic origin, but in part for religious reasons these languages were not written down. In some remote regions of the empire Celtic languages, such as Gaelic and Welsh, survived. Long before the fall of Rome a large movement of populations weakened the empire’s borders and brought inside the empire people who did not know Latin. Pushed forward by the next wave of invaders, these people settled and founded kingdoms in regions that are now western Germany, France, Italy, Spain and North Africa. The Visigoths occupied most of Aquitaine and the Iberian Peninsula, the Lombards occupied northern Italy, and the Franks occupied Belgium and northern France.

The Romanized populations considered these people barbarians, and the name of the society that crossed the Mediterranean to North Africa, Vandales, became synonymous with *barbarian*. The newer populations spoke their own languages, which belonged mostly to the same subcategory of Indo-European, the Germanic languages. There was relatively little interaction between these languages and Latin, although a few Germanic words entered the Latin lexicon, were given Latin declension or conjugation, and went back to enrich a new vernacular.

Eventually these Germanic languages and, to a lesser extent, the Scandinavian languages became dominant in Germany, most of the Netherlands and Belgium, northern Italy, and Great Britain. In the fourth century the Angles and the

Saxons started to push back the Celtic people toward the sea of Ireland, triggering a secondary migration wave to Ireland and Brittany. These invaders spoke Germanic languages closely related to those of the Continent. Indeed, Old English and Old High German are very similar.

France, the Iberian Peninsula, and Italy had been more deeply Romanized than the rest of Europe. There the basic language was Latin, not only among the elite classes but indeed throughout the whole population. (Despite the Saracen presence in Spain and southern France, the Arabic influence on these areas’ languages was comparatively limited to a few hundred words at most.) This Latin, however, quickly evolved and differentiated into several languages, such as Castilian (the ancestor of Spanish), Catalan, Old French, Italian, and Old Provençal. Old French was the name for the language spoken in France north of the Loire River; Old Provençal, closer to the Latin original, was spoken in the southern part of France; and between the two regions there was a so-called linguistic crescent where people spoke a mix of Old French and Old Provençal called Franco-Provençal.

These were the first Romance languages, so called because they stemmed from the Roman language, if not actually from Latin; Proto-Roman is the intermediary stage between Late Latin and the Romance languages of the first vernacular texts. They were not unified languages but were composed of many dialects; to some extent they were closer to each other than to the modern languages that evolved. Old French was especially fragmented. The same could be said about the Germanic languages, where the distinction between High and Low German was mainly geographic.

Another twist in the repartition of European languages happened when William of Normandy became William I (r. 1066–87), king of England, after winning the Battle of Hastings in 1066. The Normans were of Scandinavian origin but, having settled in Normandy during the 10th century, had adopted the local dialect of Old French. They now transported it to England, and the resulting Anglo-Norman dialect was the language of the aristocracy for more than a century. When English came to the fore again after a period of almost complete disappearance in written form, it was as Middle English, still a Germanic language but including a fair number of French words and Latin roots.

Around the 14th century dialectal differences started to fade. The lexicon and morphological characteristics (inflection, for example) of the modern languages were mostly stabilized, and their syntax had grown more sophisticated, allowing them to translate nuances and complexities that until then had been better expressed in Latin. Middle French and Italian, for instance, experienced an influx of Latinized forms even though the pre-Renaissance scholars tried to return to

an earlier pure or authentic language. This tendency would continue during the Renaissance, when most European languages settled into their modern forms after eliminating superfluous neologisms (extended meanings of existing words) and atypical syntax. On the whole, the medieval era was an unprecedented flourishing time for languages.

THE ISLAMIC WORLD

BY ALASDAIR WATSON

Arabic, Persian, and Turkish, each from different language families, are the three major languages that have been the main vehicles for Islamic culture and government at various times and places in the medieval Islamic world. From the nucleus of the Hejaz in the Arabian Peninsula, Arabic-speaking Muslims spread out gaining territory that a century after Muhammad's death in 632 encompassed North Africa and the Iberian Peninsula in the West and Transoxiana and the gates of China in the East. This territory, which was to form the backbone of the Islamic world until the 15th century, was home to a vast array of spoken languages and several major languages of high culture and government. The rise and fall of these languages reflect demographic events such as large-scale migrations of people as well as the coming to power of one language-speaking group or another in various parts of the Islamic world.

Arabic, the language of the Koran, is classed, like Aramaic and Hebrew, as a Semitic language, so called as speakers of these languages are said, according to the Bible's book of Genesis, to be descendents of Shem, the son of Noah. Semitic languages form one branch of the Afro-Asiatic language family. According to Islamic tradition, Arabic was the divinely revealed language Adam spoke in Paradise (compare this with Jewish traditions about Hebrew). Modern Western scholars, however, state that Arabic is the latest of all Semitic languages to appear and posit that at one time a Proto-Semitic existed and was the origin of all Semitic languages. In common with other Semitic languages, Arabic is largely based on a triconsonantal root structure (one composed of three consonants) but with a complex, highly formulaic system of derivation using prefixes, suffixes, and infixes, or formative elements placed in the middle of words.

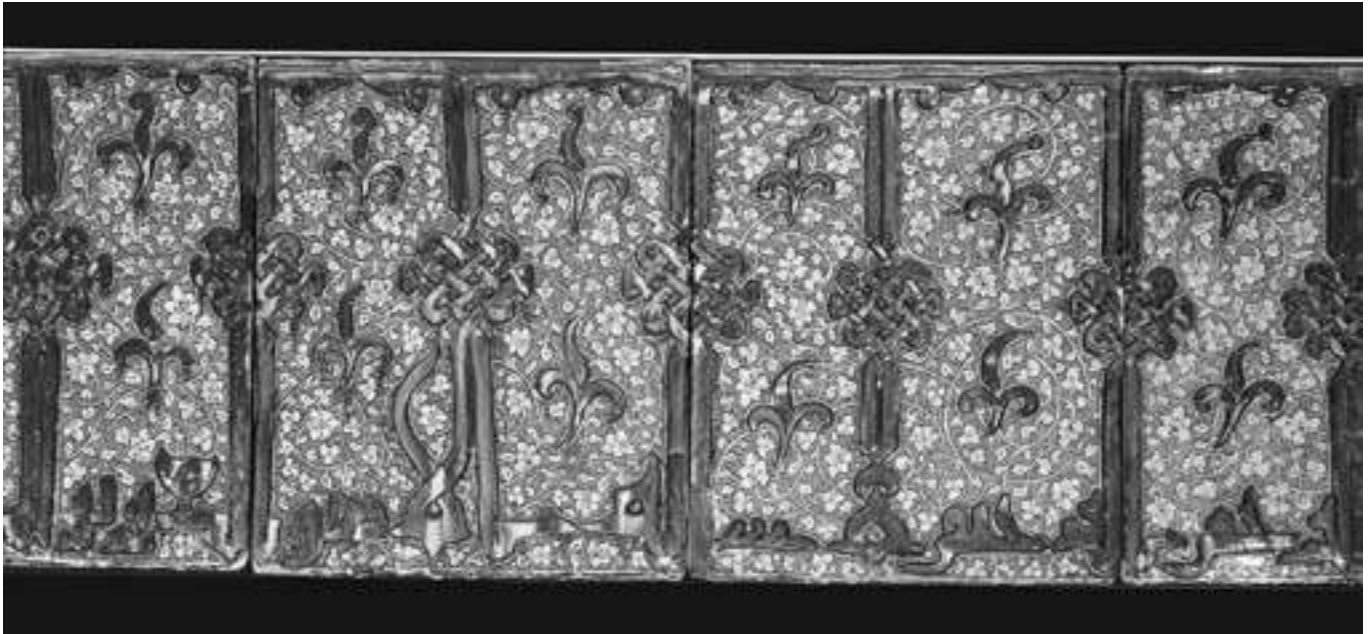
The initial Arab conquests of Syria and Palestine (633–40), Egypt (642–46), and Iraq and Iran (633–51) brought Muslim rule to these areas that had been formerly controlled by the Byzantine and Sassanian Persian empires. However, the Arabic language did not immediately displace the existing administrative languages of Greek and Coptic in the West and Pahlavi (Middle Persian) in the East. Indeed, Arab governors frequently maintained existing administrative

structures and often employed local clerks. In Syria, for example, John of Damascus succeeded his father as one such Greek-speaking Christian administrator in the service of the Muslim caliph. The Arabization of the administrative offices began in 697, apparently on the initiative of al-Hajjaj ibn Yusuf, the Umayyad governor in Iraq. This was soon to be emulated in Syria (700) following the reforms of the caliph Abd al-Malik (r. 685–705) and in Egypt (705). It was not until 742 that Arabic became the administrative language of Khurasan in eastern Iran. Thereafter, Arabic gradually became the lingua franca and certainly the intellectual and cultural language of the entire Islamic world. As this process went on, other languages, such as the Aramaic spoken in Syria and Palestine and the Coptic spoken in Egypt, went into gradual decline, but there is evidence to suggest that bilingualism was common as an intermediary stage.

Further excursions to the Maghreb (North Africa) in the seventh century brought Arabs in contact with Tamazight/Berber-speaking peoples, who, despite going on to embrace Islam and play a prominent role in the conquest of Andalusia, were often hostile toward the Arabs. It was not until the Hilali invasions of 1052 that the Arabization of the Maghreb really began in earnest.

In Islamic Spain, Spanish Arabic was the language of the Arab ruling class but also of the growing number of *muwalladun*, people of mixed ancestry who were Spanish converts to Islam. They assimilated themselves into Muslim society, often preferring the new Arab-Islamic culture and language to that of their Gothic or Iberian roots, although bilingualism was widespread among all sections of society. The Jews of the Iberian Peninsula and the Islamic world in general also often wrote in Arabic using Hebrew characters, and there exists a considerable body of this so called Judeo-Arabic literature. The Arabic script also was used in the Iberian Peninsula to write the local Hispanic Romance languages of Aragonese, Castilian, Catalan, Galician, and Portuguese. This type of literature is known as *aljamiado*.

In the eastern areas of the Islamic world, in the lands formerly controlled by the Sassanian Empire, a number of Iranian languages were spoken, most notably forms of Persian. Persian is classed as belonging to the southwest Iranian branch of the Indo-European language family, a large family that includes Germanic, Latin, Slavonic, and Greek. The earliest archaeological evidence of Persian dates back to the late fifth and early sixth centuries B.C.E. and takes the form of Achaemenid cuneiform inscriptions in what is commonly called Old Persian. It is thought that the oldest parts of the Avesta, a collection of sacred texts of the Zoroastrian religion, date from even earlier than the sixth century B.C.E. and represent a more archaic form of the language.



Luster-painted ceramic tiles with inscription in Kufic; Kashan, Iran, ca. 14th century (© The Trustees of the British Museum)

Middle Persian in the form of Pahlavi was the official language of the Sassanian government until it was superseded by Arabic as the administrative language. Arabic remained the literary and cultural language in Iran for about 150 years, until the emergence of “New Persian” in the ninth century of the Common Era. Even so, Persian continued throughout this period as a vernacular language, especially east of Iran. As other territories became part of the Islamic world—among them, Afghanistan and Transoxiana and later even parts of India, where in time a new language, Urdu (a mixture of Arabic, Persian, and Indian languages), would arise—Persian, in the form of Dari, spread and became the common spoken language of these regions, replacing another widely spoken Iranian language, Sogdian. The form of Persian spoken in parts of Afghanistan today is still known as Dari. With the waning of power of the Abbasid Caliphate in the East and the emergence of the new local ruling dynasties of the Samanids (819–1005) and the Saffarids (867–1495), Persian in its new form found patrons that ensured its continuous flourishing as the new literary language of south-western Asia. The major innovation for the language was the adoption of the Arabic script as well as the assimilation of numerous loanwords from Arabic, including much religious and philosophical terminology.

Turkish represented by its “Old Anatolian” and “Ottoman” forms, the third main language of the medieval Islamic world, belongs to the Oghuz, or southwest group of the Turkic language family, which is a branch of the Altaic language

grouping and is made up of a large and diverse number of languages and dialects all of which are structurally strikingly similar. Turkish first appeared as an Islamic language in the 10th century in Transoxiana and eastern Turkestan, which were then ruled by the Karakhanids, a dynasty with Turkish origins. Although the Karakhanids adopted the Perso-Islamic style of government normal to the eastern regions of the Islamic world, they did retain a strong sense of Turkishness, and during their rule a particularly Turkish Islamic literature developed, especially in east Turkestan.

The beginning of the 11th century marked the start of a series of large-scale migrations of various Turkic-speaking peoples into the lands of Islam, which was to continue for 400 years and have a profound effect on the Islamic world. Since Umayyad times Turks had had a presence in the Islamic world, where they were used as domestic servants, and in Abbasid times Turkish troops formed an increasingly large part of the caliph’s armies. Hence, it is often said that Turkish was the language of the army, Arabic the language of the law, and Persian the language of refined society.

The first major migrations began in the first decades of the 11th century around the time of the rise to power of the Seljuks, who were descended from the Oghuz clan of Turkic peoples. They became the sultans of a great empire stretching from Transoxiana to Anatolia. Like the Samanids and Saffarids before them, the Seljuk court adopted Persian as their language, and they were great patrons of Persian and, to a lesser extent, Arabic belles lettres, even in the non-Persian

parts of the empire such as Anatolia. However, with the large influx of Turkish-speaking peoples bringing their languages with them, it was inevitable that the linguistic map would be changed. In the late 11th century the Seljuks must have introduced what is known as “Old Turkish” to Anatolia, and by the end of the 15th century with the coming to power of the Ottoman Turks (1293–1922), who made Turkish the court language, this had developed into a refined literary language written in the adopted Arabic script and with copious Arabic and Persian loanwords.

See also BORDERS AND FRONTIERS; CLIMATE AND GEOGRAPHY; EMPIRES AND DYNASTIES; EXPLORATION; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; LITERATURE; MIGRATION AND POPULATION MOVEMENTS; NOMADIC AND PASTORAL SOCIETIES; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; WAR AND CONQUEST; WRITING.

FURTHER READING

- Lyle Campbell, *American Indian Languages: The Historical Linguistics of Native America* (New York: Oxford University Press, 1997).
- Joseph H. Greenberg, *The Languages of Africa* (Bloomington: Indiana University Press, 1966).
- Malcolm Guthrie, “Bantu Origins: A Tentative New Hypothesis,” *Journal of African Languages* 1, no. 1 (1962): 9–21.
- József Herman, *Vulgar Latin*, trans. Roger Wright (University Park: Pennsylvania State University Press, 2000).
- Weijia Huang and Qun Ao, *Chinese Language and Culture: An Intermediate Reader* (Hong Kong: Chinese University Press, 2002).
- Ann Kumar and John H. McGlynn, eds., *Illuminations: The Writing Traditions of Indonesia* (New York: Weatherhill, 1996).
- Lars Johanson and Eva Csato, eds., *The Turkic Languages* (London: Routledge, 1998).
- Harry H. Johnston, *A Comparative Study of the Bantu and Semi-Bantu Languages*, 2 vols. (Oxford: Clarendon Press, 1919–1922).
- Mecdut Mansuroglu, “The Rise and Development of Written Turkish in Anatolia,” *Oriens* 7, no. 2 (December 31, 1954).
- Marianne Mithun, *The Languages of Native North America* (Cambridge, U.K.: Cambridge University Press, 1999).
- Rebecca Posner, *The Romance Languages* (Cambridge, U.K.: Cambridge University Press, 1996).
- Orrin W. Robinson, *Old English and Its Closest Relatives: A Survey of the Earliest Germanic Languages* (Stanford, Calif.: Stanford University Press, 1992).
- Kees Versteegh, *The Arabic Language* (Edinburgh: Edinburgh University Press, 1997).
- Gernot L. Windfuhr, “Persian.” In *The World’s Major Languages*, ed. Bernard Comrie (London: Croom Helm, 1987).
- Roger Wright, ed., *Latin and the Romance Languages in the Early Middle Ages* (University Park: Pennsylvania State University Press, 1996).

► laws and legal codes

INTRODUCTION

People have been very creative in their formation of laws, the rules that govern the activities of human beings within a community. In most cases, laws have been intended to maintain order and civility among people within a society. The laws could favor the rights of individual people over society or the rights of society over individual people. Studying medieval laws and legal codes offers the chance of gaining an understanding of the ways in which human beings viewed themselves as individual people, the relationship between community and themselves, the roles of their governments, and responsible behavior within their communities. Understanding these roles and relationships in turn offers insight into the human condition.

It is tempting to suggest that the larger a society (the more numerous the people within it), the more complex the laws. The medieval era is close enough to the present age for many of the laws of nonliterate societies to have survived in oral traditions, and the oral traditions have revealed that even small communities could have elaborate laws. For example, many western African communities had neither a formal government nor lawgivers; their laws were transmitted orally and were subject to revision when times and circumstances changed. One aspect of the laws dictated gender roles, with some tasks relegated to women and others to men. This did not prevent a man from assuming a woman’s role or a woman from assuming a man’s role, but when people of one gender took on a role that the law said belonged to the other gender, they would sometimes be required to dress and behave as the opposite gender. Keeping track of who was supposed to be behaving like a woman or a man took a community-wide effort. A continent and a couple of oceans away, the medieval peoples of Australia had their own complex rules, such as ones for who had access to which territory and under what circumstances. In North America law often was a matter of community consent, fluid and flexible for changing circumstances and therefore complex.

Laws often were intended to govern personal morality rather than just public behavior. Some of the most important legal codes of medieval times were developed out of concern for morally acceptable conduct. In ancient times laws frequently were thought to derive from gods and goddesses, and they focused on how people should properly behave toward their gods. One of the significant aspects of the biblical Ten Commandments was that its focus was on how people should conduct themselves toward other people. Muslims built a culture out of this idea, with Islamic laws emphasizing such rules of conduct. For instance, laws often required people to give

some of their income to charity; by helping others less fortunate than themselves, people simultaneously fulfilled the law of the government and the wishes of God. Yet such laws were subject to disagreement, because they were constructs of words and people could vary the words to suit themselves. Often, such overarching laws as those of Islam or the Tang Code of China were made subject to local customs, which often carried more weight with individual people than did legal codes. Islamic law, for example, insisted that women be modest, but in medieval Mali in Africa, women often wore no clothing in public. Then, too—much to the shock of visitors from other Islamic lands—both men and women had sexual companions outside marriage and saw nothing wrong with it.

Laws rarely existed to liberate people. Often, they were intended to oppress people in order to preserve the privileges of the ruling elite or to perpetuate the power of government. In the Byzantine Empire, the lives of people were closely governed by laws that reached into how they worked and with whom they associated. The laws governing farmers were so oppressive that they discouraged farmers from trying to be the most productive they could be and may have been one reason why the Byzantines were willing to accept the rule of invading Muslims without much fuss. Laws also could be weapons used to keep certain social groups subject to the demands of others, such as in India, where caste laws required some people to live blighted lives in the service of people of higher social castes. Among such people Buddhism made headway because it held everyone to have equal spiritual opportunities. Islam was attractive because it regarded everyone as equal before God. These and other aspects of law shaped people's lives and behavior, and a way to measure the success of a legal code is to observe how well it served the needs of people and their communities and how often people and communities sought rescue from their laws.

AFRICA

BY KIRK H. BEETZ

The laws and legal codes of medieval Africa are the subject of controversy and are intensely studied by historians, archaeologists, and anthropologists specializing in the study of Africa. This stems from the practice of slavery, which existed in many African societies, though there were many others for which it was an alien institution. After the medieval era millions of Africans were enslaved and transported out of Africa and to Europe, the Americas, and Asia. One of the hard facts of the practice was that some Africans profited immensely from selling their neighbors or their own people into slavery. Most Africans were sold to outsiders by other Africans, and the slave trade existed throughout the medieval era. Some

historians want to uncover medieval laws that reflect a humane attitude toward slaves.

One result has been the compiling and publication of two documents: the Charter of Mande and the Charter of Kurukan Fuga. Both purport to be medieval but are at least partly modern creations. Some publications state that the two are one and the same, but the Charter of Mande was compiled from the oral history of the Mandinka and was published in 1991. Its compilers claimed that the oral tradition for the Charter of Mande dated to 1222, though other scholars believe the date to be imaginary, and it was presented as a set of laws or a constitution for the medieval Mali Empire. The Charter of Kurukan Fuga was compiled from oral histories from Mali, Senegal, and Guinea during a meeting in the late 1990s and was reformatted to make it look like a constitution in 1998; the new format may misrepresent its actual status in medieval Mali. It was dated to 1236 and was attributed to an emperor of Mali. Some scholars propose that these documents contain defenses of human rights as well as other modern notions of liberty, and a few suggest that the documents prove that Africans of the 1200s had contemporary attitudes toward human liberty, making medieval Mali the inventor of present-day concepts regarding human rights and the people of Mali benign slave owners. That Mali sold slaves abroad does not seem to enter into the discussion.

It would be wise to remember the people who gave rise to such laws. For them, slavery was an everyday practice—to be avoided if possible but to be found in the form of household servants and colonies of slaves established by emperors of Mali to serve as farming communities producing food for the emperor and his government. Terms such as *human rights* would likely be unknown to them and would require explanation. On the other hand, they did have strong notions about social rights. Their laws tended to emphasize the rights of communities of people rather than of individual people; people had rights through their families, marriages, crafts, and religions.

In the Charter of Kurukan Fuga it is easy to find much that corresponds with what historians believe is true about the laws of Mali, Ghana, and Songhai, empires that arose during the medieval era in western Africa. As seems to have been typical in most of medieval Africa, the laws are closely tied to ideas about moral and immoral behavior. For example, one law states that an entire community, not just the immediate family, is responsible for the welfare of its children. Another declares that people are not allowed to offend women. Yet another asserts that people must keep their word of honor. Others regard the organization of society. For instance, everyone who was neither too young nor too old was supposed to be allowed to participate in the making of decisions about

public policy—a practice common among many of the cultures encompassed by the Mali Empire. Other laws seem to represent criminal law. For example, anyone who attempted to murder another person was to be put to death. Mali tended to use Muslims as judges, and it seems to have had an appeals system in which people convicted of crimes could petition a higher authority to void the conviction, but how this worked has yet to be figured out.

That Mali was a nation of laws seems evident from the accounts of visitors, mostly Muslims. Ghana in the 1100s and Mali in the 1300s were praised by visitors for their strong sense of justice. Travelers on Mali's roads appear to have been remarkably safe and secure. Still, the rule of law as embodied by the imperial government often did not reach throughout the empire. Especially in remote provinces, the laws that were enforced tended to be local ones that derived from long-standing regional customs. Villages and towns often were allowed to make and enforce their own laws, which tended to take precedence over imperial laws within local communities. The remarkable safety of travelers noted in the 1300s may have derived in part from imperial laws that forbade the molesting of travelers but also from ancient rules of conduct in which banditry or theft was punishable by exclusion from the community, a fate that may have been worse than death for the perpetrators, who within their cultural outlook would lose all sense of personal identity without their places in their communities. Further, people could gain status in a community by treating strangers well, because in their view the strangers would be obligated to them until the good treatment was repaid. From this perspective, the Charter of Kurukan Fuga seems to be in harmony with medieval African customs and remote from modern controversies.

Written laws and even ones from oral history are hard to find from medieval Africa. In part this is because in many cultures laws were memorized by scholars trained for the purpose, as seems to have been the case in Benin. It is also partly because written documents may have been lost, as may be the case for the city-states of East Africa. Archaeologists often seem optimistic that they will someday uncover legal documents from city-states such as Kilwa or Mogadishu, as they are also hopeful for the Christian kingdoms of Nubia and the kingdom of Kanem. All were places with literary traditions.

One place where some records survive, although much revised over many centuries, is Ethiopia. The leaders of Ethiopia took pride in keeping records and even had libraries in which scribes were perpetually kept busy copying decaying books in order to maintain a continuous record of history and thought. Further, the Solomonid Dynasty of Ethiopia lasted from medieval times to the end of the 1900s, helping to

preserve documents that might otherwise have been lost had their government been overthrown by invasion.

Legal historians usually refer to two Ethiopian works in particular: the *Kebra Nagast*, meaning the “Book of the Glory of Kings,” and the *Fetha Negast* (also spelled *Fetha Negest*), meaning the “Law of the Kings.” The first contains accounts of the rulers of Ethiopia, and the second includes a body of legal precedents. The *Fetha Negast* was first written as a single work perhaps in about 1450, though it may have been as early as the 1200s. It was revised often as times changed, but in 1450 it still represented the legal practices of Ethiopia from the early medieval era. Its laws drew on the Bible, ancient Roman laws, and traditional Ethiopian customs.

The emperor was embodied in the law as having the final say on all matters of law. The only people allowed to interpret the law and to advise the emperor on legal matters were scholars trained at the *Matshaf Beit*, meaning “House of Books.” The *Matshaf Beit* served not only as a repository for writings about the law but as a sort of graduate school of law, where students would study 30 years to memorize the empire's laws and even foreign laws and to understand the commentaries on the laws.

Medieval Ethiopia had a system of courts and lawyers. Cases were tried before a judge, called a *dania*. The *dania*s were usually *debterras*, who originally were clerics committed to transcribing documents. They became respected for their knowledge of literature and law and often became government officials. Judges were not required to be *debterras*, so village chiefs or leading community figures, including women, could become judges. Judgments were based on both imperial and local laws, with local laws usually prevailing over imperial laws. The application of the law required judges to combine Roman laws, Greek philosophy, traditional laws, and biblical laws, especially from the Old Testament. People who lost their cases were able to petition regional or provincial tribunals and ultimately the emperor, whose decision was final. Enforcement of the law fell to the Ethiopian nobility and through them to village chiefs.

There were kingdoms in central Africa and southern Africa, but their laws are little known. Travelers of the late medieval era reported being able to travel from west Africa all the way to southeastern Africa through two large kingdoms where the rule of law seemed to prevail. Merchants and others travelers from outside the kingdoms were required to pay homage to the kings and pay duties; if they did so, they had legal protection on the roads of the kingdoms. The merchants would have been traveling to the city-states of East Africa or to Great Zimbabwe, where the nation of Zimbabwe is today. The city-states were of African origin, and their basic social structure was local. Yet they were heavily influenced

by merchants from Indonesia, India, and the Islamic world, with most of their rulers becoming Muslims. It seems that the city-states were fairly conservative societies. Most historians suspect that their laws were influenced by Islamic laws, particularly those governing trade, which would have been especially useful to the city-states that prospered from international trade. The laws of Great Zimbabwe may also have been influenced by Islamic law, although this is not certain. What little was recorded of Great Zimbabwe's laws focuses on how people were expected to behave toward its monarch.

Elsewhere in Africa were societies that did not have imperial governments, or if they did have them, the governments did not last long. Many may have arisen, survived a few generations, and then fallen apart because of economic failure, invasion, or lack of support from the subject peoples. Remarkably, chaos did not necessarily follow. Instead, African communities had an intricate and powerful set of customs that called for giving and receiving from family, neighbors, and communities; this linked people together in a common interest to ensure the survival of their social groups. These customs encouraged people to behave toward one another respectfully, to give help as well as to receive it, and to care for the well-being of their families. Just as the Charter of Kurukan Fuga asserted that children were the common responsibility of all in the community, so African traditions among farmers and hunter-gatherers in stateless cultures required that community members be responsible for one another's welfare.

THE AMERICAS

BY MICHAEL J. O'NEAL

It is risky to make generalizations about the systems of law that governed Native Americans in the pre-Columbian era. First, few legal codes were written down or formalized. Rather, codes of behavior were agreed on by a community and passed to subsequent generations through oral traditions, particularly in North America. Even within one a group or in neighboring communities, however, law could be administered in different ways. The immense diversity of Native American peoples also makes difficult any attempt at forming generalizations. North America, for example, encompassed 8 million square miles and was home to at least 400 to 500 distinct groups, each speaking its own language. Thus, nothing in the way of a common legal code existed.

Nonetheless, a few generalizations about North American groups are possible. First, law and government tended to be administered by consensus. While a chief or headman nominally ruled a community, in that capacity serving as its chief judicial officer, in general chiefs were not absolute rul-

ers who governed by divine right. Rather, they were selected for their leadership abilities, and while chieftainship could be partly hereditary, inheritance was by no means a foregone conclusion. Thus when a leader adjudicated legal issues, he did so in consultation with elders or a council as a way of building consensus. Often the leader's wife also might have a say in legal and other matters.

A second generalization is that North American groups did not recognize property ownership as it pertained to land. Land was regarded as an asset owned in common by the community, a gift given to it by a higher power. Individuals did not own title to the land their families worked, and land could not be bought or sold. With regard to personal property, the concept of ownership was sometimes fluid. An individual could own, for example, personal items of clothing, but agricultural implements were regarded as family or clan property rather than the property of one person. Sometimes this view of ownership led to disputes, which were resolved by chiefs and elders with an eye to the good of the entire community rather than to the legal rights of individuals.

A third generalization is that laws and legal codes tended to emphasize harmony and preserving the social fabric of the community. A good example is provided by the Inuit. When people crowded into winter camps, it was not uncommon for disputes to break out. Arguments often escalated into fistfights and occasionally into murder. The Inuit developed a unique way of dealing with these matters—the song duel. Singing was a highly valued art form in the dark, frozen regions of the far north. When a dispute erupted, the people gathered to witness a “duel” in which the disputants sang long, elaborate songs that detailed the vices and flaws of their opponents. The duels could go on for the entire winter season or even longer. The purpose of the song duel was to get the disputants to forget their grudges in the general hilarity of the event. In that way social harmony could be restored. In extreme cases the Inuit put to death people who were insanely aggressive, making sure that members of the person's family carried out the sentence to ensure that a feud did not erupt between families.

Another example of the emphasis on harmony was the Harmony Ethic of the Cherokee. The purpose of the Harmony Ethic was to avoid conflict and the expression of anger toward others. In the case of a legal dispute the tribal leader listened to both sides, often calling in another person to help resolve the conflict. The disputants were ordered to withdraw until judgment was rendered. The goal of judgment was to restore harmony and resolve the dispute by requiring one or both parties to exercise generosity and to give up belongings. Food was the most common item given up. The Cherokee had separate words for stinginess: one applied to food and one

to any other good. People who violated the Harmony Ethic were subjected to gossip and ostracism. In more extreme cases conjurors were enlisted to make the offender seriously ill or even cause his death. In all cases, though, a person not involved in the dispute was brought in to render judgment, thereby reducing face-to-face conflict.

Some North American groups had slightly more formal legal codes. For example, the Poncas of the Midwest enforced seven fundamental laws: have a single god, do not kill, do not steal, be kind to others, do not gossip about others, be generous to others, and revere the Sacred Pipe. When a person violated one of the laws, the victim or the victim's family usually handled enforcement. The Chickasaw, part of the Mississippi culture that flourished from about 800 to 1600, dealt with legal transgressions within the clan, a common practice among many Native American tribes. If a legal dispute involved members of different clans, elders from the two clans met to reach some kind of resolution. Usually the emphasis was on restitution. In the case of a serious crime such as murder, the victim's family had the right to demand the life of the murderer; however, if the murderer was a person of much lower social status than that of the victim, the victim's family had the right to claim a life of equal social status. This appears to be simple revenge, but for Native Americans it was a way to restore cosmic order and put to rest the lingering spirit of the murdered person. Similarly, among the Choctaw who lived in modern-day Mississippi, if a person found guilty of murder fled, the victim's family had the right to demand a substitute for execution.

Among the Mesoamerican Aztec, law was much more formalized than it was in North America. The Aztec word for "justice" was *tlamelahuacachinaliztli*, literally translated as "straight line to a point," or "to straighten that which is twisted." One Aztec ruler, Nezahualcoyotl of 15th-century Tetzaco in the basin of Mexico, created a legal code with 80 statutes. His successors expanded the code, which was designed in large part to maintain respect for authority, given that the Aztec state was militaristic. Because the Aztec state had no legislative body, judicial authority resided in the hands of the emperor, who ruled by decree.

The Aztecs had a judicial system that resembled the one that would be developed in the United States centuries later. Legal disputes were heard at a local court (*barrio*), and cases could proceed to appeals courts. The lowest court was the local court, which dealt with relatively minor criminal and civil offenses. Assisting the local court were neighborhood watchmen, who reported crimes to authorities but themselves had no enforcement powers. Higher-level courts in the capitals of the Aztec provinces dealt with more serious criminal offenses. An appeals court heard petitions from verdicts in

lower courts in the case of commoners; the same court, however, was the "court of first instance" for members of the nobility. Thus cases involving nobles went directly to the higher courts. An important case could be referred to the emperor, who would hear the case in concert with several advisers. Special courts existed for commercial matters, domestic affairs, the military, artisans, and other groups. A special court in the emperor's palace dealt with crimes committed by foreign dignitaries; one such crime was adultery, punishable by death throughout Aztec-controlled lands. In an Aztec court parties had to take an oath to the god Huitzilopochtli. They did so by touching first the ground and then their lips to symbolize that lying offended the gods and was punishable by death.

A unique feature of Aztec law was the law of the marketplace, which regulated the activities of the merchant guilds. Merchants were, in effect, a state within a state, worshipping their own gods, marrying within their caste, and inheriting their positions. The Aztec had a complex economic system consisting of a web of marketplaces. To ensure that merchants behaved legally and ethically, the merchant guilds themselves regulated the marketplaces, judged legal cases having to do with the marketplaces, and even issued death sentences.

Several regulations applied to market behavior. For example, it was against the law for merchants to trade on their way to the marketplace; they could sell their goods only at designated places. Inspectors mingled with the crowd to ensure that goods were being sold at the proper prices (based not on currency but on units of exchange determined by the value of cloth and cacao beans). These inspectors also ensured that scales and measuring devices were accurate. A nearby court rendered immediate judgment on thieves or people selling stolen goods. Any vendor guilty of violating the laws could be fined. Those guilty of serious violations were beaten to death in the middle of the marketplace.

Judges were specially trained and held in high repute. Most were members of the nobility, but some were members of the priestly class. The latter were feared persons, for they often walked the streets after a night of ritual bloodletting, during which they painted their bodies black. The state set aside special lands from which judges drew their income. It was believed that this method of payment made judges less susceptible to corruption. Any judge found guilty of corruption was put to death. Judges ruled swiftly, and Aztec justice was harsh.

In South America, the greatest empire was that of the Inca, who originated in Peru in the 13th century and quickly rose to power. Unfortunately, little is known about the Inca legal system, for no written records survive. What information historians have is fragmentary and incomplete. It is known no prisons existed. Although the Inca overall were

very warlike, within the state life was very peaceful, and crime was infrequent. One possible reason for this apparent internal tranquility is that punishments for crimes were swift and brutal, and the state specified numerous capital offenses, such as treason, disobedience to the ruling Inca, and thievery. A thief was beaten with stones for a first offense and beaten to death for the second.

Laziness was regarded as a crime—a form of stealing from an employer and from the state. Disabled people were required to work within the limits of their disability, as were the elderly. It is also known that land was divided into thirds: one parcel was dedicated to the use of the gods, a second to the ruling Inca, and the remaining to the landholder. The landholder was expected first to work the land dedicated to the gods and then to focus on the ruling Inca's land before finally paying attention to the personal share of the property. It is also known that the Inca required men to marry by the age of 20 and people with disabilities to marry people with the same disability.

ASIA AND THE PACIFIC

BY KENNETH HALL

During the medieval era the Asian court elite codified prior legal practices into written legal codes. Chinese dynasties shared the legal values and customs that complemented the formal law and procedures as contained in the Tang Code (624). The Tang Code, which became the basis for judicial codes in neighboring Korea, Japan, and Vietnam, contains 502 articles. The initial 57 articles establish the basic principles of justice and judicial procedure; the remaining 445 articles define specific offenses. South Asia and most neighboring Southeast Asian countries based their legal codes on the multiple Dharmasastra Hindu-Buddhist texts that were codified in the era of the Gupta monarchs (320–550). The Dharmasastra texts, which outline the Indian system of jurisprudence, define universal obligations and penalties, but they were always subject to local caste, religious, and civil codes that prescribed appropriate local behavior.

These Chinese and Indian legal codes were modified to accommodate local needs and common practices in the law codes of their neighbors. Since issues of social justice were universally regarded as foundational to civil order, they took precedence in Asian law. Laws reinforced and defined the privileges of social hierarchy and regulated landholding, property rights, taxation, and service relationships. Criminal law included elaborate lists of appropriate penalties. Commercial law established the standards of the marketplace. Religious law defined appropriate ritual traditions and practices.

THE ABOMINATIONS OF THE TANG CODE

The Tang Code was one of the most influential set of laws in the medieval world. It was established in 624 but did not take on its final form until 737. Out of this immense work in 12 sections and 502 articles, medieval Chinese legal scholars identified criminal laws that were “abominations” because they disrupted the order and the peace of society. These laws concerned depravity, family life, the conduct of government, and the security of the emperor. Mass murder, which was the slaying of three or more people at a time who had not committed capital crimes, may have been chief among depraved crimes. Another depraved crime was the use of sorcery to harm others, especially to murder them. The burning or dismembering of murder victims before or after death was an abomination.

Physically harming elder family members was an abomination. It was illegal for someone to beat or murder a parent, and aunts, uncles, and elder siblings were also protected by the law. On the other hand, it was legal for a parent to beat a child, though the law might punish a parent if the harm done to the child was too excessive for the offense for which the child was beaten. Treason was an abomination. This crime included switching sides during a war, joining a rebellion, or giving allegiance to a foreign ruler. Murdering a government official was treason. The penalties for these offenses varied from loss of social rank to exile to the hinterlands of the empire to death, usually by beheading.

In general, most reprehensible were violations of the laws protecting the emperor, because the emperor both represented the government and was the father of all the Chinese people. Deliberate efforts to harm him were forbidden. Other abominations included failing to carry out duties, such as properly tasting his food before it was served to him, or failing to follow dietary laws or to prepare healthful food when cooking his meals. Physicians who did not follow appropriate procedures when treating the emperor also committed abominations.

Chinese law was shaped by two conflicting approaches to maintaining societal order. China's humanistic tradition was more optimistic in its hopes for humanity and was thus more tolerant of transgressions than the Confucian legalistic tradition. The Confucian legalistic tradition was based in a

detailed written legal code that was considered to be foundational to political power, which derived from a social and moral order that resulted from social control. Thus the Chinese legal code defined inappropriate conduct as this was a detrimental threat to societal harmony. The legal code dictated obedience. Disobedience resulted in severe penalties, including public humiliation, mandated labor, physical mutilation, community expulsion, slavery, or death. Above all, the code demanded proper conduct (*li*) as appropriate to one's social standing in a family, community, or state hierarchy. Since the family and community were ultimately considered to be accountable for individual misconduct, legal penalties were regularly imposed on an inclusive group rather than exclusively on the offender.

Families, clans, and village organizations promoted proper behavior through education and example. Aggressive selfish behavior was unacceptable; yielding to the interests of others was expected. Conflicts were resolved by compromise, frequently through the intervention of respected family elders and community leaders. A magistrate's court was the last resort and was to be avoided if possible, since courts were not aware of local circumstances and threatened to impose legal decisions that would ruin reputations, alienate property, and impose a variety of physical punishments, including a possible death sentence.

For minor offenses, the sentence required public humiliation, with the criminal wearing a heavy collar bearing the inscribed record of the crime. Since the collar was too large to allow access to the criminal's mouth, the criminal would starve if not fed by others, a symbolic gesture of the community's accountability for the criminal's rehabilitation. Minor offenses might also result in exclusionary penalties, as members of an elite family might be barred from future government appointments, and monetary fines. Those unable to pay their fines worked off their sentence as "debt slaves." Labor penalties of one to six years were normal judgments imposed on those guilty of theft or other civil crimes. Those of wealth and status could have their labor service performed by servants or younger family males. More serious offenses resulted in mutilations, such as publicly shaving the offending man or woman's hair or beard; branding; or, in more extreme cases, cutting off a body part, such as a nose, ear, hand, foot, or sex organ. Decapitation and hanging were the normal executions of death sentences, but there were unusual executions, as when a criminal was sentenced to be torn apart by horse-drawn chariots or to be buried with the exception of the head, to die a slow death. The heads of executed criminals were displayed on poles, to deter other would-be criminals and to increase the shame of the criminals' families and neighbors.

Chinese magistrates were state appointees who were accountable to the emperor rather than to the local community. A magistrate was both the judge and the chief prosecutor, required to investigate a case thoroughly before assigning a fair verdict. As a statement of respect, those attending a legal proceeding were required to kneel before the magistrate and could be whipped if they were not reverential. Private lawyers were prohibited, since they were seen as self-serving individuals who were more interested in prolonging the legal process to run up their fees than in working toward a quick resolution that was in the best interests of the community.

Magistrates were subject to regular legal reviews conducted by their bureaucratic superiors or, in rare cases, the Chinese civil system's censorate, which reported directly to the emperor. These investigations evaluated the magistrate's record keeping, supervision of subordinates, management of penal law, legal investigations, and interactions with and management of the local public. A magistrate was held accountable for mistakes of law or fact, regardless of his good intentions. Offending officials might be fined, removed from office, reassigned, or, in rare cases, executed. There was also substantial consequence to an offender's family, which was subsequently ineligible for bureaucratic appointments and barred from lucrative imperial commissions. The severe consequences of wrongdoing encouraged Chinese officials to mediate local settlements to avoid courtroom litigations.

Chinese magistrates were forbidden to receive anonymous accusations; personal testimony had to be given, subject to in-court questioning. Knowingly providing false testimony led to severe consequences. As a check on legal decisions, there was an automatic new trial if the convicted criminal refused to sign an acknowledgment that the judgment was valid according to both the law and the facts. A case could be reopened if one party claimed to be the victim of injustice. Family members could appeal any conviction all the way to the emperor, but they were subject to the risk of punishment if their appeal was ruled to lack merit. The Tang Code mandated three reviews of a sentence of death before an execution.

In Chinese justice the criminality of an act had to be proved: Had a law been broken, and had the violator intended to break the law? The system was sensitive to the state of mind of the offender; an accused might be free of prosecution or receive a reduced sentence if, feeling remorse for a lapse in judgment, he surrendered voluntarily prior to the issuing of an arrest warrant. The judicial system also considered traditional cultural practices and beliefs, such as the claim of spiritual possession and detrimental ancestral interventions that were responsible for a criminal act. Among the acceptable allowances was the ignorance of the accused

or other family members in avoiding an inauspicious day or failing to adequately perform ancestral rituals, funerals, and marriages. Any of these acts would cause demons and malign spirits to impose their reprisals and thus lead to the human crime.

Indian law was based in the moral codes of the Hindu and Buddhist religious traditions. Law was conceived as dharma, the duty or obligation of proper conduct relative to the needs of society over those of the individual. The Dharmasastra texts prescribe the obligations and penalties appropriate to caste and social status. Like Chinese justice, Indian justice encouraged local resolution, through community tribunals based in caste, trade, artisan, family, sect, and village society. Each community could establish and apply its own customs and procedures; in theory, there was no hierarchy among these frequently overlapping, community-based institutions.

Indian Dharmasastra law was the ideal rather than an absolute, and it was above all intended to make practical legal decisions based on common usage rather than on a written

code of law. Legal decisions were in the best interests of the community, to maintain local societal harmony consistent with the community's political, economic, religious, or hereditary hierarchy. As did the Chinese, Indians believed that in an orderly hierarchical society, if members behaved according to what was expected of their social rank, righteousness would surely prevail. Physical penalties were rare, and there are few records of severe fines. Instead, legal decisions mandated restitutions or public admission of wrong and recommitment to acceptable behavior. Subsequent offenses resulted in boycotts or expulsions. Rare death penalties were subject to a king's review before an execution.

Kings involved and asked the guidance of Hindu and Buddhist clergy, scholars of Dharmasastra, before making legal decisions. In the absence of an inclusive bureaucrat system, Indian kings might exercise their legal authority directly, or more commonly through their delegated agents who would travel the countryside on their behalf. A royal agent's local judicial intervention resulted from a community's failure to make their own resolution. If a legal appeal reached the court, a court tribunal sent officials to gather the facts of a case, and to determine the common practice of the groups involved. From the local community's perspective, such royal legal intervention was undesirable, since the king's justice ultimately served the king's rather than the community's interests. Legal interventions frequently discovered local improprieties that resulted in unintended fines, penalties, or additional taxes. Thus, as in China, state interventions were infrequent, and local resolution was the norm.

Six text-based traditions of law developed in Southeast Asia during the medieval era. In each case the legal system localized either Indian or Chinese legal culture. The Burmese *dhammathat* (dharma) and *Thai-Lao thammasat* legal traditions consisted of numerous texts that incorporated India-derived Buddhist modifications of Dharmasastra law according to local needs. Cambodian law developed in the era of the Angkor-based court (eighth to 14th century) and made similar local modifications of the Indian Dharmasastra Hindu and Buddhist legal codes. Numerous Sanskrit and Khmer temple inscriptions highlight issues of landholding and labor rights as they relate to royal patronage of Hindu temples and Buddhist shrines. In Vietnam the 15th-century Hong Duc code marked a Confucian departure from previous reliance on Buddhist codes of law. The new secular law code, in common with the old, included significant local modifications that were consistent with prevailing Vietnamese social practice, with notable concern relative to local landholding, social, and ritual practices as these related to royal authority.

Javanese law, which was codified in the 14th-century Majapahit court, was also Indic inspired with local variation.



Folio from a *Khamsa* of Amir Khusrau Dihlavi, showing a priest bringing a marriage document; ink and color on paper, Sultanate Period, India, 1450–1500 (Freer Gallery of Art, Smithsonian Institution, Purchase, F1959-2)

Javanese law was inclusive of assorted local legal traditions that are documented in charter and temple inscriptions dating from the eighth century and 11th-century through 15th-century literary adaptations of the Indian Mahabharata and Ramayana epic poems. Java's texts and inscriptions go beyond the Angkor court's inscriptions in their variety of concerns relative to land, property, societal, political, and ritual rights. In contrast to Java, from the 13th century the rulers of the neighboring Malay Strait of Malacca region modified their previous legal practices in keeping with local conversions to Islam. The most complete account is supplied in that era's court chronicle (*Hikayat*) tradition, as these texts detail issues of law and contract and the legitimacy of the law as a derivative of the Muslim ruler, the "shadow of God on earth," who had been empowered by divine revelation.

The legal culture among the Pacific basin islands was based in family bloodlines and ranking of the different branches of ancestors. Rank-based legal consequence was often related to previous islands of residence and favored the earliest settlers over those who arrived later. Legal culture was respectful of the realm of nature and penalized those who were disrespectful of or abused the natural realm due to belief that such disrespect would alienate the spiritual forces and bring negative human consequence. The center of the community was a communal building or a central space, where justice was dispensed by a chief, village or family elders, or a meeting of all the local society's adult members, who would reach a judicial decision based on the community's best interests and to ensure the community's continuity. Among the most extreme options of punishment was banishment of the offender from the community or from the island itself.

EUROPE

BY JULIE-ANN VICKERS

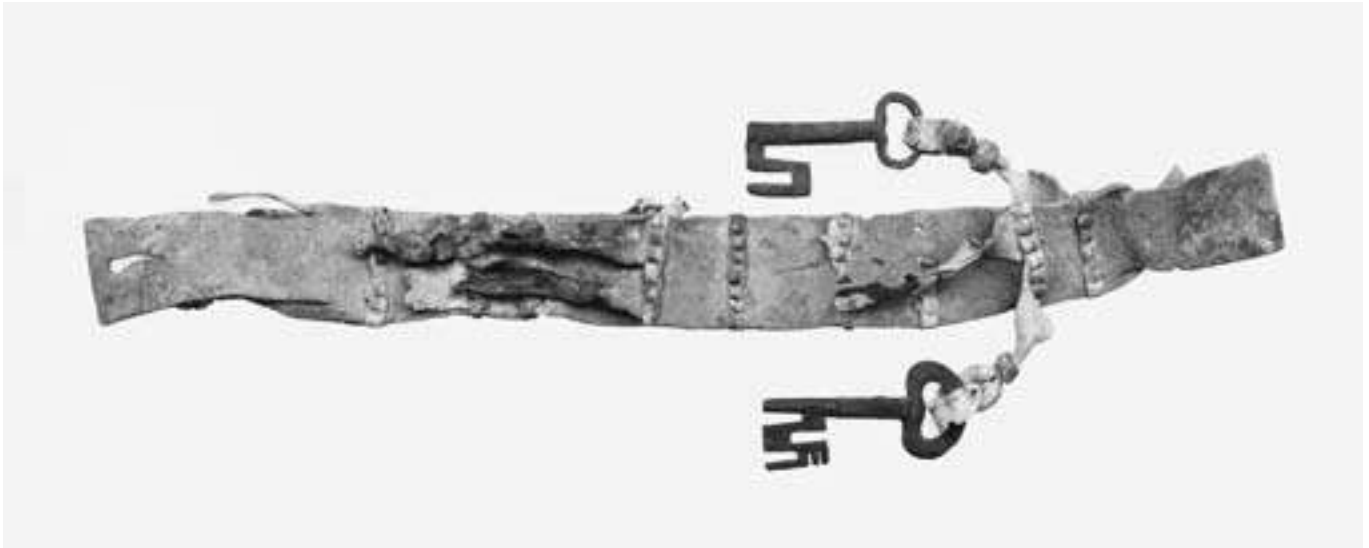
The history of laws and legal codes in the Middle Ages is intricately bound to the fragmentation of political systems that occurred after the fall of the Roman Empire. From the fifth to the 11th centuries laws and the processes upholding them were characterized by diversity and local autonomy. This was a reflection of the decentralized nature of political power at the time. In the 12th century a resurgence of Roman law coupled with increasing consolidation of monarchical power led to the development of more cohesive bodies of legal thought. Significantly, those laws applied to whole societies rather than particular groups or communities.

The most important influence on the development of law in the Middle Ages was the body of legal knowledge that medieval society inherited from ancient Rome. From 529 to 533 the Byzantine emperor Justinian I (r. 527–65) issued the

Corpus Iuris Civilis (Body of Civil Law). This set of texts was a collation and codification of the legal knowledge of classical Roman jurists. Beginning in the late fifth century, however, western Europe became increasingly isolated from the Byzantine east, both politically and culturally. As a result only incomplete sections of Justinian's Corpus Iuris Civilis, along with fragments of Roman law that predated it, were known to western Europe in the early Middle Ages. In Byzantium this document continued as the core of the legal code until the end of that empire in 1453.

The Germanic tribes that settled in western Europe after the fall of Rome brought with them their own legal culture. This culture differed in several respects from the principles that informed Roman law. Traditionally, Germanic law—sometimes referred to as barbarian law—was oral and customary in nature. Their laws were not written down but were based on the customs, developed over generations, of specific tribal groupings. The societies also subscribed to a principle known as the personality of the law. According to this principle, birthright law, which was dictated by ethnic grouping, governed individuals regardless of where they lived. Thus individuals of different ethnic origins living in the same region fell under different legal customs. In contrast, Roman law was written and territorial, which meant that the same body of law governed all the inhabitants of a region. The substance of Germanic law also differed markedly from Roman law. Germanic law was primarily concerned with regulating the complex system of fines and compensations used to end feuds when an infringement of customary law occurred. But owing to their nomadic past, the German populations had few provisions for contract or property law, both of which were highly developed in Roman law.

In the Germanic kingdoms of the early Middle Ages inhabitants coexisted under different bodies of law. Roman law continued to apply to the native inhabitants of the former Roman provinces as well as to all members of the clergy, who automatically came under its ruling. Meanwhile, the Germanic rulers and their people adhered to their own systems of customary law. Soon, however, the Germanic laws began to change, reflecting the influence of Roman law. Faced with the written legal tradition of Rome, the German kings began to write down or codify their own laws—a process that also worked to strengthen the authority of their rule. The codification of Germanic laws began in the late fifth century and continued into the ninth century. These codes were written in Latin, which remained the language of learning and law throughout the Middle Ages. When specific laws were lacking, such as in the area of property law, the German codes simply borrowed from Roman law. The more notable of these codes are the Codex Euricianus (Code of Euric, ca. 475) of the



Leather belt with keys belonging to the doorkeeper of the Star Chamber, an English law court at the Palace of Westminster; Britain, ca. 1500 (© Museum of London)

Visigoths, the Lex Salica (Salic Law, ca. 500) of the Franks, and the Edictum Rothari (Edict of Rothari, 643) of the Lombards. Collectively these laws are known as the *leges barbarorum*, or barbarian laws. Some Germanic rulers issued separate codes, adaptations of Roman law, for their Roman subjects. Of these, the most comprehensive is the Lex Romana Visigothorum, also known as Breviarium Alaricianum (Breviary of Alaric), issued in 506. The Roman codes issued by the Germanic kings are often referred to as Roman vulgar law.

Having several legal systems in one territory was complicated and often confusing. Some rulers, like the emperor Charlemagne (r. 800–14), attempted to impose legislation that applied universally to people under their dominion. These attempts were only partially successful, however, and personal law continued to be cited when it was expedient. Over time the various populations of local communities integrated. As a result, each community came to subscribe to its own body of customary law, which was applied equally to all inhabitants of that community. In this way the Roman principle of the territoriality of law began to encroach on personal law.

From the eighth century onward power and authority became increasingly tied to land ownership. Rulers granted land to freemen in return for military service and other obligations. Freemen, or vassals, gained autonomous authority over their estates; they were also free to grant parts of their land to other freemen in return for specified services. Land grants and the authority they bestowed could be inherited by successive generations. The laws governing these complex mutual obligations and transfers of property were customary and for centuries remained unwritten. Eventually, in the

later half of the 12th century, the first written collection of land grant laws appeared. It was called the Liber Feudorum (Book of Feudal Laws). Feudal relations continued to play an important role in medieval society for the remainder of the medieval period.

In the early Middle Ages an entire community was responsible for enforcing the law. Lacking a professional law-enforcement agency, the local assembly, or court, had to deal with transgressions of the law. Similarly lacking in professional judges, the community turned to a local nobleman or a representative of the sovereign to preside over court proceedings. He was assisted by freemen from the community. The primary purpose of the court was to maintain law and order through consensus rather than coercion. Thus the main role of the presiding authority was to facilitate an agreement between the two sides of a case, rather than to sit in judgment. If an agreement was reached, it had to have the approval of the community. Various types of courts were available to accommodate the diverse legal codes that could apply to disputants. The church also had its own courts. For serious crimes and grievances, particularly those involving the higher classes, another avenue of appeal was the king's justice in the royal court.

After the eighth century the organization of agricultural society around specific economic and territorial units called manors or seigneuries led to the development of manorial justice, also called seigneurial justice. Under this system landlords gained autonomous jurisdictional authority over their estates. They held court and made rulings on a case-by-case basis according to a mixture of public and customary law.

The extent to which lords respected the customs and traditions of the communities under their jurisdiction, as opposed to asserting their own judgments in cases, varied greatly. In general, however, the principle of communal consensus still dominated proceedings. The manorial system of justice developed in conjunction with the increasing application of territorial law and the emergence of feudal law.

In the late 11th century two developments occurred that reshaped the legal culture of Europe for the remainder of the Middle Ages and into the early modern period: the consolidation of church law, known as canon law, and the rediscovery in the West of the complete version of Justinian's *Corpus Iuris Civilis*. In the early Middle Ages the clergy lived under the authority of Roman law, but during this time they developed it to suit their requirements. Most important, they added new laws based on scriptural tenets, the decisions of church councils, and papal decrees. In the late 11th century these accretions began to be worked into a cohesive body of ecclesiastical law using the principles of Roman law as its basis. From this emerged canon law. The jurist Gratian issued the first commonly accepted collection of canon law known as the *Decretum Gratiani* (Decrees of Gratian) in the middle of the 12th century.

At the same time that canon law was forming, western Europe gradually recovered a complete version of Justinian's *Corpus Iuris Civilis*. Historians have not determined precisely how this happened. It is likely that one or more manuscript traditions ensured the transmission of the text through the early Middle Ages. Then, in the second half of the 11th century, the significance of the subject matter was recognized and subjected to intense study. The recovery of the *Corpus Iuris Civilis* is one of the most important developments in the legal history of western Europe. By studying its contents, medieval scholars gained access to a comprehensive and systematic body of written Roman law.

The first formal legal studies were taught in Bologna at the end of the 11th century, giving rise to legal experts and the development of legal principles, both of which allowed the law to be applied in a consistent and accountable manner. Canon law also became increasingly sophisticated as a result of the recovery of the *Corpus Iuris Civilis*. A combination of Justinian law, Roman law, and canon law formed the *ius commune*, or common law. This was the formal system of law that dominated western European legal thought from the 12th century onward. In conjunction with local variations of customary law, the *ius commune* also came to be the applied law, except in England, which developed along its own trajectory.

The application of the *ius commune* as a common system of law in continental Europe was assisted by the consolidation of monarchical power that occurred in western Europe

at the same time. In the 13th century a strong papacy also extended its political and legal power via the Roman Curia, a centralized ecclesiastical court that dealt with all administrative and legal matters of the church. In England the process of unification that William the Conqueror started in 1066 assisted the development of that country's system of common law, instigated by Henry II (r. 1154–89) in the following century. Under Henry II the royal court made decisions based on an amalgamation of local customs. The king's representatives were sent out to judge cases all over the land according to this common custom, and in this way local variations of customary law were gradually eradicated. The English common law in use today evolved directly from these medieval precedents. Likewise, the *ius commune* lies at the foundation of the contemporary legal systems of continental Europe.

THE ISLAMIC WORLD

BY PERI BEARMAN

Islamic law is composed of both divine revelation and interpretations of it by skilled jurists. The divine revelation is fixed and incontrovertible and is made up of two elements. The first element was revealed by the angel Gabriel to Islam's messenger, the prophet Muhammad, and is contained in the Koran, Islam's holy book and first source of law. The second element consists of the Sunna, a large corpus of writings by the prophet's contemporaries, who demonstrate his example by reporting what he did, said, and failed to do during his lifetime. These two sources of Islamic law, known collectively as the *sharia* ("path to water"), define the path that God laid out for humankind to attain salvation. They guide the believer in all matters, both religious and nonreligious. Muslims regard the *sharia* as holding universal truths and covering all of human life.

Because the two sources of Islamic law are finite, they do not treat every situation that might arise in a legal arena. Therefore, they are supplemented by a very large body of legal rulings elaborated by scholars based on their understanding of the moral teachings of Islam and on textual exegesis of the two divine sources. As a product of human intellect rather than divine revelation, this collection of legal sources is not canonical or above critique. The tension between the sacred and the human elements of Islamic law, and thus between the proponents of each element, has formed a continuous thread throughout the 1,400 years of the law's existence.

When Muhammad died in 632, the small Muslim community was left without a leader. The prophet had been the lawgiver, judge, general, and chief executive of the immature Islamic polity. It was left to the caliphs who succeeded Muhammad to expand the realm of Islam to outlying areas and

create institutions, including those required by a legal system, that the prophet had not established. Just 100 years after Muhammad's death, Islam had spread from the Arabian Peninsula, where it had begun, through Mesopotamia to the east as far as India and to the west across North Africa as far as southern Spain, bringing its social and religious message to many diverse peoples and cultures.

The Umayyad Caliphate (661–750) is largely credited with the establishment of a judicial class of government officers. The caliph dispensed justice in accordance with his legal authority—judicial, administrative, and legislative—but the expanding empire demanded that he delegate his authority to governors and judges, whom he appointed to act on his behalf in resolving legal disputes in an official tribunal setting. Because the textual canons of the Koran and the Sunna were not yet finalized, much of the caliphal law was based on a combination of customary, Roman, canonical, Jewish, and Sassanian law. The personal judgment of each adjudicating official, based on his sense of equity and his knowledge of Islamic moral teachings, also played a role in the development of this practical body of law that some call Umayyad judicial practice. This law formed part of the much larger corpus of Islamic law developed by religious scholars who, unlike judges, remained independent of the official administration.

By the time of the Abbasid Caliphate, which followed the Umayyad and ruled until 1258, individual scholars who were revered for their vast religious knowledge had become an important source for laypeople in matters of law, religion, and ritual. Rapidly expanding numbers of Muslim converts sought to know the correct practices of their new faith—everything from the right way to worship to permitted financial transactions—and they asked for advice or legal opinions (*fatwa*) from these scholars, many of whom began articulating a body of legal rules that entailed more than just judicial practice. In doing so they attracted circles of students who learned and transmitted their masters' teachings, starting schools of legal thought that differed from one region to the next in both substance and method. Whereas, for example, one school would place more emphasis on custom in determining a correct ruling in a legal matter, another would rely more on reason.

Islam teaches that God is the ultimate judge and the knower of all things, and human fallibility in the understanding of what ultimately is only knowable to God is a given. Hence all sincere and conscientious interpretations of God's message to humankind are accepted as possible and legitimate. In this way many divergent legal rulings prevailed. No religious or judicial institution, such as a church or a supreme court, was established to determine the proper way for the community of believers to obey the divine will. Classic Islamic law is the culmination of great intellectual effort, free



Ceramic tombstone of a qadi, an Islamic judge. He is described as malik al-calama ("king of the learned men"), and there follows the genealogy of seven earlier generations of qadis in his family. Kashan, Iran, ca. 1270. (© The Trustees of the British Museum)

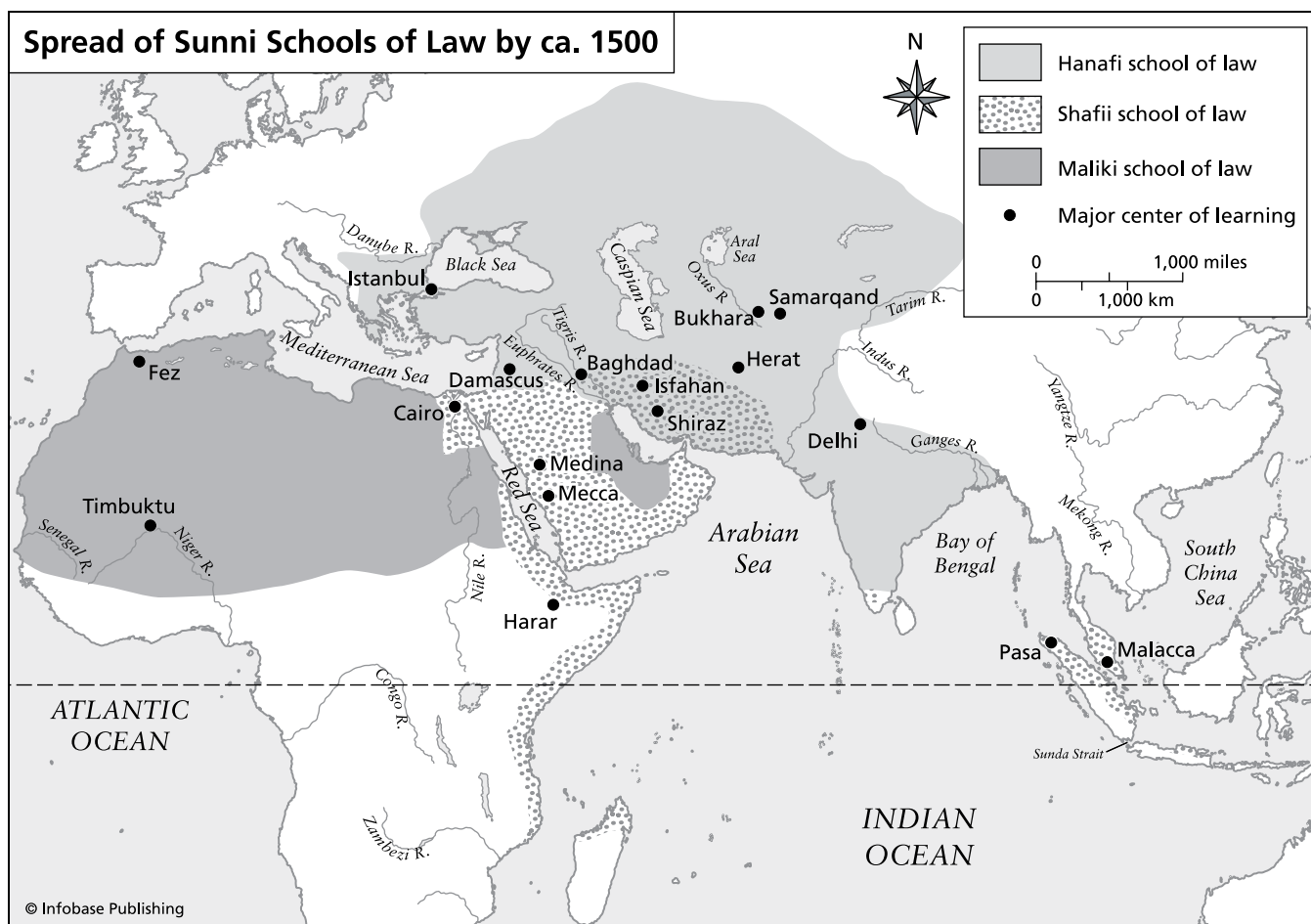
from the authority of the state, and various opinions and debates among scholars are the seeds from which it sprang.

Nevertheless, the number of legal rules and methodologies increased to such an extent that in the ninth century an effort was made to organize them under one theory. Abu

Abdullah Muhammad ibn Idris al-Shafii (767–820), one of the foremost legal scholars of the time, proposed a hierarchy of sources that would grant the stamp of orthodoxy to the growing jurisprudence. He named the Koran as the first and highest source of law, followed by the corpus of prophetic custom, consensus of the topmost scholars, and analogous reasoning stemming from the clear rules of the foundational texts, in that order. All other principal sources used at that time—such as the customs of local communities, independent reasoning of scholars, the “preferred” view, and the public good—were disparaged. Of the hundreds of schools of law that existed then, only a small number accepted the imposed hierarchy. By the 12th or 13th century only a handful of those schools were left, and those lasted until the legal codification process of the 19th and 20th centuries erased most of their influence.

The schools of law that adopted the new legal theory and survived into the premodern period were the four orthodox, or Sunni, schools of Hanafi, Maliki, Shafii, and Hanbali, each named after a prominent master in the early history of the school. These were the legal schools of choice for most Muslim believers inhabiting regions from Morocco to Indonesia. The most widespread school of law was the Hanafi school, since it became the doctrine of choice of the large Mongol and Ottoman empires and spread accordingly throughout the imperial lands.

Two schools of law emerged apart from the Sunnis. An early heterodox movement called Shiism, which later broke into numerous sects such as the Twelvers, the Seveners, and the Zaydis, formulated its own theological and legal doctrines. A small percentage of the Muslim community followed the Jafari school of law of the Twelver sect, which forms the law



Four Sunni schools of law—Hanafi, Maliki, Shafii, and Hanbali—became the legal schools of choice for most Muslim believers inhabiting regions from Morocco to Indonesia. The most widespread school of law was the Hanafi school, since it was adopted as the official doctrine during the Mongol and Ottoman empires and spread accordingly throughout the imperial lands. By the end of the medieval period the Hanbali school had few followers, although it experienced a revival in the 18th century with the rise of the Wahhabi movement.

of modern-day Iran. An even smaller minority followed another independent school, the Ibadiyya, which remained very small and prevails now only in Oman.

Thus classical Islamic law did not have one code; in both theory and practice, the various rulings of each school of law were regarded as authoritative. Nor was classical Islamic law drafted by appointees of the state; rather, it was the product of an intellectual tradition, the vision of the scholar-jurists who promulgated it. Within a school certain texts and teachings of foremost jurists from that school were given canonical status. Throughout the centuries, however, when they could not reach a consensus on a particular rule of law, scholars would formulate new law based on their understanding of the foundational texts and in line with their school's methodology. Despite the lack of codification, a measure of consistency in the law was thus assured, despite its being predicated on diversity.

From the perspective of the jurists, Islamic law sought to fulfill the ideal presented to them by divine revelation: happiness in this life and salvation in the next. The jurists were most concerned with the pious conscience in the law—that is, with matters that touched on preserving Islam and its social and moral teachings. The areas of the law that preoccupied jurists the most were family law, the laws of sale and hire, contracts, torts (the law of damages), inheritance, property, and criminal law (especially crimes considered offenses against God, like brigandage, theft, sexual intercourse outside of marriage, false accusation of adultery, drinking alcohol, and apostasy, or repudiation of the Islamic faith). Other areas of the law, which today would be called public law, were relegated to the local ruler. Beginning in the Umayyad Caliphate, matters that affected the state or the community as an entity, whether con-

stitutional, administrative, financial, or criminal, fell more to the relevant governing body. The primary concern of the jurist, on the other hand, was that the ruler's law not contravene the *sharia*. The two legal arenas, with their own institutions and officials, functioned side by side for many centuries, yet a tension between them always existed.

The tolerated diversity in doctrine and the parallel religion-based legal system were both assailed during the later medieval period, especially under the Ottoman Empire (1281–1924), which ruled over much of the Middle East, North Africa, and the Balkans. The Ottomans leaned toward standardization and codification. Reform began with the Hanafi doctrine being declared the favored law of the empire and some Hanafi texts prescribed over others for reference. In the end the entire legal system was refitted, with codes adopted from European civil law substituted for much of the Islamic legal doctrine and with the establishment of secular courts to apply the new codes. Vestiges of codified Islamic law still function in the area of family law, but only a handful of modern states have either preserved Islamic law as the basis of their legal system (Saudi Arabia, Oman, and Yemen) or re-applied it (Iran, Sudan, and northern Nigeria).

See also AGRICULTURE; ALCHEMY AND MAGIC; CHILDREN; CRIME AND PUNISHMENT; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; FAMILY; GOVERNMENT ORGANIZATION; LITERATURE; MIGRATION AND POPULATION MOVEMENTS; MONEY AND COINAGE; MUSIC AND MUSICAL INSTRUMENTS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WAR AND CONQUEST.

Europe

Justinian: Excerpts from the *Corpus Iuris Civilis* (sixth century)

THE DIGEST: PROLOGUE

The Emperor Caesar, Flavius, Justinianus, Pious, Fortunate, Renowned, Conqueror, and Triumpher, Ever Augustus, to Tribonianus His Quaestor, Greeting:

With the aid of God governing Our Empire which was delivered to Us by His Celestial Majesty, We carry on war successfully. We adorn peace and maintain the Constitution of the State and have such confidence in the protection of Almighty God that We do not depend

upon Our arms, or upon Our soldiers, or upon those who conduct Our Wars, or upon Our own genius, but We solely, place Our reliance upon the providence of the Holy Trinity, from which are derived the elements of the entire world and their disposition throughout the globe.

Therefore, since there is nothing to be found in all things as worthy of attention as the authority of the law, which properly regulates all affairs both divine and human, and expels all injustice; We have found the entire arrangement of the law which has come down

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to us from the foundation of the City of Rome and the times of Romulus, to be so confused that it is extended to an infinite length and is not within the grasp of human capacity; and hence We were first induced to begin by examining what had been enacted by former most venerated princes, to correct their constitutions, and make them more easily understood; to the end that being included in a single Code, and having had removed all that is superfluous in resemblance and all iniquitous discord, they may afford to all men the ready assistance of true meaning.

After having concluded this work and collected it all in a single volume under Our illustrious name, raising Ourselves above small and comparatively insignificant matters, We have hastened to attempt the most complete and thorough amendment of the entire law, to collect and revise the whole body of Roman jurisprudence, and to assemble in one book the scattered treatises of so many authors which no one else has herebefore ventured to hope for or to expect and it has indeed been considered by Ourselves a most difficult undertaking, nay, one that was almost impossible; but with Our hands raised to heaven and having invoked the Divine aid, We have kept this object in Our mind, confiding in God who can grant the accomplishment

of things which are almost desperate, and can Himself carry them into effect by virtue of the greatness of His power. . . .

We desire you to be careful with regard to the following: if you find in the old books anything that is not suitably arranged, superfluous, or incomplete, you must remove all superfluities, supply what is lacking, and present the entire work in regular form, and with as excellent an appearance as possible. You must also observe the following, namely: if you find anything which the ancients have inserted in their old laws or constitutions that is incorrectly worded, you must correct this, and place it in its proper order, so that it may appear to be true, expressed in the best language, and written in this way in the first place; so that by comparing it with the original text, no one can venture to call in question as defective what you have selected and arranged. Since by an ancient law, which is styled the *Lex Regia*, all the rights and power of the Roman people were transferred to the Emperor, We do not derive Our authority from that of other different compilations, but wish that it shall all be entirely Ours, for how can antiquity abrogate our laws?

From: *The Digest of Justinian*, ed. C. H. Monro (Cambridge, Mass.: Cambridge University Press, 1904).

Europe

~ The Institutes of Justinian: Sources of Laws ~

Justice is the set and constant purpose which gives to every man his due. Jurisprudence is the knowledge of things divine and human, the science of the just and the unjust. . . .

The precepts of the law are these: to live honestly, to injure no one, and to give every man his due. The study of law consists of two branches, law public and law private. The former relates to the welfare of the Roman State; the latter to the advantage of the individual citizen. Of private law then we may say that it is of threefold origin, being collected from the precepts of nature, from those of the law of nations, or from those of the civil law of Rome.

The law of nature is that which she has taught all animals; a law not peculiar to the human race, but shared by all living creatures, whether denizens of the air, the dry land, or the sea. Hence comes the union of male and female, which we call marriage; hence the procreation and rearing of children, for this is a law by the knowledge of which we see even the lower animals are distinguished. The civil law of Rome, and the law of all nations, differ from each other thus. The laws of every people governed by statutes and customs are partly peculiar to itself, partly common to all mankind. Those rules which a state enacts for its own members are peculiar to itself, and are called civil law: those rules prescribed by natural reason for all men are observed

by all people alike, and are called the law of nations. Thus the laws of the Roman people are partly peculiar to itself, partly common to all nations; a distinction of which we shall take notice as occasion offers. . . .

Our law is partly written, partly unwritten, as among the Greeks. The written law consists of statutes, plebiscites, senatus consults, enactments of the Emperors, edicts of the magistrates, and answers of those learned in the law. A statute is an enactment of the Roman people, which it used to make on the motion of a senatorial magistrate, as for instance a consul. A plebiscite is an enactment of the commonalty, such as was made on the motion of one of their own magistrates, as a tribune. . . . A senatus consult is a command and ordinance of

the senate, for when the Roman people had been so increased that it was difficult to assemble it together for the purpose of enacting statutes, it seemed right that the senate should be consulted instead of the people. Again, what the Emperor determines has the force of a statute, the people having conferred on him all their authority and power by the *lex regia*, which was passed concerning his office and authority. Consequently, whatever the Emperor settles by rescript, or decides in his judicial capacity, or ordains edicts, is clearly a statute: and these are what are called constitutions.

From: *The Institutes of Justinian*, 3rd ed., trans. B. Moyle, (Oxford: Oxford University Press, 1896).

The Islamic World

≈ *Extract from the Sunna* (ca. seventh century and later) ≈

OF JUDGMENTS

The first judgment that God will pass on man at the day of resurrection will be for murder.

Whosoever throws himself from the top of a mountain and killeth himself is in hell fire forever; and whosoever killeth himself with iron, his iron shall be in his hand, and he will stab his belly with it in hell fire everlastingly.

No judge must decide between two persons whilst he is angry.

There is no judge who hath decided between men, whether just or unjust, but will come to God's court on the day of resurrection held by the neck by an angel; and the angel will raise his head toward the heavens and wait for God's orders; and if God orders to throw him into hell, the angel will do it from a height of forty years' journey.

Verily there will come on a just judge at the day of resurrection such fear and horror, that he will wish, Would to God that I had not decided between two persons in a trial for a single date.

OF WOMEN AND SLAVES

The world and all things in it are valuable, but the most valuable thing in the world is a virtuous woman.

I have not left any calamity more hurtful to man than woman.

A Muslim can not obtain (after righteousness) anything better than a well-disposed, beautiful wife: such a wife as, when ordered by her husband to do anything, obeys; and if her husband look at her, is happy; and if her husband swear by her to do a thing, she does it to make his oath true; and if he be absent from her, she wishes him well in her own person by guarding herself from in chastity, and taketh care of his property.

Verily the best of women are those who are content with little.

Admonish your wives with kindness; for women were created out of a crooked rib of Adam, therefore if ye wish to straighten it, ye will break it; and if ye let it alone, it will be always crooked.

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Every woman who dieth, and her husband is pleased with her, shall enter into paradise.

That which is lawful but disliked by God is divorce.

A woman may be married by four qualifications: one, on account of her money; another, on account of the nobility of her pedigree; another, on account of her beauty; a fourth, on account of her faith; therefore look out for religious women, but if ye do it from any other consideration, may your hands be rubbed in dirt.

A widow shall not be married until she be consulted; nor shall a virgin be married until her consent be asked, whose consent is by her silence.

When the Prophet was informed that the people of Persia had made the daughter of Chosroes their queen, he said the tribe that constitutes a woman its ruler will not find redemption.

Do not prevent your women from coming to the mosque; but their homes are better for them.

O assembly of women, give alms, although it be of your gold and silver ornaments; for verily ye are mostly of hell on the day of resurrection.

When ye return from a journey and enter your town at night, go not to your houses, so that your wives may have time to comb their disheveled hair.

God has ordained that your brothers should be your slaves: therefore him whom God hath ordained to be the slave of his brother, his brother must give him of the food which he eateth himself, and of the clothes wherewith he clothes himself and not order him to do anything beyond his power, and if he does order such a work, he must himself assist him in doing it.

He who beats his slave without fault, or slaps him in the face, his atonement for this is freeing him.

A man who behaves ill to his slave will not enter into paradise.

Forgive thy servant seventy times a day.

From Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*, Vol. 6: *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Derk Bodde and Clarence Morris, *Law in Imperial China* (Philadelphia: University of Pennsylvania Press, 1973).
- R. C. van Caenegem, *Legal History: A European Perspective* (London: Hambledon Press, 1991).
- R. C. van Caenegem, *An Historical Introduction to Private Law* (Cambridge, U.K.: Cambridge University Press, 1992).
- Wael Hallaq, *Law and Legal Theory in Classical and Medieval Islam* (Aldershot, U.K.: Variorum, 1995).
- Wael Hallaq, *The Origins and Evolution of Islamic Law* (Cambridge, U.K.: Cambridge University Press, 2005).
- Alan Harding, *Medieval Law and the Foundations of the State* (Oxford, U.K.: Oxford University Press, 2002).
- M. B. Hooker, *A Concise Legal History of South-East Asia* (Oxford, U.K.: Oxford University Press, 1978).
- Ephraim Isaac, "Law and Justice," *Social Structure of the Ethiopian Church*. Available online. URL: <http://tezeta.org/5/social-structure-of-the-ethiopian-church-by-ephraim-isaac>. Downloaded on September 21, 2007.
- Bruce Elliott Johansen, ed., *The Encyclopedia of Native American Legal Tradition* (Westport, Conn.: Greenwood Press, 1998).
- Siriman Kouyate, *From the Charter of Kurukan Kuga*. Available online. URL: www.oecd.org/dataoecd/56/56/38874847.pdf. Downloaded on October 4, 2007.

- Eugene L. Mendonsa, "Tradition, Civic Culture and Kinship." In *West Africa: An Introduction to Its History, Civilization and Contemporary Situation* (Durham, N.C.: Carolina Academic Press, 2002).
- Joseph Schacht, *An Introduction to Islamic Law* (Oxford, U.K.: Clarendon Press, 1964).
- Peter Stein, *Roman Law in European History* (New York: Cambridge University Press, 1999).
- Frank E. Vogel, *Islamic Law and Legal System: Studies of Saudi Arabia* (Leiden, Netherlands: Brill, 2000).
- Bernard G. Weiss, *The Spirit of Islamic Law* (Athens: University of Georgia Press, 1998).

► literature

INTRODUCTION

The Middle Ages saw the end as well as the partial preservation of many traditions of oral literature through the spread of writing. At the same time, many vernacular languages developed in the Middle Ages and, with them, modern literary forms. While people in the modern world inevitably think of

literature as tied to writing, the composition of literature was originally oral. Before the invention of writing (or before a culture's acquisition of writing) poetry was inextricably tied to the performance of song. But once writing was introduced, the written document became the locus of literature and performance quickly vanished. Instead of performing poetry, one read it aloud.

In many preliterate cultures the most prestigious performer of poetry was the bard, who sang epic poetry at the courts of royalty and nobles. From studying and working in his tradition, the bard had memorized the great stories and myths of his people and also thousands of specific oral formulas equivalent to a line or half of line of verse that might consist, for example, of the name of a hero and some descriptive epithet or a vivid description of some typical action of fighting in a battle. During a performance the bard told his chosen story by recombining all of these elements, spontaneously arranging the formulas to make a poem in much the same way that individual words are arranged in ordinary speech. The singing of the story could be fitted to the length of time available (from an hour to the two days it would have taken to perform a long poem, such as the *Iliad*), and its details could be fitted to circumstances. For instance, the role of the special god or ancestor of the bard's patron could be expanded. There was no standard text of the poem but rather a new creation with each performance.

Once a language becomes literate, however, it will at first seem important to record the poetry of the bard in writing. This paradoxically destroys the bardic profession, since he is no longer an integral part of the poetry that is now written. By the same token, however, bardic poetry of the past can have been preserved for us only at the moment of a culture's transition from illiteracy to literacy. This happened in antiquity in the case of the Homeric poems. The *Iliad* and the *Odyssey* were recited by two prominent but now anonymous bards for written transcription in the early sixth century B.C.E., and within a generation the profession of the bard had died in Greece and was replaced by *rhapsodes*, who merely recited the written text of those two poems from memory.

The Middle Ages was another period productive of the recording of bardic epics because many cultures on the fringes of the classical Mediterranean world gained literacy at that time. This is true of the peoples of Scandinavia, for instance. Bards were there called *skalds*. Their tradition produced two great epics that were written down in the early Middle Ages. One was *Beowulf*, composed in Old English, perhaps for the Danish rulers of England. Another is the *Elder Edda*, composed in Old Norse and eventually transcribed in Iceland. By the mid-14th century, the *skalds* were dying out, and a third epic, the *Prose Edda*, merely contained the themes of

epic verse without the poetic form. Other bardic traditions originated in the Middle Ages and concern the exploits of historical figures from that era. An example of this is the tradition that flourished in the mountain villages of Serbia (with a cycle of stories about the battle of Kosovo in which Serbia was conquered by the Ottoman Empire) that flourished into the 20th century and which modern scholars study to learn the characteristics of oral composition.

Bardic traditions of oral poetry composition were not limited to Europe, however. A form of bardic verse seems to have existed in both Mayan and Aztec culture, some remnants of which were recorded shortly after the Spanish conquest. Something similar probably existed in the Inca Empire as well. Performance there was based on knotted and beaded strings. While detailed knowledge of this system was quickly lost after the Spanish conquest, probably each different-colored bead and differently spaced knot referred to some element of bardic performances and allowed performances to be composed in advance. Epic also developed in the royal courts of western Africa, where the bards were called *griots*. The *griot* tradition survived into colonial times. India also produced an old epic literature that was written down in medieval times.

Europe is a special case in the Middle Ages. As literacy came to the vernacular languages, it eventually produced a mature literature represented by the Italian poets Petrarch and Dante, by the French Arthurian cycles, by German poets like Wolfram von Eschenbach, and in English by Chaucer. At the same time, Europe inherited the Latin literature of antiquity, and until very late in the Middle Ages conducted all of its intellectual and official life in Latin, which was a purely learned language with no native speakers. India also had a venerated ancient language, Sanskrit, ancestral to several medieval vernaculars; only a few, but nevertheless important works of a religious character, such as the Vedas and some early Buddhist literature, were written in it.

Like those of Christendom and Judaism, the culture of Islam is based on a religion of scripture. The Koran—the content of which was said to have been revealed by God to Muhammad—was the dominant factor not just in Arabic literature but indeed in every aspect of Islamic life. Much of the most important Arabic literature of the later Middle Ages was devoted to commenting on and interpreting this seminal work. Another important Arabic literary activity in the Middle Ages was either translating Latin and Greek works into Arabic or developing poetic genres closely related to classical literature.

East Asia had writing from very early times, so by the medieval period literary compositions were more like those of the late medieval period in Europe in recognizably modern literature genres. China, in particular, produced a great deal

of Confucian and Taoist philosophical text. Poetry was composed for publication rather than traditional bardic performance. One of the dominant genres was the novel, such as the Chinese *Journey to the West* and the Japanese *Tale of Genji*.

AFRICA

BY TANURE OJAIDE

Like music and art, literature is a cultural production. It is an artistic expression of a people's verbal and imaginative talents. For this reason, the literature of a people is as old as the people themselves, because a people always have a way of life that involves "literary" production. Long before Europeans came to Africa and colonized the continent, African ethnic groups had a vibrant literature of their own. During the Middle Ages, spanning from about 500 to 1500, Africans had a literature informed by the nonliterate and oral nature of their society. Because African society of that time placed a premium on passing information by word of mouth from one person to another and from one generation to another, the literature was oral. That literature has been passed from medieval times to contemporary times and thrives together with modern-day literature, which is written down.

Literature can be oral or written; what makes literature is not the mode of its preservation but its artistic and imaginative expression through verbal words of individual or human experience. A poem or song remains poetic because of the imaginative, witty, and innovative use of language—it matters not whether it is written or oral. At the same time, a story is interesting because of its humor, wit, irony, foreshadowing, suspense, and other narrative techniques and not because it is written down. Thus, oral African literature of medieval times entertains and educates its targeted audience in ways that are different from written literature.

It is significant to note that many African groups were still on the move during the Middle Ages and that many were inhabiting places different from where they are today. In the process of moving to seek fertile land and fishing waters or to escape ethnic conflicts, the groups carried along their forms of oral literature ("orature") and in the process created variants of songs, folk tales, legends, and epics in their new environments. New experiences encountered during the process of migration also informed the literature. For instance, during the reign of the Ogisos in Benin in the 13th through 15th centuries migrations of different groups (such as the Urhobo, Igbo, Ishan, and Afenmai) created their separate legends of Ogisos, which are still told today. The contemporary writer Isidore Okpewho's *Once upon a Kingdom* deals with the tyrannical Ogiso legend among the Asaba group of Igbo people. Similarly, different groups of the western African savanna

belt have their versions of the story of Sundiata, founder and hero of the medieval Mandingo epic.

THE NATURE AND FUNCTIONS OF AFRICAN MEDIEVAL LITERATURE

African literature of medieval times relied on memory to be preserved. It is for this reason that there are numerous variants of many tales—the human memory is not perfect. A storyteller might forget some parts of a story and spontaneously improvise others. The "oral" text changes according to the mood of the storyteller, the time of the telling, the place it is told, the environment in which it is told, and many other factors that make oral literature an evolving text. For example, the folktale of a beautiful young woman who wants to marry a "spotless man," or a complete gentleman, has variants that change according to the environment, social trends, and historical circumstances. While the story today involves a young man dressed in a suit and carrying an attaché case, in traditional societies of medieval times the beautiful young woman yearned for a man dressed in traditional attire, with a hat and a walking stick. In this way one can say that an oral text is an evolving text.

The literature of Africans in the Middle Ages was integrated into the daily lives of the people. It was in the songs that men and women sang at home or on farms or while fishing, hunting, or traveling on lonely roads. A woman sang as she weeded her yam or cassava patch, while pounding her millet, as she lulled her baby to sleep with poetic lullabies. At the same time, a man clearing and planting a farm or preparing palm oil in a press sang songs to revive his energy. Unlike Western literature, which demands leisure and formal education, traditional African literature of the Middle Ages was a people's literature. The literature was woven into the different stages of people's lives: There were songs at births, naming ceremonies, initiation into different age grades, marriages, and deaths, among others. Oral literature was also performed at festivals and social gatherings to the accompaniment of drums or other musical instruments.

African literature of the Middle Ages was a very functional literature that catered to the needs of the traditional society. In communalistic societies literature in various forms helped maintain a healthy social ethos that bound people together. One of the advantages of traditional African literature is that it is cohesive in bringing people together to share verbal imaginative expressions in the forms of poetry, songs, chants, narratives, and performances that took place in a very live atmosphere. It is a literature with its own aesthetics and manifests in different forms.

In medieval times Africa had no formal schools, but there were avenues for teaching young ones about life, society,

and the environment and for imparting language and literary skills, which the oral tradition brought about. Usually at the end of the day's work parents and elders gathered their young ones by the fireside to tell them stories. Such sessions were a part of the growing process of young boys and girls, and they looked forward to these informal fireside "schools" with enthusiasm. They not only listened to others but also learned to tell such stories and sing the songs themselves.

African oral literature, as thrived in the Middle Ages, manifests in the following forms: folktales, folk songs, specific types of chants, myths, legends, epics, proverbs, riddles, and tongue twisters. There is no clear-cut division of the genres of narrative, poetry, and drama, as in modern Western literature. Literature is integrative in the sense that a good narrative involves poetic songs and chants, with the minstrel wearing a mask and a costume and performing to the accompaniment of music supplied by drums and other musical instruments. Oral literature as practiced by Africans of the period was a multimedia event.

ORAL NARRATIVES

The folktale is one of the commonest forms of traditional African literature. It is anonymous because it is a product of the common imaginative genius of the group. It is different from specific songs that are owned by individuals or groups. Often folktales are narratives with animal characters that behave and act like human beings. Although the stories feature animal characters, the elders telling the story and the young ones listening know that the tales are reenacting human behavior and actions. Folktales are usually didactic, teaching moral and ethical lessons. Growing up in a traditional African environment, one is taught not to steal or do other bad things indirectly, through folktales. One learns to be selfless and to desist from immoral behavior through the lessons learned from folktales. Whoever is like the tortoise—self-centered and greedy—is punished for their bad actions, which destabilize society. Traditional African folktales teach a person to be a constructive individual in a communal unit. There are hundreds, if not thousands, of folktales in Africa of the medieval period, all geared toward moral and ethical lessons.

As indicated, different animals are involved in folktales. The tortoise (and its water equivalent, the turtle), the hyena, the fox, the elephant, the lion, the rat, birds, and others are often characters in folktales. Many of these stories, such as the tortoise tales, are trickster tales, in which weak or small animals outwit bigger and stronger animals. For instance, the small rat often outwits the big elephant to teach the lesson that the small can overcome the big with wit. There is a folktale, for example, in which a tortoise rides a hyena without being hurt.

A typical folktale, however, recounts the action of one animal as it relates to others and highlights the consequence of such action. An example is the tortoise tale, one Igbo variant of which the Nigerian writer Chinua Achebe uses in his *Things Fall Apart*. In this variant, Tortoise hears that the Sky God is going to throw a party to which all are invited. Since Tortoise has no wings to travel to Sky God's party in the heavens, he asks birds to lend him feathers and to go along to the party. Many birds lend Tortoise feathers with which he can fly, and they all set off for Sky God's party.

When they arrive and are offered food and drink, Tortoise asks Sky God for whom the bounty is intended. God answers, "For All of You." But Tortoise claims the food is for only him. After eating and drinking to his satisfaction, he asks his followers to take the leftovers. His followers feel humiliated and treated like slaves; out of anger they take their feathers and leave for home. The last bird takes pity on Tortoise and, before taking his feather, asks Tortoise what message he should give to Tortoise's wife. Tortoise asks the bird to tell his wife that she should place soft things, like cotton, on the ground below so that he can fall from the sky without being hurt. To punish Tortoise for his greed and self-centeredness, the bird tells Tortoise's wife to place pieces of rock, stones, knives, machetes, and hard items on the ground. From the sky Tortoise does not see well but thinks that his wife has prepared the ground for his fall; he dives down only to fall on the hard things and break his back. Ants take pity on him and glue together the different pieces—hence the patched body of the tortoise today.

That story, with many variants in the Africa of the Middle Ages, is a typical folktale; it teaches a lesson and also explains a natural phenomenon—why the tortoise's shell looks like a patched body. Many such tales seemingly explain why things are the way they are. This particular tortoise tale the lesson is also that in a communal society in which the tortoise has to borrow wings from others, he has to share with them, too. The tale shows that humans are interdependent.

Other stories feature human beings, like the many variants of the beautiful princess who wants to marry a "spotless man" or a "complete gentleman." Often the girl falls in love at first sight with an ogre or snake that has transformed himself into a handsome man after hearing of the finicky girl; she marries the stranger in haste and follows him away to his home. On the way to the stranger's home, he gives back the borrowed body parts and once more becomes an ogre or a snake. The woman finds herself stuck with him until she is rescued by one of the local men she had earlier rejected, who is rewarded with her hand in marriage. A folktale common in many African patriarchal societies, it tells how humans have a desire for an ideal that often is nonexistent.

Myths have always been an integral part of Africa's oral literature, and many were told in medieval times. Myths are common in traditional African literary repertory, and they, too, often explain natural phenomena. They are sometimes described as "etiological" tales. Among Africans, there are myths about why the sky is so high. The mythical explanations vary: A woman pounding millet knocks God with a pestle, and he withdraws to the heavenly heights. Or humans pester God with complaints that cause him to ascend to the heights to avoid them. There are myths about why the fowl drinks only in drops, why the pig always looks down, why some birds cry the way they do, and so forth.

One myth concerns the reason that men and women are always quarreling but cannot live without each other. In the Urhobo version of this myth, which dates back to the time some groups of Urhobo people migrated from Benin in the 14th century, the Supreme God, Osonobrughe, first creates a man and gives him the whole world. However, the man wants a companion with whom he can share his happiness, and God obliges by giving him a woman as companion. They start quarreling, and Man goes back to tell the Creator: "When I was alone there was peace, but since I got this companion there has been no peace; please take her so that I will enjoy my peace." But Man had become so used to Woman in one night of lovemaking that he could not do without her the following night. The next morning he goes back to ask God to give her back. The to and fro goes on for six days; on the seventh day God tells Man and Woman to go and solve their problems themselves because he is tired of them. He withdraws to an impossible height, where they could no longer reach him. This myth explains the relationship between man and woman in society.

Other forms of African oral literature are legends and epics. The legends are often exaggerated truths in the sense that they often seemingly explain natural aspects of the landscape or manmade features. In Benin City (a town in Nigeria), for example, a giant is said to have used his toe to circle the city three times; this story is meant to explain the presence of three moats that act as defenses around the city. In a myth from Borno State (Nigeria), Lake Alau is said to be the spot where a heroic warrior died and left for the afterworld. In another myth, from the Ughelli group of the Urhobo people, a bride is said to have turned into a tree when she returned to a lake to fetch her forgotten belongings after being warned not to look back.

Many epics in Africa today date back to medieval times. The best known are the epic of Sundiata (ca. 1217–ca. 1255), the founder of the Mali Empire; the saga of Ozidi, a folk hero of the Niger Delta Izon people (Nigeria); and the epic of Mwindo, the legendary chieftain of the Nyanga nation

(present-day Democratic Republic of the Congo). Generally, in these epics the hero saves his or her people from oppression, exploitation, harassment, enslavement, and humiliation by another group. The epic tends to expose the noble qualities, courage, and other virtues of a people. The rule of the epic hero ushers in an era of peace and plenty as was not seen before and would not be seen after him; hence derives the nostalgia for the period of the hero. Often, as in the epics of Sundiata and Ozidi, there are many versions performed by the minstrel, called a griot in the Senegambian and Mali areas of western Africa. In traditional African society the epic often is performed during a festival to reenact and dramatize the heroism, peace, and abundance of the past as a reminder to the present generation of its proud heritage and as a guide toward heroic deeds of its own. Young ones have their mentors and aspire to contribute to society and learn to make sacrifices for the general good. The epic would have had a special appeal in medieval Africa because of the youthfulness of many of the ethnic groups that were trying to establish their separate identities at the time.

FOLK SONGS AND OTHER TYPES OF SONGS

Folk songs and other types of songs are integral to the African oral tradition that thrived in the Middle Ages. These simple, common songs involving repetition were sung by men, women, and children alike. Sometimes they are found integrated into folktales. Many such songs are associated with festivals and rituals. In addition to folk songs are other types of songs and chants in traditional Africa, among them, songs of praise such as the *ijala* chants of the Yoruba people of Nigeria and Benin Republic, who sang the praises of hunters for their bravery in confronting wild animals in the bush. *Ijala* recitals are common at the burials of hunters as the last sign of respect for fallen comrades.

From South Africa, especially among the Zulu and the Sotho, come the impromptu praise chants called *izibongo*. The poet is a colorfully and flamboyantly costumed man who recites his praise of important personalities on special occasions. He often praises kings and their chiefs and is expected to know the history and genealogy of those being praised. Since the position frequently is inherited from father to son, certain formulas and praise epithets tend to run in one family's recitals. The *izibongo* requires a sharp memory, wit, and finely honed dramatic skills from its practitioner.

Just as there are praise songs and chants in traditional Africa, so are there also abuse and satiric songs. There are varieties of such songs in Africa, but the most elaborate traditions seem to be the *udje* dance songs of the Urhobo people in Nigeria and the *halo* among the Ewe of Togo and Ghana. *Udje* is a unique type of performance in which, on an appointed

day, rival quarters or towns perform songs composed of exaggerations about the other quarter or town. Central to the concept of *udje* are the principles of correction and determent through punishment with “wounding” words. Rival groups used these performances to maintain their rivalry during peaceful times. By exaggerating undesirable behaviors or characteristics, *udje* dance songs also were used to establish and maintain social norms. These songs attack negative behaviors and characteristics, such as adultery, flirtation, greed, harshness, laziness, miserliness, prostitution, overzealousness, stealing, and vanity.

In the *udje* tradition the poet composes the song, which is later taken to a communal workshop for editing and then given to a sweet-voiced person to sing. The poem or song is not complete until it is performed before a large crowd; consideration of their performance informs the compositions of the poetic songs. *Udje* performers wear costumes that will enhance their appeal. Being an integrative art, *udje* fuses song, music, dance, and other dramatic and theatrical features. Various poetic and gestural features enhance the song quality of *udje*. Doubtless other types of songs exist in Africa but the folk songs, praise songs, and abuse songs are the most vibrant.

PROVERBS, RIDDLES, AND TONGUE TWISTERS

While the oral narratives of folktales, myths, legends, epics, and songs have their role in society, proverbs, riddles, and tongue twisters are also very important. They cater to the intellectual and language-building aspects of individuals in society, especially youngsters. A proverb is a wise saying that expresses an idea in a concise and succinct manner. It is a traditional trope, or saying that is highly figurative. It tends to have a central image that is expanded upon to convey meaning.

Most of the proverbs that exist today date back hundreds of years, to medieval times. For instance, in the saying “A dog with bells will not be lost in the bush,” the central image is of a dog wearing bells whose ringing will always expose the dog’s whereabouts. This image would have made sense in medieval Africa, where hunting was a major occupation. The proverb generally exhibits wit and is usually anonymous in the sense that it cannot be attributed to a single person. Its origin is always ancient, even though some proverbs appear to be much older than others because of the conditions of the time in which they were introduced into the language. Proverbs are based on language and ethnicity and often result from generations of observation or experience. Every proverb appears to emanate from experience over a very long period and seems at a particular time to be incontrovertible truth or perceived truth from observable reality.

Proverbs are deeply rooted in traditional culture, in which they play many roles, such as advising, cautioning, and entertaining. They arise from the people’s experience and sensibility and reflect the character of a people or an ethnic group in that they affirm acceptance of what the proverbs entail. Proverbs corroborate the way of life or lifestyle acceptable to a people. The ethics, morality, and virtues of a people are enshrined in their proverbs. Over the ages, proverbs became, for nonliterate traditional Africans, the memory of their common experience as a people. With African peoples, the strength of their language lies in their proverbs, which are not only expressive and communicative tools but also agents of the perpetuation of their entire culture and its values.

A people’s culture and experience are dynamic and change with time. As time passes, new proverbs arise to express and reflect the new realities. Proverbs are the summations of keen observations and lessons learned from different facets of life. In the small ethnic world the observations that make the proverb tend to be narrow in scope; with new sensibilities some could be challenged, like the gender-based views of the patriarchal African society. Proverbs continue to be formed by people about their experiences. The proverb is an integral part of the language, which carries it to enrich and strengthen itself. It is amazing that proverbs are never assigned to a person, and it is rare to know specifically from where in the language belt it derives. A people’s experience involves their environment, history, culture, society, politics, character, sensibility, and worldview, and proverbs relate to these diverse and broad manifestations of human experience. Proverbs are used to register the people’s ethos and affirm faith in their own ways of life.

Riddles and tongue twisters also form parts of the African oral literature tradition. Riddles are like far-fetched metaphors and create meaning in the group. Since riddles in a particular ethnic group or area have set answers, one gets them either right or wrong. Even before the person asking the question completes the question, the young ones who are listening compete to answer it. Riddles demand a sharp imagination for answers. A traditional Nigerian Hausa riddle asks: What is an egg with thorns? The answer is a pineapple.

Tongue twisters are common in African languages. They test the child’s acumen in repeating fast sentences that contain clusters of alliteration. In Urhobo, a Nigerian language, this is one sample tongue twister: Kua kp’ Ekrebuo, kua kp’Ekrebuo, Ekrebuo be kua ra (meaning “Move to Ekrebuo; move to Ekrebuo; Ekrebuo is not difficult to get to”). Speed is the essence of pronouncing a tongue twister.

The oral tradition of medieval Africa was of particular help in the nonliterate society of medieval times in playing the role of educator, entertainer, and role model to establish

a peaceful, happy, and warm human community. Through the oral tradition, the individual understood his or her place in the social fabric. At the same time, communal living did not restrict individual freedom and sense of worth. The oral tradition carried the hopes and fears of the people of the time, and through it contemporary Africans can peep into the lives of the past with a view to imbibing what can strengthen modern life. The oral tradition shows the roots of modern Africans and carries the values, worldview, philosophy, and experience of their ancestors. One can glean from the oral tradition the African world as the people lived it. The changes that Africans have encountered over the centuries are reflected in various forms of the orature. Above all, the oral tradition affirms faith in communal living and creates cultural identity.

THE AMERICAS

BY ALESSIA FRASSANI

No written record of literary text survives from pre-Columbian indigenous America. The rich poetic, epic, and historical heritage of American native cultures was almost entirely oral and substantially relied on recitation for transmission and preservation. At the moment of contact in the 16th century, on the other hand, the Spanish eagerly recorded native literary and historical tradition using the Latin alphabet. These European documents, together with archaeological evidence and contemporary oral tradition, enable scholars to reconstruct the role, major features, and content of pre-Columbian literature. Archaeological evidence includes painted vases and murals, which depict scenes from mythology or scribal activity, and a few pictographic codices from Mexico. (A codex is an unbound manuscript of a classic text.) Linguists and anthropologists, supplementing the work of archaeologists, study living traditions that still follow ancient customs of storytelling, record keeping, and divination in different parts of the Americas.

The lack of written records from the pre-Columbian Period does not mean that other devices were not employed to help in the memorizing and reciting of literary texts. Pictography relies on pictures rather than words and was particularly developed in Mesoamerica (a region including modern-day central and southern Mexico, Guatemala, Honduras, Belize, and Salvador), where the system was used to record tribute payments, genealogies, and religious information (the latter in special relation to timekeeping and the calendar). In South America the Incas continued in the 15th and 16th centuries the millennial Andean tradition of using knotted threads of varying colors and shapes to keep records of imperial affairs, from taxation to historical events.

A phonetic (sound-based) writing system was developed by the ancient Maya in the Preclassic Period (1000 B.C.E.–150 C.E.) and was widely employed throughout the Classic Period (until 900 C.E.) to record historical events, mostly royal successions and battles, and astronomical and calendar information. By tying royal deeds to the movements of the stars, the Maya created a type of history that was highly mythical and cast factual reality into a cosmic realm. The glyphs found on pottery or carved in stone were meant as a springboard for oral recitations either in a courtly setting or in the open spaces of large public plazas. These recitations had a double function: they entertained the audience while at the same time fostering a sense of communal identity through historical, mythological, and highly moralizing storytelling.

The main features identified by scholars in American indigenous literatures are common to all the great epic traditions of the ancient world—for example, the *Iliad* and *Odyssey* in Greece. Several stories develop around a known and fixed set of characters. The stories are very long and usually evolve through tens if not hundreds of years. There is no linear structure. The narrative usually begins in the middle of the story, and the plot can be better described as a series of unrelated segments with recurrent personages and themes. A certain familiarity of the audience with the stories and characters is therefore expected, and the success of the performance rests on the ability of the storyteller to give a lively delivery.

Not all literary production was epic and grand. Highly educated nobles produced courtly and refined lyric poetry, often engaging in philosophical thinking. This meditative poetry was concerned with the nature of the divine, the mystery of death, and the duty of war and political leadership. Finally, religious and ethical issues were addressed in poems that spoke about good and proper behavior toward the elderly and the rulers, in societies strongly divided by gender and class. Sacred hymns also elaborated on respect and honor owed to the supreme beings, such as gods and natural forces.

Memorization of long and intricate stories, as well as complex poems, was achieved by employing specific rhetorical devices. Actors and poets often relied on established metaphors and poetic associations, and what might be perceived by 21st-century ears as being obscure was rather plain and understandable to pre-Columbian listeners. Parallelism is the most common and recurrent feature in indigenous poetry. It involves the repetition of sentences in couplets with only slight wording variations. This device can be considered equivalent to the rhyme and metric system in Western poetry because it created the basic musical structure of the poetic verse. A common elaboration on the two-verse parallelism is the triplet, in which a third verse concludes the preceding couplet by breaking the established pattern. In this way, the

performer is able to change pitch and stress before starting again with new sets of parallel verses.

PAN-AMERICAN ORIGIN MYTHS AND HISTORICAL NARRATIVES

Despite chronological and geographical differences, similar origin myths appear throughout the pre-Columbian Americas. The Maya (from the Guatemala highlands) book of the Popol Vuh, the Aztec *Leyenda de los soles* (Legend of the Suns), the Mixtec (from southwestern Mexico) Codex Vienna, Andean chronicles from South America, and indigenous North American folklore tell the story of the creation of the world, humankind, maize (the staple food of the societies that practiced agriculture), and civilization. Frequent is the idea of many creations, either as a series of failed attempts on the part of the gods to create worthy human beings or as a cycle of creations and destructions due to disastrous natural phenomena. According to all these myths, before creation there was only darkness and mud. The sun (and therefore the passing of the days and time) did not exist, and water and earth were not divided and united again cyclically by the rain and the seasons. Priest-gods' offerings of tobacco or incense caused mountains to rise from water, the emergence of the sun, and the beginning of day counting.

According to traditional Aztec lore, the Aztec were living in the fifth sun, that is to say, the fifth cycle of creation, after four previous eras that had been ended by devouring jaguars, wind and hurricanes, rain and volcanic eruptions, and flood, respectively. Vestiges from previous eras were still visible in the present world: Boulders were giants of the first era turned into stone by the new rising sun; monkeys were nothing more than a failed attempt to create human beings; butterflies, dogs, and turkeys were the survivors of the third creation; while human inhabitants had been turned into fish at the end of the fourth sun.

In Andean lore the world originated in the region of Lake Titicaca. Before creation everything was in darkness. The god Viracocha created the first race of humankind. These people were eventually turned into stone by the god, who was dissatisfied with them. They were at the time of the Inca identified with the stones and ruins of Tiahuanaco, a powerful center that originated and flourished in the highlands not far from Lake Titicaca a thousand years before the Inca. The god eventually created the sun, moon, and stars from the lake and still in the 21st century indigenous people celebrate the recurrence of this important cosmic event by visiting Titicaca annually. The different cycles of creation were known as *pachacuti*, literally a "revolution or turning upside down of time and space." According to one chronicle, there had been five previous creations, during which humankind progres-

sively approximated the final state. The gods Viracocha and Pachacamac were already worshipped, and agriculture, metallurgy, and other social institutions still practiced at the time of the Inca were also a legacy of previous eras.

Culture heroes also play a crucial role in creating the defining features of American civilizations. Their deeds always revolve around the defeat of death, with braveness and deftness, the creation of humankind with bones of the ancestors, and blood self-sacrifice. This is the case of the legendary god known in Nahuatl (the language of the Aztec) as Quetzalcoatl, or Feathered Serpent, and Coe Savi, or Rain Serpent, among the Mixtec. Among the Maya he is known as Kukulcan, in Yucatán, and Gukumatz in the Guatemala Highlands. Although the god is represented frequently in Mesoamerican art from the Preclassic Period (as early as 700 B.C.E.), especially as a powerful animal double for priests and rulers, extensive documentary data exist only from the Late Postclassic Period (ca. 1200–1521 C.E.). An exemplary wise man, Quetzalcoatl, according to Aztec mythology, agreed to descend into the Underworld for the sake of defeating the Lords of Death. He successfully overcame the challenging tasks that they posed to him, let his blood fall on the ancestors' bones, and brought the world out of obscurity. He was also responsible for giving maize to the people by turning himself into an ant and stealing a few kernels from the womb of the earth. According to other myths, Quetzalcoatl was a Toltec ruler. The Toltec dominated central Mexico before the Aztec and were regarded as the inventors of writing, poetry, and the arts. Quetzalcoatl was a devout and pious king who fasted and lived in chastity, only to flee away to the east, the region of the sun, when the golden age of the Toltec came to an end.

In the Mayan Popol Vuh, the twins Hunahpuh and Xbalanque, skilled ballgame players, went to Xibalba (the Mayan Underworld) to retrieve the remains of their father who had been sacrificed by the Lords of Death. They played and danced for the gods of the Underworld, ritually killing and bringing back to life each other, until they tricked the Death gods, sacrificed them, but did not revive them. They eventually revived their father, who came back to life sprouting as a young corn plant. This last aspect is very relevant metaphorically, as it indicates the importance of sacrifice, death, and renewal in Mayan agricultural society.

Tricksters, in some ways similar to the Mayan Hero Twins, are probably the most common culture heroes in Native North America. They are—most of the time—animals or children, smart and deft. Stealing is the typical way by which these heroes create the living and natural things of the world. Coyotes, spiders, and ravens are among the most common tricksters. They are rather ambivalent figures, with the creative power of the gods but all the moral limitations of

humans. The unpredictability and instability of their personalities make them outcasts in their own societies. They are unsettled characters, always wandering in a rather unpredictable way. In many ways, trickster stories provided good moral lessons, exemplifying the type of behavior that should not be followed in society.

Caves were mythical origin places for indigenous people in the Southwest, Mesoamerica, and South America. Pueblo and Navajo stories usually tell of mythical origins from a hole in the earth, or a cave, where the ancestors lived for many generations, escaping floods and other natural disasters. The emergence from the cave takes the shape of an epic journey through different ascending worlds, where the people face different challenges and create social institutions and order out of a primordial state of barbaric chaos.

In the case of the Aztec, the society that would eventually dominate central Mexico originated from Chicomoztóc, “place of the seven caves,” together with six other groups. Besides historical reality (the Aztec did in fact enter the Valley of Mexico from a place to the north) the myth explains the power relation between the dominating Aztec and other culturally related, but eventually subjugated societies. Similarly, in the Andes, the Inca were said to have originated from a place called Pacaritambo, “inn of dawn or origin.” They migrated northward and settled to found the city of Cuzco as the center, literally the navel, of their empire. Other different Indian nations that allied with the future imperial family of the Inca also originated from Pacaritambo.

NORTH AMERICAN INDIAN LORE

Despite the vastness, diversity, and long history of the North American continent, literature, almost entirely known through oral tradition, has come down only from modern times. Few stories were recorded during the first European encounters of the 16th and 17th centuries, and it was only in the late 19th and early 20th centuries that American ethnographers began to collect and study Native American folklore. There is a general understanding among Native Americans that there are two different literary genres: the sacred stories, also referred to as “old” and “true,” contrasted with the “young,” narrated or “false” stories. From the Western perspective, these two categories would be “myth” and “fiction,” respectively. The former touches the deep core of community identity and history, while the latter is meant mostly for entertainment.

AZTEC HISTORY AND LITERATURE

Aztec literature is relatively well known. Different genres are documented that clearly anchor this central Mexican tradition to wider Native American lore. The myths about different cycles of creation and the culture hero Quetzalcoatl are



Stone bust of Quetzalcoatl, a god associated with the Aztec creation myth; Mexico, ca. 1325–1521 (© The Trustees of the British Museum)

known as *teotlahtolli* (divine words). Specifically, Aztec is the story of the migration from Aztlán to the Valley of Mexico that recounts in rather epic fashion the geographical and chronological journeys that shaped the past and present cultural identity of the clan. Although no pre-Hispanic document has survived the Spanish conquest, many paintings and chronicles produced after 1521 were meant to leave a testimony of the grandeur of Aztec past and empire. According to these sources the Aztec had entered the basin of Mexico (where today the national capital of Mexico City is found) after leaving and wandering for some time in the northern part of Mexico. The glorious history of the Aztec from a “barbaric” and nomadic lifestyle to the founding of the imperial city of Tenochtitlán centers on the myth of their patron deity, Huitzilopochtli (Hummingbird of the Left, or Hummingbird of the South). The deity’s birth at Coatepec (Hill of the Serpent) is a pivotal event in Aztec cultural and political history. Huitzilopochtli was the miraculous son of the goddess Coatlicue (She of the Serpent Skirt) and had to kill his own brothers and sister, who were infuriated at their mother for her shameful pregnancy. This myth probably coincides with actual historical events that led to the Aztec rule over their neighbors and former allies in the Valley of Mexico.

Another important literary genre is constituted by the *huehuetlahtolli* ("ancient words") compositions learned and transmitted in the *calmecac*, priestly schools, by members of the nobility. They are speeches from mothers and fathers to sons and daughters, emperors to their subjects, and supplications to the gods in times of drought, famine, or other natural disasters. They also include official speeches of ambassadors and merchants. They chiefly address the moral concerns of a traditional society preoccupied with maintaining the established authoritarian order.

MIXTEC BOOKS AND EPIC LORE

The literary tradition of the Mixtec of Oaxaca, in southwestern Mexico, is expressed in the famous codices, or painted manuscripts, that were produced a few decades before the conquest. The Codex Vienna (from the city where it is currently located) recounts the origins of the Mixtec, the major geographical features of their land, their cultural traits, and their lineages. Aspects common to the rest of Mesoamerica include the primordial creation myth and the culture hero Quetzalcoatl, or Coe Savi.

A series of other manuscripts, however, depict an epic story that is peculiar to the region. Manuscript painting was a courtly activity and therefore reflects the ideological concerns of the ruling class. Although lineage reckoning and legitimization were important goals of these codices, a strong literary component is also present in the epic story of a legendary Mixtec general who, during the 11th century, is able, albeit temporarily, to unify the different city-states of the Mixtec. Son of a priest, and therefore not destined to political leadership, Lord 8 Deer Jaguar Claw achieves an unprecedented power in the region thanks to military campaigns, political alliances, and ritual pilgrimages. His quest and ambitions eventually take him to central Mexico, where he is crowned sovereign ruler, and to a place in the east where he meets the sun god. His life nevertheless is ended by murder, killed in revenge by the son of a former lover whose execution he had ordered. This story, present in fragments in the different manuscripts, has a highly moral tone, besides entertaining the audience with grand historical events, love stories, and political intrigues.

POPOL VUH, A QUCICHE MAYAN COUNCIL BOOK

The single most important text surviving from ancient Mesoamerica is the so-called Popol Vuh from the Guatemala highland. The term means the "Book of Council" and refers to the fact that the text was consulted by Mayan kings in making important political decisions. The book, which was an anthology of hieroglyphs, survives in the 21st century in the Latin alphabet and was written down between 1554 and 1558.

The original painted manuscript probably included extensive illustrations, such as astronomical tables and calendars to accompany the textual parts. It is stated in the available version that there are two different ways of reading the Popol Vuh: divinatory and narrative. Priest-diviners consulted the book as a springboard for oracular deliberations that were often uttered in obscure form. The narrative part, on the other hand, is the version that has come down to us and that was only partially represented in the text and pictures of the original manuscript, basically relying on oral tradition. The story is divided into three sections. First, there is an account of the creation of the Mayan world and humankind by the gods. Second, there follows the epic journey of the Hero Twins to the Underworld that gives rise to the life cycles of death and renewal and agriculture through sacrifice. Finally, the manuscript takes a more historical turn and recounts the first lineages that populated the various Mayan regions, from the Guatemala highlands to the tropical lowlands of Guatemala and Mexico and the desert region of Yucatán.

INCAN WRITING AND MYTHOLOGY

Native-language sources abound in Mesoamerica, but few texts in Quechua (the language of the Inca) about Andean native mythology, literature, and history have survived. Pictography, the art of painting symbolic pictures on animal skin, cloth, or paper was flourishing in Mesoamerica at the time of the Spanish conquest. Spanish missionaries probably saw similarities between the production of books in ancient Mexico and medieval manuscript illumination. In the Andes, on the other hand, knowledge was chiefly preserved and transmitted by means of knotted strings stored in large bundles. Although many examples of quipus, as they are called in Quechua, survive, their decipherment and interpretation is highly controversial. Perhaps the lack of any writing system that vaguely resembled the Latin script was a restraint to translating traditional literature into an alphabet. From colonial sources it is known that quipus were used in narrating stories about the Incan past as well as for collecting statistical information, such as census and tribute accounts. Information was encoded in the different colors and combination of colors of the strings and in the variation and positioning of the knots. Every *quipucamayoc* ("knot maker" or "knot keeper") probably developed a personalized system of encoding information. Spanish chronicles of Incan history and mythology are the literal translation of original Quechua accounts made by the *quipucamayocs* during the "public readings" at ceremonial occasions.

The Inca, from a valley in the south-central Andes, came to dominate a vast region that includes modern-day Peru, Ecuador, northern Chile, and western Bolivia. Their power

stemmed from the natural resources of the fertile highlands and maritime coast, but they also maintained contacts with people living in the Amazonian forest. Their empire rested on a strong centralizing political and economic ideology that centered on the region of Cuzco.

Oral tradition stresses the imperial view of the Andean past and its heritage, but the Huarochirí manuscript offers a complementary view of Incan history and lore. It balances the typical Andean vision of creation and history focused on Lake Titicaca with a view from the coastal region. Just outside the modern Peruvian capital of Lima lies the pilgrimage center dedicated to Pachacamac. Although the ethnic group of the Yauyos of the province of Huarochirí, where the manuscript was produced, said that they recognized Viracocha as the sun deity of the highlands (the Lake Titicaca region), Pachacamac was the supreme creator deity. He was credited with the creation of the first human couple. He gave corn to the people by sacrificing and planting the teeth of one of the sons of the first couple. He planted the boy's ribs and bones and created yucca tubers. Eventually, Pachacamac was defeated by a son of the sun deity, Viracocha, and disappeared into the sea in front of the place where the temple dedicated to him still stands in the 21st century.

ASIA AND THE PACIFIC

BY KENNETH HALL

The spirituality, ideals, experiences, fears, and hopes of medieval Asia are contained in its sophisticated philosophical, moral, epical, and religious texts. Literacy and learning were prestigious; even Japan's samurai warriors were literate and composed poetry. Despite the fact that women did not attend regular schools and were not tutored as boys were, some were taught to read and write by their family members. Such was the case especially in imperial Japan among court ladies, such as Lady Murasaki Shikibu (ca. 978–ca. 1026), the author of the *Genji monogatari* (*Tale of Genji*, ca. 1010). In India, where religion was a focal part of life, most of the early literature was associated with India's Hindu and Buddhist traditions. In China the Confucian tradition favored philosophical texts that focused on human existence in this world rather than speculating on a life everlasting. By the sixth century China's acceptance of Buddhism encouraged new works of fiction and poetry, countering the Confucian view that creative works were wasteful, self-indulgent exercises.

INDIAN LITERATURE

Earlier oral compositions transitioned into Sanskrit, Prakrit, Pali, and Tamil written texts in the medieval era. In contrast to earlier religious literature, which records the mythology,

rituals, ritual chants, magical spells, and philosophy of Indian society, medieval literature shifts the focus from the worship of mythological divine to consideration of a universal celestial creative force, Brahma, and proposes ascetic and mystical ways to realize wisdom and eternal truth. This philosophy was foundational to the development of Hindu law, as contained in the Dharmasastra legal texts that address good and evil, human morality, and societal duty.

Medieval Buddhist teachings, popularized in the Jataka folktales concerning the previous lives of the Buddha, provided an alternative commentary on a middle way between Hindu ritual and withdrawing asceticism. These themes are developed in contemporary and subsequent Hindu literature, notably Indian epic literature and poetry. The Bhagavad Gita, a Gupta-era (320–550) addition to the Mahabharata epic poem, became the philosophical base for new Hindu devotional (bhakti) cults, which focused on the veneration of numerous intercessionary divine beings that were represented in stone and metal icons and addressed in an assortment of post-10th-century bhakti poetry and literature celebrating the Hindu gods Vishnu and Shiva.

INDIAN EPICS

The Mahabharata and Ramayana epic poems were the first secular literature of south Asia and evolved in their oral forms over centuries from Vedic times (ca. 1600–800 B.C.E.). Initially they were martial ballads of heroes in India's ancient past, but later the Brahmin priesthood added long passages on theology, morals, and statecraft. The epics, which transitioned from oral tradition to writing during the Gupta era, continued to evolve in medieval times, with additions and innovative compositions inspired by the epics in India and in Southeast Asia.

The Mahabharata is the world's longest poem, with 90,000 stanzas. The Mahabharata's diverse plot centers on a great civil war between two rival factions of heirs to the throne in the Vedic-era kingdom of Kuru in northwestern India. On one side are the Pandava brothers, Yudhisthira, Bhima, Arjuna, Nakula, and Sahadeva, who are the rightful heirs; on the other are the Kaurava brothers, led by Duryodhana. After a long series of earlier intrigue and conflict, including a period in which the Kaurava brothers leave the kingdom and travel among various other courts as soldiers of fortune, all the kings of India and surrounding regions join one side or the other to form two huge armies, which meet in a decisive battle on the plain of Kurukshetra. In an 18-day battle, all of the important chiefs die except the five Pandava brothers and their companion Krishna (Lord Vishnu in one of his alternate identities), who had become Arjuna's charioteer-adviser. The eldest Pandava brother, Yudhisthira, becomes the new king,

and when he retires, he names Arjuna's grandson Parikshita as his heir. The five brothers, with their joint wife Princess Draupadi, the daughter of the king of the Panchala, who had selected her mate from among an assembly of potential marital partners, then go on foot to the Himalayas, where they climb Mount Meru to enter the realm of the gods.

The five Pandava brothers and other characters represent the various personalities of humankind. Yudhishthira is pious, righteous, and gentle but a little negative in character; Bhima is physically imposing, rough, and gluttonous but very intelligent; Arjuna is the great warrior—principled, generous, and brave; Draupadi, their wife, has spirit and is not afraid to speak her mind to her husbands when she has issues with them. The villain, Duryodhana, and his followers are not totally evil; they have noble qualities and courage, and are worthy opponents of the Pandavas. Among the key subordinate episodes are the Santi Parvan, a philosophical discussion on statecraft and ethics, and the Bhagavad Gita, the sermon of Krishna to Arjuna on dutiful behavior before the climactic battle. Other notable narrative subsidiary episodes tell legends of the gods as well as the stories of numerous secular characters from Kuruksetra or its neighboring regions.

In contrast, the Ramayana epic poem is about one-fourth the length of the Mahabharata and is a later composition. Its story is based in Ajodhya, the capital of the neighboring kingdom of Kosala, east of Kurukshetra. The plot focuses on Rama, one of the king of Kosala's four sons, and his wife, Sita, the daughter of the king of Videha, whom Rama had won in an archery contest. Later versions of the poem add that Rama is really an incarnation (avatar) of the god Vishnu, who takes an earthly form (as he does as Krishna in the Mahabharata) to right a wrong in the realm of humankind. Owing to a disagreement with his father, Rama voluntarily goes into exile with Sita and his brother Lakshmana, and they live as hermits in the forest of Dandaka, where Rama destroys many demons who are attacking ascetics and villagers.

Ravana, the demon king of Lanka (Sri Lanka), intent on avenging his fellow demons' deaths, comes in disguise while Rama and Sita are on a hunting expedition and kidnaps Sita, carrying her off to his Lanka home in his magical flying chariot. In an attempt to find Sita, Rama and his brother ally with Sugriva, the king of the monkeys, and his general, the brave and loyal Hanuman. Hanuman discovers Sita in Ravana's palace and leads his great army of monkeys and bears across a bridge of stone that Rama had magically built from India to Ravana's island kingdom. There Rama, Lakshmana, Hanuman, and their allies kill Ravana and his followers and rescue Sita.

While Ravana has not mistreated Sita, nor has Sita in any way yielded to Ravana, under Hindu sacred law Rama

must refuse Sita as his wife. In anguish, she throws herself on a funeral pyre, but the fire god Agni refuses to accept her. This rejection is interpreted to be a sign of Sita's innocence, allowing Rama and Sita to renew their marriage vows and return to Ajodhya to rule righteously as king and queen for the remainder of their lifetimes. In a later addition, Rama responds to continuing criticism from his subjects that his queen is impure, and to satisfy the will of the people, despite his belief in her true innocence, he banishes her to a monastic hermitage. There she gives birth to twin sons. Rama eventually discovers Sita and her sons and acknowledges that her sons are his. Sita calls on her mother, the earth goddess, to intervene to make a final proof of her innocence. The earth opens and swallows Sita; soon Rama returns to heaven, to resume his form as Lord Vishnu. In yet another later addition to the text, Rama and Sita are finally reconciled in heaven, in their divine forms.

There were other medieval regional epics, the most notable being those of southern India and the court literature of Java. Among the Tamil-language compositions that blend southern Indian and northern Indian Sanskrit culture are the erotic, heroic, and religious-themed *Cilappatikaram* (The Jeweled Anklet) and the *Manimekalai* (The Girdle of Gems), which date to the early medieval era. Both works are set in the capitals of the three Tamil kingdoms: Chola, Pandya, and Chera. The first tells the story of a young Chola merchant, Kovalan, who is married to the virtuous Kannagi but is in love with the courtesan Madhavi; he is punished by being exiled to the Pandya realm, where he is executed when he tries to sell his wife's ankle bracelet. Kannagi comes to redeem her husband's name and in rage tears off one breast and throws it at the city of Madurai, which goes up in flames as demonstration of the supernatural powers of a faithful wife. In death, Kannagi becomes the goddess of chastity.

The second example, the *Manimekalai*, continues the story of the *Cilappatikaram*. The heroine is Madhavi's daughter, Manimekalai, a dancer and a courtesan like her mother. Manimekalai is torn between her desire for a princely lover and her spiritual needs—the first encouraged by her grandmother, the second by her mother. She flees from the attentions of a prince, and while he pursues her, she achieves magical powers: She changes forms and survives prison, lecherous villains, and other dangers. She converts the queen and finally goes to the Chola capital, which is being destroyed by ocean storms; worships Kannagi; and arrives in the Chera capital city to provide famine relief and to perform "penance." Unlike the *Cilappatikaram*, which is a local blend of Hinduism and Jainism, the *Manimekalai* mixes Buddhism with local supernatural and naturalistic beliefs common to early south Asian society.

SANSKRIT KAVYA AND CLASSICAL DRAMA

India's early literary tradition culminated in the classical Sanskrit compositions of the Gupta era, notably the *kavya* poetry and drama of Gupta-era authors. These writings on love, nature, and morality were intended for recitation and performance, to elicit an emotional response from their audience. Human emotions are personified in seasonal and day and night settings, as well as in birds, beasts, and flowers. *Kavya* compositions follow a rigid set of grammatical rules. The unit of poetry is the stanza, which has four quarters, each of varying length from eight to 21 syllables; epics employ the *sloka*, with eight syllables to the quarter.

By general consensus, the compositions of the court poet Kalidasa (fifth century) are the best. One of his most popular remaining works is *Meghaduta* (The Cloud Messenger), whose central character is a young man who is banished to the mountains for a year for a civil offense. The poem expresses the anguish of his separation from his beautiful wife; he finally gives a cloud his message of love to take to his wife. Subsequently, the 10th-century popular bhakti devotional poetry, composed in India's regional languages, addresses the intense emotions of the individual devotee who distances himself from the secular world to embrace an intense desire to become one with the divine and to fulfill the human potential for love that becomes possible when one totally commits to Lord Shiva or Lord Vishnu.

Kalidasa and other Gupta-era authors also set the standard for subsequent Indian drama; among them are the works of the eighth-century central Indian dramatist Bhavabhuti (fl. 700), who is considered to exceed Kalidasa in his portrayal of sorrow. Many medieval Indian dramas are filled with melodrama that brought medieval audiences to tears, but they always have a happy ending. Women are exiled from their homes by their fathers and husbands, who later realize the injustice; lost or banished children are eventually reunited with their families; and at the last moment noble heroes are always saved from death. Plots were borrowed from earlier and contemporary sources, such as dramatizations of the epics, legends of gods and ancient heroes, folklore, and tales of historic figures. There were 12 recognized categories of drama, ranging from allegorical plays to light comedies. Indian dramas commonly feature a hero, a heroine, a villain, a comic relief, and a cultured but shallow parasite who befriends the hero with negative consequences.

JAVANESE KAKAWIN LITERATURE

Java's *kakawin* poets, whose patrons were kings and their courts, composed Javanese-language versions of epic stories set in the Java landscape (1000–1500 C.E.). Their stories told

about the activities of a court. Heroes were courtiers whose behavior was refined, and they were equally accomplished in the arts and in warfare. Their opponents were crude, intellectually unstable, and self-centered. Courts were not isolated but networked with their countryside. Men and women of the court regularly traveled beyond the court, where they had contact with commoners and foreigners, gods and goddesses, demons and priests. Courtiers especially sought harmony among several realms of existence, in the realm of humanity and in those of the divine. Humans lacked the preeminence of divinity and nature. In their travels courtiers encountered romance, fought in great battles, and paused to receive instruction from the gods on the meaning of human existence, all of which allowed the elite to bring prosperity to their subject humanity.

Kings established the standards of acceptable conduct appropriate to Java's hierarchical society, from courtiers to commoners; in common with the theme of Indian epic literature, proper behavior insured society's success. In the minds of the poets, a king's power ultimately depended on his alliances with his nobles and his ritual leadership in partnership with Hindu or Buddhist priests, who were his intermediaries with the Supreme Divine. The initial *kakawin* poets hoped for a future golden age, which later poets claimed was achieved by Java's 14th-century Majapahit court (1293–ca. 1500). While early-14th-century poets thought of kings and priests as intermediaries whose special relationships with the gods was essential to their subjects' success, by the 15th century poets symbolized the declining fortunes of the courts by asserting that Java's prosperity was by then less the consequence of the kings and their priests than it was their subjects' actions in this life, notably family rituals that honored the memory of deceased ancestors.

CHINESE LITERATURE

In contrast to medieval south Asian literature, which generally has a religious context, China's early literature focuses on secular existence and addresses the necessary conditions for successful governance. Confucian tradition dictated that early Chinese literary compositions conform to rigid standards and have some secular value. The era of the Han Dynasty (202 B.C.E.–220 C.E.) was notable as a period of literary transition. This period featured the development of Chinese governmental record keeping and the use of these records to provide documentation for the writing of official dynastic histories, which were written by the subsequent dynasty, and the composition of essays that apply Confucian logic and the historical past to the resolution of current societal needs.

Chinese poetry reached its fullness in the Tang and Song eras of the seventh to 12th centuries. While earlier poetic ex-

pression was constrained by Confucian structure and poetry was expected to have some secular value, by the Tang era Chan Buddhism made it clear that literary creativity was an appropriate exploration of the human mind. Writing was an act that brought self-discipline, which perfected the individual, who might then be a more productive member of society. Tang poetry began to make this transition but was still hesitant, and most of that era's poems have some purpose. Song-era poets fully embraced creativity for its own sake, and their poems openly indulge in the subtle pleasures of life. Song poets believed in a limited role of government leadership, stressing the need to believe once again in the moral capacities of humanity, and thus they argued for a less regimented society as the means to inspire greater creativity.

Tang and Song texts were printed using carved woodblocks, a practice that made written works widely available among an increasingly literate Chinese urban public. Among these were popular new *huaben* stories and earlier *shuo hua* oral stories that were printed and widely sold. There were also popular accounts of Buddhist pilgrims, printed encyclopedias, interpretive histories, and neo-Confucian philosophical essays. Tang-era writings were still hesitant, and most had some purpose, but Song-era authors fully embraced creativity for its own sake, even to the point of openly indulging in the subtle pleasures of life, which Confucian scholars regarded as dangerous to the welfare of humanity.

CHINA'S NOVELS

Chinese authors finally produced novels during the Yuan Dynasty (1279–1368), when two of China's four great classic novels, *Shuihu zhuan* (Water Margin; also known as Outlaws of the Marsh and All Men Are Brothers) and *Sanguo yanyi* (Romance of the Three Kingdoms), were published. *Xiyouji* (Monkey: Journey to the West, ca. 1590) and *Shitou ji* (Dream of the Red Chamber, 1791) are the other two, to which many add a fifth major composition, *Jin Ping Mei* (The Golden Lotus, 1610). In each of these stories the lead heroic characters all end as immortals or supernatural beings with magical powers.

Shuihu zhuan depicts the lives of outlaws and their defiance of the imperial government in late Song China to the founding of the Southern Song in 1127. It is loosely based on the historical Song Jiang and his 36 companions, who were active in the Huai River region and surrendered to government troops in 1119. The bandits' exploits became the basis of Chinese folktales, in the Robin Hood tradition of the West. From the 13th century, under the Yuan Dynasty, *Shuihu zhuan* collects previous folk and literary works, becoming the basis of popular Yuan drama. There are frequent brawls, passionate brotherhood, and emphasis on physical strength over philosophical logic. In these stories the villain Kao Chui

forces each of the heroic bandits to become outlaws. They join his rebel band, which lives on the water margins of Kiang Shan Po, where they and others become Kao's opponents and eventually overthrow him. Along the way, their adventures, sword fights, plots, and counterplots against seemingly insurmountable opposition offer commentary on Chinese philosophy. Over time, the qualities of the central characters change: Lin Chung, ever the conscientious army officer, becomes the greatest hero; the small-time petty crook Kao Chui becomes his empowered opponent. The heroes, who were initially respectful of legal authority and are forced into banditry in their troubled times, always maintain their moral integrity and ultimately rebel against their corrupt government.

In contrast, *Sanguo yanyi* presents the sophisticated treachery of individual elite characters subtly manipulating others to achieve their own self-interests. The plot centers on the intrigue of the late Han Dynasty and its aftermath, from roughly 150 to 280. This novel also was composed in the Yuan era, in the 14th century, and compiles various folk and official traditions. The stories blend traditional Chinese culture with Buddhism, in their acceptance of the notion of reincarnation and karma (action) that leads to the fate of the individual at death. Like the *Shuihu zhuan*, this novel is a string of numerous stories within the story, in this case the decline of the Han Dynasty. The main story begins at the end of the Han Dynasty, when the last Han emperors place their trust in their eunuchs (castrated male courtiers) and do not pay attention to the advice of their able officials. Generalized corruption at the top leads to the decline of the Chinese economy and personal security. In the reign of the next-to-last Han emperor the Yellow Turban popular revolt breaks out (184), under the leadership of Zhang Jiao, who practices Daoist wizardry and holds immortal powers. The emperor's brother-in-law, He Jin, leads the imperial forces quickly to suppress the revolt but is subsequently murdered by the eunuchs. He Jin's loyal elite followers successfully deal with the eunuchs. Among them, Dong Zhuo, governor of Western Liang, takes the opportunity to depose Emperor Ling and place Emperor Xian, who is his puppet, on the throne. Dong Zhuo's subsequent tyranny causes the other nobles to unite and drive him from power. Dong Zhuo's foster son, Lü Bu, the mightiest warrior of his time, eventually kills his father over Diao Chan, a beautiful woman they both want.

By this time the imperial government has collapsed, and the elite return to their provinces and begin to fight each other. After an initial series of battles three centers of power emerge, coincident with a prolonged war among the Wei in the north, the largest, with their capital at Yuoyang (220–65). The Wei force the last Han emperor, Xian, to abdicate in their favor in 220. The kingdom of Shu Han (post Han) emerges

in the lands west of the Yangtze Gorges to Yunnan in the southwest (221–65), its capital at Chengdu (Sichuan Province), claiming legitimacy based on its inheritance of the Han bloodline. The independent kingdom of Wu emerges in the southeast (222–80), its capital at Jianye (Nanjing Province), which is controlled by a powerful southern family. Eventually the three are absorbed into one, after the conquest of Shu by the Wei in 263, followed by a successful palace coup by the Wei general Sima Yan, who establishes the Jin state in 265 and then absorbs the Wu in 280.

The text is a window into the Chinese past as well as a commentary on Chinese political philosophy and ultimately a reflection on politics in the Yuan era. Several of these historic figures had become deified heroic figures widely worshiped in Yuan Dynasty and Ming Dynasty times, owing to their celebrated past bravery and extreme loyalty to the imperial throne. *Sanguo yanyi*, however, portrays them as overconfident, of questionable integrity, and less than worthy of the divine status the Yuan rulers had granted them. The lead characters of the epic came to be known by all Chinese: Cao Cao, the founder of the Wei, is the classic villain. The three early Shu heroic champions are Liu Bei, who fights to uphold the traditions of the past, and his able and loyal generals Zhuge Liang, who defeats Cao Cao at the Battle of Red Cliffs, and Guan Yu, who becomes Guan Di, the Chinese god of war.

JAPANESE LITERATURE

The foundation of the Nara imperial court in 710 created the conditions and audience for the development of a literature based on Chinese models. In fact, the Chinese system of ideographic writing was used in these early literary efforts, but the characters were used phonetically to record sounds rather than the meaning they represent. A conscious effort was made to transfer historical folk tradition to a written form that would bolster support of the claims of the imperial house to sole rule in all of Japan. This resulted in the first written histories of Japan, the *Kojiki* (Records of Ancient Matters) and the *Nihon shoki* (Chronicles of Early Japan).

Poetry was also produced at the court, generally short pieces expressive of piety, love, or the meaning of nature for the human condition. This poetry, like the court itself, helped to strengthen the importance of the traditional Shinto religion. This literature is known through a collection of 4,516 poems compiled in about 760, the *Man'yōshū* (Collection of Ten Thousand Leaves). In 952 a group of poets transcribed the *Man'yōshū* into the newly created kana phonetic script, which was designed to represent the sounds of the Japanese language in roughly the same way Western languages use the Latin alphabet. The relative ease of using this new script

promoted a wider growth of literature in the Heian Period (794–1185).

One popular form of Japanese poetry known throughout the world is haiku, which uses two stanzas of 17 (with lines of 5-7-5) and 14 (7-7) syllables, respectively. This form has its origins in *renga* poetry, developed in the 15th century. *Renga*, however, was a collaborative form, in which attendees at a party would create a lengthy poem by writing alternating stanzas, usually rapidly improvised. Its main purpose was to encourage sophisticated camaraderie.

Two important early novels were produced around the year 1000 by ladies of the court: the *Makura no soshi* (Pillow Book) of Sei Shonagon (965–ca. 1010) and the *Tale of Genji* of Murasaki Shikibu (ca. 973–ca. 1025). The earlier of these novels was *Makura no soshi*, by Sei Shonagon, who served as a lady-in-waiting to the empress Teishi between 900 and 1000. The form of this work is more nearly a diary than a novel and seems to refer to historical personages as characters. Its miscellaneous style is also diaristic, containing a compilation of character studies, short stories, and random notes. The author's primary interest is in romantic relationships. She describes the arranged marriages common among the nobility, based on family interest rather than romantic love, and the system of male polygamy common at the court. In fact, she and Murasaki were supposedly personal rivals because they were maids to two different wives of the emperor (Murasaki of the empress Shoshi).

The noble women that are characters lived independently in their own quarters with their children and would be visited for romantic liaisons by their husbands and lovers. It was a common practice (known as *tsuma toi kon*, or “visited-wife marriage”) that once a married man had sired an heir by his first wife, he was free to take on whatever other relationships he chose—whether supporting a lifelong mistress or pursuing a single liaison. Sei's female characters have an equal range of freedom with respect to their relationships; they range from vampiric man-eaters to tragic heroines wounded through abandonment by a husband or lover. One may compare to this state of affairs the ideology of courtly love in the medieval West.

Murasaki's *Tale of Genji* had the same courtly setting as Sei's work but is a psychological novel approaching the modern type. This in itself is a rather startling achievement, since it has no clear precedent in earlier Japanese or Chinese literature and is far more like the modern novel perfected in the West but now popular throughout the world than were the romances composed in Roman antiquity or by European courtly writers of the medieval period. The main character is Genji, a minor courtier and the son of the emperor and a concubine, who may be based in some degree on the author.

While of relatively unfortunate birth, Genji distinguishes himself as master of courtly arts and manners in speech, poetry, and music. He is handsome and is pursued by both men and women. The plot concerns Genji's movements through various romantic entanglements, while the metatext of the novel explores the meaning of every kind of human relationship as well as the philosophical idea of Confucianism and Buddhism. The imperial court itself, however, is in some ways the main character of the work. While the Fujiwara clan exercised temporal power, the emperor and his entourage were free to devote themselves to *mano no awari* ("subtle manners"). Their introverted concern is with understated perfection in dress, speech, and art.

Heike monogatari (Tale of the Heike) is an epic poem based on a tradition of oral performance among mendicant Buddhist monks. The chief version that we have was compiled in 1371 by Kakuichi, a monk trained in the tradition. Kakuichi is said to have been blind, but the key figures in epic traditions are often presented as blind (such as the Greek poet Homer), so this may itself be a folkloric element, as though sight were traded for poetic inspiration. The three sections of the poem are each long enough to be recited to accompaniment of the *biwa*, or Japanese lyre, during a single night's entertainment, recalling the work's origin in oral performance. The poem concerns the Genpei war fought in 1161 and 1185 between the Taira and Minamoto clans for control of the Japanese state. But just as the subject of the *Iliad* is not the Trojan War but the wrath of the hero Achilles, *Heike monogatari* concerns the destructive force of emotion in human life, pointedly given a Buddhist moralizing reading. The first section has to do with Taira no Kiyomori, whose wrath turns victory into defeat. The second section concerns two cousins of the Minamoto clan, Yoshinaka and Yoritomo, whose rivalry even in victory brings about the destruction of Kyoto and the shaming of the emperor. The third section develops the story of Yoritomo's betrayal of his brother Yoshitsune. The tradition, not necessarily mediated through the written version, also inspired a number of Noh dramas and woodblock prints throughout the feudal period. It continues to be referenced in modern Japanese comic books and video games.

KOREAN LITERATURE

As in Japan, the contemporary Tang-era court culture of China inspired Koreans to create their own written literary works during the seventh-century reign of the Silla court. The *hyangga*—short, four-line folk ballads and nursery songs and 10-line philosophical commentaries by priests and emotional writings by warrior-aristocrats—are the first uniquely Korean poetic form. *Hyangga* were recorded in the *hyangchal* script, in which the Korean language was written using the "sound"

(*um*) and "meaning" (*hun*) of Chinese characters. The *Samguk yusa* (Memorabilia of the Three Kingdoms) contains 14 poems from the Silla period; other surviving 10-line *hyangga* poems are collected in the *Kyunyo chon* (Tales of Kyunyo), *Seo Dong yo* (Ballad of Seo Dong), *Che mangmae ka* (Song of Offerings to a Deceased Sister), and *Ch'an-Kip'arang-ga* (Song in Praise of Kip'arang). The 13th-century literature of the Koryo court period is marked by the increased use of Chinese letters, the disappearance of *hyangga*, and the creation of *Koryo kayo* (Koryo songs), which were first transmitted as oral literature until they were written after the founding of the Yi court in 1392. Other Koryo-era compositions include *Samguksa-gi* (Chronicles of the Three Kingdoms) collection of folktales, the *Legend of Tangun* (a recollection of the founding of the legendary Old Choson Dynasty), and *King Tongmyong* (a legendary account of the Koryo Dynasty's founding).

In the Yi Dynasty (1392–1882) Korean authors finally composed in the first Korean script (*hangul*). This era's poetry had two forms: the "short-stanza form" (*tallyonch'e*) single-stanza works and the "extended form" (*yonjangch'e*) that was separated into many stanzas. The "Chong Kwajonggok" (Song of Chong Kwajong) and the "Samogok" (Song of Maternal Love) are examples of the short-stanza form, but in the more representative *Koryo kayo*, which include "Ch'nongsan pyolgok" (Song of Green Mountain), "Sogyong pyolgok" (Song of the Western Capital), and "Tongdong and Ssangh-wajom" (Twin Flower Shops), poems were written in the extended form, each divided into four to 13 stanzas.

EUROPE

BY ANNE BERTHELOT

The medieval era traditionally starts with the fall of Rome to Theodoric (r. 474–526), king of the Ostrogoths, in 476 C.E. and ends with the fall of Istanbul to the Turks in 1453. This represents almost 1,000 years of literature to take into account, when usually literary periods or fashions are envisioned on a much smaller scale. The situation is complicated by the linguistic picture of the Middle Ages. It may be described as a kind of generalized bilingualism, with Latin as the medium for philosophy, theology, and all serious matters and various vernacular languages (languages of the common people) for less-weighty literature.

MANUSCRIPTS AND BOOKS

The conditions for the production and diffusion of books were drastically different from those in the modern period. The first printed books date back to the last two decades of the 15th century. Before that time there were only manuscripts. Manuscripts are very expensive and take a long time to copy,

so books were few at the best of times. Manuscripts are fragile, too. Very few existing manuscripts are older than the 13th century, although the works contained in some date back to the 12th century or earlier. Furthermore, one cannot be certain that the written version reproduces faithfully the oral version that was sung or played 200 or 300 years earlier. For instance, the *Four Branches of the Mabinogi*, a Welsh manuscript that dates to the end of the 13th century, transmits stories dating from the ninth or 10th century.

Because the written version may be quite different from the original—whether transmitted orally, written in a different dialect, or transcribed at a different stage of linguistic evolution—it is somewhat hazardous to date texts. There was no concept of “copyright” until at least the 14th century, and it was very difficult, without the technical support provided by printing, to make exact copies of long texts. Moreover, the meaning of words changed over time, and scribes may have substituted new expressions for old ones; alternately, they may have provided explanations, or glosses, for facts or ideas that were no longer current or may have added to the original text a passage that seemed fitting.

The notion of “author” presents similar problems. Many texts are simply anonymous because there was no centralized system preoccupied with remembering the identities of those who wrote them. What mattered was not the name of the person who composed a text but the authority that could be invoked to give weight to the work. In some cases a text was attributed to a much earlier and respected author; conversely, an older text may have been adopted by a contemporary writer who considered it no problem to erase the original author’s name and substitute his own. Furthermore, numerous authors used pseudonyms, relying heavily on puns and word games.

The existence and quality of manuscripts depended on the scribes who copied them; for a long time these scribes were almost exclusively clerics, who considered only Latin a respectable language and only religious matters worthy of being written down. Many antique texts were lost during the Middle Ages, some forever and others to be recovered at the dawn of the Renaissance. Many new texts were not considered valuable enough to be copied and collected by the aristocracy. Archaeologists must take into account a considerable attrition rate in trying to estimate the popularity of a text on the basis of remaining manuscripts. Criteria that have been honed during the last two centuries do not necessarily apply to medieval productions.

Similarly, modern categories defining certain types of literary works simply cannot cover the medieval corpus. The texts themselves very often address this issue, using various words to describe what they are; however, it is difficult to

establish a clear-cut typology. Some medieval genres disappeared by the end of the 15th century or even earlier. Others, like romance literature, underwent such changes that they barely can be considered as the same anymore.

RELIGIOUS LITERATURE

Throughout the medieval era Latin remained the primary literary language of philosophy, theology, and science. While there were attempts to translate the Bible into vernacular beginning around the fourth century—Bishop Ulphilas (ca. 311–ca. 382) produced a Gothic version of it, and the Anglo-Saxon abbot Aelfric (ca. 955–ca. 1010) translated the book of Genesis into Old English—the famous theologians of the Middle Ages wrote their treatises in Latin. These authors included Saint Anselm of Canterbury (1033 or 1034–1109), Peter Abelard (1079–ca. 1144), Thomas Aquinas (1225–74), and Roger Bacon (ca. 1220–92).

Although predication (preaching) long had been done in the various vernaculars of any Christian audience, the common language for moral teachings and edification remained Latin. Priests, abbots, and bishops were prone to use fables, often borrowed from antique tradition, or brief anecdotes with a moral point, called *exempla*. These came to represent a body of popular wisdom that got translated into the vernacular languages, sometimes as part of a larger allegorical construct. The linguistic and philosophical theory of the four meanings of the scriptures (a belief among medieval scholars that each biblical verse had four meanings), enlarged to secular pursuits, influenced such works as the *Roman de la rose* (Romance of the Rose, 1225–70), which plays on the complementary literal and secondary meanings of an apparently straightforward love story.

Allegory also was present in the important body of literary visions or dreams describing the Christian afterlife. From the ninth-century *Navigatio sancti Brendani* (The Voyage of Saint Brendan) to the 14th-century *Divina commedia* (Divine Comedy) by Dante (1265–1321), vivid descriptions of hell and purgatory (less so of heaven) bore testimony to the eschatological preoccupations of medieval Europeans.

In the 13th century arose an encyclopedic ambition to charter the whole world. Whether in theology, the sciences, or history, scholars tried to gather all the information pertaining to a subject in one work; such books are called in Latin *specula*, “mirrors” of the world, or *summae*, “sums” of knowledge, such as Thomas Aquinas’s *Summa theologiae* (Summary of Theology, 1265–74). Many of them were written in Latin, but the encyclopedic trend spread to vernacular texts and even to romances like the Lancelot-Grail, a series of volumes describing the romance of Lancelot and Guinevere and the search for the Holy Grail.

Apart from predication, Latin was the language of everyday liturgy, with the growing handicap that the people attending mass did not understand the language. Religious pageants seem to have stemmed directly from an effort to make the Holy Scriptures understandable to the people. Reenactments of scriptural events (called *plays* in English, *jeux* in French, and *Spiele* in German) took place outside the church, encompassing secular and even farcical elements, although most of them preserved a strong religious component. During the 14th and 15th centuries the large mystery plays, which engaged a whole population for several days, were spectacular affairs striving to give a global rendition of scriptural history. Meanwhile, a secular theater emancipated itself from any religious influence: Middle German *Fastnachtspiele* (Carnival plays) were presented during the festival of Carnival preceding Lent but were hardly related to the liturgy. Similarly, French farces, such as *La farce de Maître Pierre Pathelin* (The Farce of Master Pierre Pathelin, ca. 1470), were not even remotely religious.

The so-called legends of the saints were edifying tales that were meant to be read during mealtime in an abbey. The tradition of Latin hagiography continued until the end of the Middle Ages; the most famous example was the huge *Legenda aurea* (Golden Legend) in which the Dominican brother Jacobus de Voragine (1228 or 1230–98) gathered all the hagiographic material pertaining to the saints honored during the Christian year. This ambitious work soon was translated into various vernacular languages. In fact, several of the first vernacular literary texts are religious, such as the *Cantilène de Sainte Eulalie* (The Cantilena of Saint Eulalie), a late-ninth-century biography, and the Old German *Heliand* (Savior), a ninth-century telling of Christ's life. Loosely in the same category are the moralized Bibles, which were commentaries to specific books of the Bible.

Religious and secular literature was not mutually exclusive. The anonymous author of *Pearl*, one of the most famous Arthurian romances in Middle English, also wrote the 14th-century works *Cleanness* and *Patience*, which are prime samples of allegorical musings. Even earlier, in the first half of the 13th century, the French poet Raoul de Houdenc (fl. ca. 1200–30) wrote both *Le songe d'enfer* (The Dream of Hell) an allegorical vision of a pilgrim's journey to hell, and *La vengeance Raguidel* (The Vengeance of Raguidel), an Arthurian verse romance.

HISTORIC LITERATURE

Latin was the language of historiography until at least the 12th century, mainly because those who took it upon themselves to write a chronicle of past or contemporary events were almost always clerics. Some monks painstakingly gave an ac-

count of the entirety of world history starting with the fall of Adam and ending with the dealings of their own abbey and its secular neighbors. (Sometimes the linguistic choice was reinforced by the literary style; while most Latin chronicles are in prose, numerous vernacular chronicles are in verse.)

This tradition was maintained for a long time, from the sixth-century *Historia Francorum* (History of the Franks), by the Frankish bishop Gregory of Tours (538–94), and the eighth-century *Historia ecclesiastica gentis Anglorum* (Ecclesiastical History of the English People), by the theologian known as the Venerable Bede (672 or 673–735), to the 12th-century *Gesta Danorum* (Deeds of the Danes), by the Danish historian Saxo Grammaticus (ca. 1150–after 1216), and the 13th-century *Chronica majora* (Major Chronicles), by the English historian Matthew Paris (d. 1259). Most vernacular chronicles date to the late 13th or 14th century; sometimes, as in the case of the mainly anonymous *Great Chronicles of Saint Denis*, the language begins as Latin but ends in a vernacular (here, French), the turning point happening during the reign of King Philip II (r. 1179–1223) of France. The Holy German Empire boasts a long tradition of vernacular chronicles, from the 12th-century *Kaiserchronik* (The Book of Kings) to the 15th-century *Weltchronik* (World Chronicle, also known as Nuremberg Chronicle) by Hartmann Schedel (1440–1514).

Vernacular chronicles or histories tended to become more secular and to give up offering a summary of the Bible as a foreword to contemporary events. This tendency is especially illustrated by the two *Conquêtes de Constantinople* (Conquests of Constantinople), one by Geoffroi de Villehardouin (ca. 1150–1213), one of the chiefs of the ill-advised Fourth Crusade (1204), and the other by Robert de Clari, one of the knights who went to fight for the freedom of the Holy Land and ended up besieging Constantinople. In effect, the apologetic tone of Villehardouin foretells the “new history” as Philippe de Commines (ca. 1447–1511) later presented it at the end of the 15th century in his *Mémoires* (Memoirs).

ROMANCE AND EPIC LITERATURE

At times it is difficult to identify a work as either history or romance. Perhaps the most famous instance of this ambiguity is found in the *Historia regum Britanniae* (History of the Kings of Britain), by the English bishop Geoffrey of Monmouth (ca. 1100–54). Geoffrey goes back to the Trojan War to introduce the founder of Britain, Brutus, a descendent of the Trojan hero Aeneas; he then proceeds, generation after generation, until he comes to the modern period. In this manner he was the first writer to coherently organize scattered annalistic or legendary material pertaining to the great figure of King Arthur.

His book was greatly successful, though perhaps less as a truthful historical account of past events than as a tool of political propaganda. Two verse translations of his work were written in vernacular languages: the Anglo-Norman *Roman de Brut* (Romance of Brutus, ca. 1155–60) by Wace (ca. 1100–after 1174) and the Middle English *Brut* by Layamon (fl. ca. 1200). Both translations introduce numerous modifications in Geoffrey's storyline, not the least being the invention of King Arthur's legendary Round Table. Wace's octosyllabic text clearly refers to elements of a nonhistorical, perhaps oral tradition concerning King Arthur.

The epic is another genre that may be difficult to distinguish from either a historical work or a romance. Among the first written works of the Middle Ages appear a number of so-called heroic poems that tell of the prowess of some larger-than-life characters and of the wars fought by Christians against enemies of faith. The Middle High German *Nibelungenlied* (Song of the Nibelungs, 12th century) borrows the material of thinly Christianized pagan legends, and the Old Norse sagas tell of seafaring expeditions and feuds between landed families in Norway and Iceland. The Old

English *Beowulf* (ca. 700–1000), however, is more about the fundamental conflict between good and evil, represented by monsters and dragons the civilizing hero must conquer. In their turn, the Old Spanish *Cantar de mio Cid* (Song of the Cid, written down in 1207) and the Old French *Chanson de Roland* (Song of Roland, ca. 1090) offer a polarized vision of the world where Christians are right and pagans are wrong.

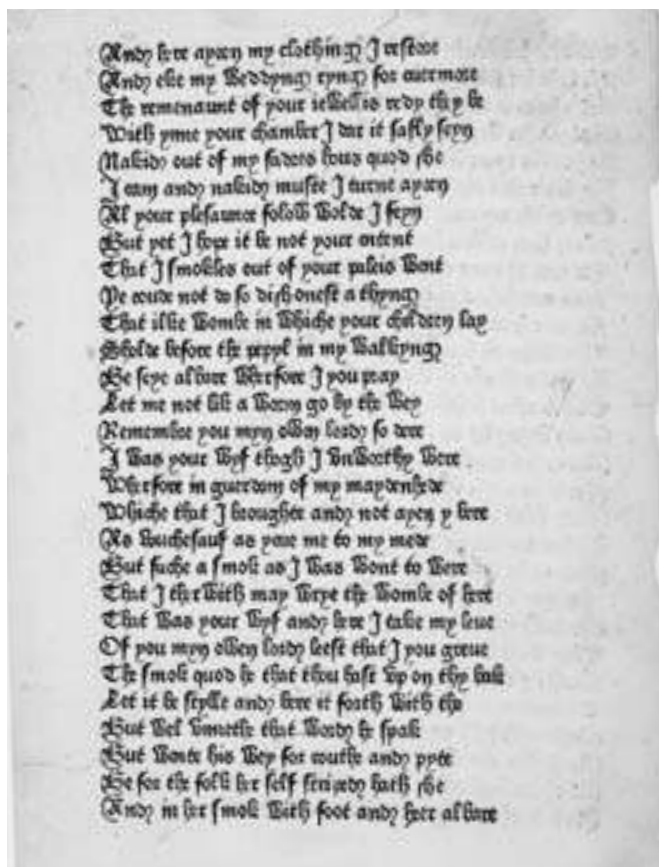
Most of these epics are anonymous; the manuscripts that preserve them represent probably the last stage of a prolonged creative process wherein cantilenas, or songs, were written down either by clerics intent on gathering these testimonies of popular faith or by literate performers interested in building a repertory of works. Little is known about the production, transmission, and performance of these songs. After they were put into writing, however, the individual epics were organized in cycles, or works grouped according to theme, such as the French William of Orange cycle, and evolved toward romance or chronicle.

While most French and Italian epics revolve around the figure of Charlemagne, some focus on more contemporary characters or events. There are some *chansons de geste* (songs or tales about heroic deeds) about the historical Crusades. One, the *Canço de la Crozada* (Song of the Crusade) in Old Provençal, is about the early-13th-century crusade against the Cathar sect in southern France; it was written shortly after the fact by two authors whose perspectives are very different. Although the modern reader would not consider these epics trustworthy sources for historical information, at a later date in the medieval era many of these texts were rewritten in updated language and presented as chronicles.

COURTLY LITERATURE

War songs about great heroes of the Christian faith performing exceptional deeds (*gesta* in Latin) seem to have catered mainly to a male, war-oriented, feudal audience. During the 12th century new ideas from a whole new culture were imported from southern France and Arabic Spain first into northern France and then to England. A few decades later they reached Germany and the northern parts of Europe and eventually spread throughout western Europe and beyond. In many respects, Eleanor of Aquitaine (ca. 1122–1204), the queen of France and then, after her divorce from King Louis VII (r. 1137–80), queen of England as wife to Henry II (r. 1154–89), was instrumental in the diffusion of what came to be called courtly culture.

This culture was indeed found at court, originally among the great lords of Provence and Aquitania and later at the courts of Blois and Champagne, where Eleanor's daughters by her first husband had married powerful counts whose courts rivaled the royal courts in Paris or London. It implemented a new set



A leaf from William Caxton's edition of Geoffrey Chaucer's *Canterbury Tales*, printed at Westminster, Britain, in 1476 (© Museum of London)

of values that were more refined than the feudal ones and often at odds with the teachings of the church. Women were given a more important place in this new system; they were the ladies for whom the knights would accomplish great deeds. In the new game of *fin'amor* ("perfect love," often roughly translated as "courtly love") women were the dominant figures.

Whether *fin'amor* and courtly manners ever were more than a parlor game for the aristocracy is debatable. In literature, however, a large number of texts, probably intended mainly for feminine audiences, develop the tenets of this new ideology. Courtly romance was a very successful genre in the 12th and 13th centuries. It encompassed a number of topics; evolved from verse to prose; included short lays, or ballads, as well as huge narratives; and remained characterized by the association of weaponry and love (*arma et amor*) along with a very un-Christian acknowledgment of adultery or a secret relationship between a lady and her knight.

THE THREE "MATTERS"

In a French polygraph from the late 12th century the poet Jehan Bodel (ca. 1167–1210) identifies three "matters," or main topics, in narrative literature. The "matter of France" describes factual epics about Charlemagne and the Crusades. The "matter of Rome" deals with stories borrowed from antiquity; the writings of the ancient Greek writers Homer (eighth or ninth century B.C.E.) and Virgil (70–19 B.C.E.) are the models of various medieval romances, such as the Old French *Roman d'Eneas* (Romance of Aeneas) and *Roman de Troie* (Romance of Troy) and the Middle High German *Eneit* (Aeneas) by Heinrich von Veldeke (ca. 1145–before 1210). The richest and most famous topic is the "matter of Britain," which regroups stories about fairy lovers (both male and female), the Tristan and Isolde legend, and the Arthurian tales.

Oral tales probably were told first by itinerant minstrels and later evolved into short poems and then romances. The doomed love story of Tristan and Isolde was widely read in the 12th and 13th centuries. Among the many versions are ones in Old French by Bérout and Thomas of Erceidoune (fl. 1220–97) and the anonymous *Prose Tristan*; in Middle High German by Eilhart von Oberge (fl. 12th century) and Gottfried von Strassburg (fl. 1210); in Middle English (*Sir Tristan*); and in Old Norse (*Tristrams saga ok Isöndar*).

The Champenois writer Chrétien de Troyes (fl. 1170) was the first to compose Arthurian romances. He created, as a response to the not-quite-courtly Tristan-and-Isolde story, a new couple of courtly lovers: Lancelot of the Lake and Queen Guinevere, whose love was to become the core of the huge 13th-century *Prose Lancelot*. Chrétien was also the "inventor" of one of the most enigmatic and fascinating literary objects ever created, the Grail, soon to be the Holy Grail. King Ar-

thur, Merlin, and the knights of the Round Table associated with the Grail in huge romance cycles that came to include Tristan and Isolde and even Alexander the Great (356–323 B.C.E.), who was presented as an ancestor to Arthur.

Despite the obviously British origin of the Arthurian material, Arthurian literature was primarily French until the end of the 13th century, when its fashion began to wane on the Continent. With the notable exception of *Parzival*, by Wolfram von Eschenbach (ca. 1170–ca. 1220), Germany showed little interest in King Arthur and his entourage, but the whole story was translated and adapted several times into Middle English during the 14th and 15th centuries. The famous early-14th-century poem *Sir Gawain and the Green Knight* develops an original motive, but Sir Thomas Malory (fl. 1470) gives in his *Morte d'Arthur* (Death of Arthur) the definitive version of the legend that was remembered into the modern period.

The three "matters" do not cover the whole range of narrative texts during the golden age of medieval literature (roughly 1150 to 1470); many romances or short stories, in verse or in prose, cannot be restricted to specific categories. On the comical side, the 13th century brought the development of the *fabliaux*, short texts exploiting sexual and scatological motives and taking the counterpoint to courtly ideals. At the end of the Middle Ages, starting with the Italian *Trecento*, a new fashion appeared: the collection of short stories. These were organized loosely under various headings: *Decameron* (ca. 1349), by Giovanni Boccaccio (1313–75), is one of the first, followed by the *Canterbury Tales* (ca. 1386–1400) of Geoffrey Chaucer (ca. 1342–1400) and the 15th-century Middle French *Cent nouvelles nouvelles* (One Hundred New Tales). This tradition continued deep into the 16th century, and many humanists enjoyed the freedom of familiar conversation among the different narrative voices and the eclectic quality of the material.

POETRY

Latin poetry represents an uninterrupted tradition from ancient to medieval times. Religious poetry was dominant, and love poetry became a minor trend that was associated with other Epicurean themes, such as the pleasures of drinking, gambling, and wandering freely instead of being confined in a cloister. The so-called Goliards were presented as wild monks at odds with church hierarchy, ancestors to numerous bon vivant churchmen satirized in various literary productions of the Renaissance. Conversely, songs of love for and praise of the Virgin Mary represent an important repertory that later influenced the vernacular languages, as in the *Cantigas de Santa Maria* (Songs of the Virgin Mary, ca. 1270–84) of Alfonso X (r. 1252–84), king of Castile and León.

During the first half of the 12th century a new kind of poetry arose in southern France. This reflected the ideology

of courtly love and depicted the poet-singer (*trobador*) as a lover entirely subservient to the whims of his (usually cruel) lady. The *trobadors* developed a sophisticated and refined code of behavior resolutely contrary to the teachings of the church. The love expressed in their songs is of necessity adulterous; it places the woman above her lover and gives her the freedom of choosing whether to yield or to resist his prayers. Even when the would-be lover and poet is in fact one of the most powerful princes of the time, as in the case of William IX (1071–1127), the count of Poitiers and duke of Aquitaine and Gascone, this notion of womanly superiority is maintained. (In a slightly different genre, however, William also composed erotic poems that do not fit in the usual frame of *fin'amor* discourse.)

Trobador poetry is more formal than passionate, although modern readers tend to interpret it as the expression of deep and sincere feelings. This is the case with Bernard de Ventadour (d. ca. 1195), considered the greatest of the *trobadors*, who was instrumental in importing this type of poetry into the northern courts. There the poets were called *troveurs* or, in 13th-century Germany, *Minnesänger* (“love singers”), but the topics and ideology remained the same. Conon de Béthune, Thibaut IV de Champagne (1201–53), Walther von der Vogelweide (ca. 1171–ca. 1230), Ulrich von Lichtenstein (ca. 1200–75), Petrarch (1304–74), and Dante (1265–1321) all sang of the joys and pains of love for a perfect and unattainable lady.

Lyrical poetry did not disappear with these courtly lovers. While the courtly ideology lost favor toward the end of the 13th century, love remained an important poetic topic in, for instance, the works of Guillaume de Machaut (ca. 1300–77). Other trends also appeared and gradually gained prominence. Political and satirical poetry, which had begun in the 12th century with the atypical *trobador* Bertran de Born (d. ca. 1202–15), bloomed during the Hundred Years War (1337–1453). The rise of didactic poetry was facilitated by the separation of music and text as new types of verse, closer to the rhetorical model than to the lyrical one, became fashionable.

At the end of the medieval era the theme of courtly love had vanished, but first-person poetry remained. The supposedly personal confessions of, for instance, François Villon (1431–after 1463) open the door to modern poetry and, despite the formal changes introduced by the Renaissance, stand in perfect continuity to those of 16th-century poets.

THE ISLAMIC WORLD

BY SUHAIL MOHIUL ISLAM

The early authors during the formative period of Islamic thought lived during the era when Arabic was the written language of Islamic culture and literature (seventh century

to 10th century). The new Persian language had just begun to emerge as the language of literature at the end of this period, and Turkish would not appear for a century or so. As for medieval Islamic literature, whether it should be called “medieval” is debated by those who object to the application of European periodization to other cultures, but no other alternative term has yet been suggested. The cultural advancement of Islam began with the collection and translation into Arabic of many of the classical Greek and Roman works.

Islamic literature is subdivided by works in the following main languages: Arabic, Persian, and Turkish. The main languages are quite different from each other. Although Islamic literature is very diverse, it has a coherent thematic unity that is striking and justifies the term *Islamic*. The religious foundation of Islam has contributed to this homogeneity. There are two basic strands in Islamic literature: the classical *adab* literature and the popular “folk” tradition.

THE RANGE OF ISLAMIC LITERATURE

The Muslim influence spread far and wide; it included a diverse mix of peoples, many of whom had preserved their own traditional cultures and languages. Initially, for a long period Arabic was the literary language for many regions of the Islamic world, from Spain to central Asia; as time passed, however, local influences blended with Islamic culture, and native languages came into use. Such was particularly true in Persia and Turkish central Asia, where the Arabic alphabet was adapted to the Persian and Turkic languages.

By the 11th century the northwestern Indian subcontinent and the area that is now Pakistan had become a flashpoint of Islamic literature in the Persian language and, to some extent, in the Turkic languages. Persian retained official language status in Muslim India until it was replaced by English in 1835, while the common language of literature became Urdu, which was mainly derived from Persian sources in its early period.

Another geographic region, central Asia, came under Islamic rule after 711. With the cultural and literary cities of Samarqand, Bukhara, and Fergana, central Asia was the center of Islamic literature and scholarship of the time, much of it in the Arabic language. A substantial portion of the literature of central Asia was also written in the Turkic languages; in later centuries, when the Seljuk and Ottoman Turks conquered much of the Islamic world, their languages displaced Arabic in some regions. After the 14th century, for example, a sophisticated classical Turkish literature took root, highly influenced by Persian diction and poetics.

In Islamic Spain, at the western front, the Muslims created a highly developed culture that reached its zenith in the 10th century and continued to prosper until the Muslims

were defeated by Christian rulers in 15th century. Many of the major Arabic and Islamic works in literature, philosophy, and the sciences reached the academic institutions of medieval Europe through Spain, Cyprus, and Sicily.

PERIODS OF ISLAMIC LITERATURE

Three successive caliphates ruled the Islamic world: the Rashidun ("Rightly Guided" or "Pious") Caliphate (632–61), the Umayyad Caliphate (661–750), and the Abbasid Caliphate (750–1258). In 1258 the Ottoman Turks invaded and sacked Baghdad, the capital city, ending Islamic rule in the eastern section of the empire. However, a weak Abbasid Caliphate survived in Egypt until 1517, while in Spain and the western part of North Africa various factions and dynasties continued to rule until the 15th century.

The Prophet and the Pious Caliphs

After the prophet Muhammad's death the problems of ruling the young Islamic community were immediately complicated by apostasy and military attacks. However, Abu Bakr (ca. 573–634) and his immediate successors, the "pious caliphs," were able not only to consolidate the community but also to expand beyond the Arabian Peninsula into Syria, Mesopotamia, and Egypt. The fourth of the pious caliphs, Ali (r. 656–61), was opposed by Muawiyah, the governor of Syria. In the battle of Siffin, Ali was defeated and was forced to negotiate with Muawiyah. A few years later Ali was murdered; after his death a group, the party of Ali, who believed Ali's descendants to be the rightful rulers of Islam, formed the Shia sect.

Heroic narrative verse was prominent in early Arabic poetry. Owing to the warlike character of ancient Bedouin society, feuding goes back as far as history can record and was so deeply rooted in the tribal structure that Islam was able to keep it under control only during the era of the Prophet and the four pious caliphs.

In the context of Islamic literature the Koran (the recitation) must be analyzed both as a work of art and as religious scripture. In fact, the two aspects overlap and complement each other. Therefore, the first fact of Islam is the Koran. It declares itself to be the word of God and its authenticity to rest on the matchless eloquence of its language, classical Arabic. The risk of losing this language, felt by Muslims who mixed with conquered peoples, gave impetus to literary and philological studies. There was a massive effort to collect and record the language of the Arabs and what they still remembered of the pre-Islamic prose and poetry of the ancients. The reason for this effort was to preserve and practice using the classical language in order to understand the sacred scripture.

To Muslims, the Koran is not an ordinary book; it is considered to have been revealed to the prophet Muhammad by the angel Gabriel (called Jibrail) during the last 23 years of the Prophet's life; however, it came down in totality on the so-called night of power (Laylat al-Qadr). The revelations came in rhymed prose style (*saj*), and they are regarded as God's words, the message, the one of the *Umm al-kitab*, the prototype of all revealed books kept near God's throne. The Koran is clear regarding humanity's exceptional worth and teaches *bayan* (eloquence): The word *bayan*, applied only to God and to human beings as taught by God, is not an attribute of any other creature, not even of the angels. The words of the Koran are not Gabriel's or Muhammad's but are God's, given to help Muslims organize their lives for their good here and hereafter and for the benefit of other human beings.

Historically, the Koran is divided into two sets of chapters, or suras. The Meccan suras, which were revealed to Muhammad before the Hegira (the Prophet's migration to Medina), are short, strong, and full of hope for reward and warnings of punishment, dealing mainly with love, faith, loss of faith, misery, and the essence of God and his attributes, very rarely giving details about life in this world. The Medinite suras, on the other hand, are longer and cover all aspects of human life on this earth. After establishing a community based on religious, spiritual, and moral principles, Muhammad needed direction from God as to how to organize the lives of the people in a comprehensive Islamic state and system. Muslims believe that there cannot be two separate aspects of life, one secular and the other religious, as divine guidance from the Koran integrates the two parts into unity.

Muslims believe that the instructions in the Koran come directly from God, and any additional instructions from the prophet Muhammad were termed Sunna, the way of the Prophet. For example, the command to pray and the times for prayer are stipulated in the Koran, but the prayer positions are not. Muslims believe that the prayer positions were taught to Muhammad by the angel Gabriel and that the Prophet passed them on to his companions. The prayer positions, then, come from the Prophet's Sunna, not from the Koran.

The Sunna can be learned from two sources: the Hadith collections and the *Sirah* (a biography of the Prophet). The most important was the Hadith, the record of the sayings and deeds of Muhammad through *isnad* (the chain of supporting authorities). The death of the spiritual and political leader within a few decades made it necessary to preserve all of Muhammad's words and actions, since they were believed to have been inspired. The Hadith collections are the original source of the Sunna, though they contain not only the Prophet's sayings but also reports about his practices and the practices of his close companions (*Sahabas*). By the ninth

century the Hadith had been solidified into a body of material to which no new traditions were added. Today the Hadith is revered as a major source of religious law and moral guidance, second only to the Koran.

The other source of Sunna is the *Sirat un-nabi* (biography of the Prophet), in which scholars started to gather together all of the information available about the Prophet's life. The *Sirat un-nabi*, of Muhammad ibn Ishaq (ca. 704–67), apart from being the earliest-surviving full biography of the Prophet and the earliest-existing history of Islam, also contains the stylistic influences of pre-Islamic literature. However, ibn-Ishaq's work and, to some extent, Ibn Hisham's abridged life of Muhammad give us historical circumstances of the Prophet's birth and early years. Ibn Ishaq also tells of miraculous signs and events connected with Muhammad's birth and childhood, such as trees bowing down to him and the Christian monk Bahirah's recognizing signs of prophethood in Muhammad.

Another collection that was begun at the same time consists of the sayings of Ali, Muhammad's son-in-law and the fourth caliph, whose followers later established a major division in Islam, Shia. Finally compiled in the 10th century, the collection is called the *Nahj al-balaghah* (Road of Eloquence). It is a masterpiece of Arabic prose that has inspired numerous commentaries and imitations in other languages.

The Umayyad Caliphate

After the death of the pious caliphs, Muawiyah (r. 661–80) assumed the caliphate, and his victory was significant as it established into power the prophet Muhammad's family, who were relatively late in accepting Islam. It also marked the beginning of the hereditary caliphate and moved the capital to Damascus, Syria. Most of the classical forms of Islamic literature originated during this period. Initially, the passion was for collecting and editing poetry from the oral tradition; together with the Koran this literature represented the classical, or "old style," strand in early Islamic literature. The enormous corpus of pre-Islamic poems associated with feuding and battles is almost entirely of the "heroic" type, in which the recurrent themes are the perseverance of the poet-hero, his defense of his tribe's reputation and his own prestige, and his fight for a worthy cause.

With the advent of Islam, the hero's adversaries are not just from hostile tribes but in fact become national enemies. From this perspective, *maghazi* poetry (about the Prophet's military expeditions of 623–30) is dominated by narrative impulses, as is *futuh* poetry (about Islamic conquests of 633–62). The wars against the powerful Byzantines and Persians, the efforts of Muslims to spread Islam, and the intermingling in the conquered lands of converts from vastly different cul-

tures supplied rich material for fascinating stories. The legends associated with Muslim heroes like al-Qaqa b. Amr, Abu Mihjan al-Thaqafi, and Amr b. Madikarib reveal the fantastic elements in the adventures of these poets.

The other major theme of epic poetry, worldly love, is also common in pre-Islamic poetry, especially in the works of Imru al-Qays (d. ca. 550) and al-Asha (before 570–ca. 625). The social and economic developments of the Umayyad Period helped foster and popularize the worldly love poetic genre of *ghazal*, or ode. The wealth resulting from the Arab conquests provided an easy and leisurely life for the people of the Arabian Peninsula. Wealthy and well-bred and living in opulence, security, and ease, most of the Arabian poets devoted their lives to wine, music, and flirtation.

A remarkable poet from Mecca, Umar ibn Abi Rabiah (644–712 or 719), was unquestionably the most illustrious love poet of his time. His youth, good looks, and wealth endowed him with the reputation of being a lady-killer, a breaker of hearts, a seducer whom no beautiful woman could resist. The various themes that Umar develops are more or less the stylized narration of real events. He contributed to the development of the *ghazal*, a love lyric consisting of five to 12 verses that probably originated as an elaboration of the *qasida*'s opening section (a *qasida* being an elaborate ode). His poems sing of amorous adventures with the ladies who came to Mecca on pilgrimage. Using the same literary form, one of the last Umayyads, al-Walid (r. 705–15), gained a greater reputation as a poet than as a warrior. His poetry is characterized by frivolous love verses and odes praising the virtues of wine.

In Medina the vogue was highly idealized love poetry akin to the chivalric romances of medieval Europe. This genre was invented by Jamil (d. 701), who sings of lovers who become martyrs, dying in their total surrender to the force of true love.

The political unrest, the civil wars, and the development of sectarian rivalries gave rise to the *naqaid* ("poetic slander"), a form of poetry that became a favorite genre for expression of the divergent points of view. The three eminent poets of the Umayyad Period were all polemicists who used their verses to support or attack various political groups.

The *naqaid* was used by Jarir (ca. 650–ca. 729), Tammam ibn Ghalib Abu Firas (al-Farazdaq; ca. 641–ca. 730), and al-Akhtal (ca. 640–710), a Christian, who was a strenuous supporter of the policies of the first Umayyad, Muawiyah I. Jarir and al-Farazdaq were active at the courts of the Umayyad caliph Abd al-Malik (r. 685–705), still keenly aware of pre-Islamic tribal feuds and of the prowess of their ancestors. Jarir and al-Farazdaq, however, were enemies, and they delighted rival tribesmen with their biting satires against each other.

The work of these two poets has furnished historians with a rich vein of material on the social and political climate of Islam during the early eighth century. They used the traditional *qasida* form, an elaborately structured ode consisting of 20 to 100 verses, which maintains a single end rhyme throughout the entire piece to great effect, incorporating a wealth of vocabulary and imagination.

The Abbasid Caliphate

Although the Umayyads ruled ably enough initially, the caliphate survived for a very short 90-year period. During the early part of eighth century opposition to their rule mounted; Shiites were opposed to them from the very outset, and others accused them of worldliness and incompetence. By contrast, the Abbasid Caliphate ruled for more than five centuries. The Abbasid caliphs proclaimed the end of worldly and secular Arab rule and the beginning of a religious and pan-Islamic state. During the Abbasid Caliphate, led by Caliph al-Mansur (r. 754–75), with the capital at Baghdad, the flowering of Islamic literature began. The reign of al-Mansur's grandson, the fabled Harun ar-Rashid (r. 786–809), came to be regarded by later generations as the golden age of Islam. In Iraq all of the cultural currents of the ancient Near East, especially Persia, came together, adapting and reworking elements from all of the earlier cultures.

The most original development of the early Abbasid Caliphate was the emergence of the “new style” in Arabic poetry to accommodate the realities of court patronage, the religious spirit fostered by the state, the needs of the administrative secretaries, changes in socioeconomic conditions, and contact with other cultures, such as Persian and Turkish societies. The “new style,” in contrast to the “old style,” was distinguished by the use of novel similes, an innovative and bold approach to eulogy and satire, lucidity of style, and avoidance of strange words and ornamental padding. More artful prose was fostered by translations into Arabic of outstanding foreign literary works, a growing desire for systematic accounts of early Islamic times, and the more sophisticated cross-fertilization of taste and style with Persian and central Asian Muslims. To serve the tastes of a new courtly culture in which skill in Arabic literature was highly esteemed, the form known as *adab* was developed. It was a highly mannered, anecdotal, very didactic, and vastly entertaining form, aimed at instilling a pattern of cultivated living. Al-Jahiz (ca. 776–868 or 869) is usually credited with having established it in its paradigm form; its influence spread all over the Islamic world, affecting all forms of Islamic prose.

Al-Jahiz of Basra wrote treatises raising Arabic prose to heights of elegance and sophistication. The *Kitab al-bayan wa al-tabyin* (Elegance of Expression and Clarity of Ex-



The Persian epic hero Rustam; stone paste painted with enamel, Iran, 12th century (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1911-319)

position) deals with literary style and the effective use of language, known as *adab* literature. As a founder of *adab* literature, al-Jahiz experimented with various styles and genres. His *Kitab al-bukhala* (Book of Misers) is a collection of stories about the avaricious. Although he was an intellectual free spirit, al-Jahiz supports government policy in his “Manaqib at-turk” (“Exploits of the Turks”), an essay on the military qualities of Turkish soldiers, upon whose strength the government depended. His *Kitab al-hayawan* (Book of Animals) is a mine of information on Arab proverbs, superstitions, and traditions.

The major poets of the Abbasid Caliphate were Abu Nuwas (ca. 747 to 762–813 to 815), al-Mutanabbi (915–65), and al-Maarri (973–1057). The greatest of these was Abu Nuwas, a boon companion of Harun ar-Rashid and of half-Persian origin, who had an incomparable command of language and imagery. Abu Nawas's witty, cynical verses and delightful drinking songs scandalized the religious and ascetic Muslims, however. Close contacts with the high life of aristocracy provided Abu Nawas with the motifs of the poetry for which he is most renowned. He also composed poems with traditional themes of love, satire, and the chase, and he even composed religious poetry.

Al-Mutanabbi, one of the greatest Arab poets, took the panegyric form to its perfection. He was the main poet patronized in the Hamdanid court and followed the mainstream tradition of classical *qasida* poets, but his work surpasses that of his predecessors in imagination. Al-Mutanabbi did not follow the poetics of the “new poets”; rather, he went back to the

older meters and forced them to bend to his art. His compositions are noted for their exaggeration, sound effects, and formal perfection. Many of the poems are addressed to Sayf ad-Dawlah (916–67), the ruler of Aleppo, whose friendship al-Mutanabbi enjoyed for a decade and whom he eulogized in brilliant verses.

By contrast, almost two centuries later al-Maarri (973–1057), orphaned and blinded in his childhood, was deeply religious, disturbed by the shallowness of worldly life and the uncertainties of time. The dominant theme of his poetry is the expression of his philosophical ideas about his own faith and other religions in which pessimism, asceticism, and fatalism are the main traits. Although al-Maarri's poems are cynical and sad, they do not equal the cynicism of Abu Nuwas. One can detect, mostly in al-Maarri's talk of love, dogged traces of a faith and hope in justice for humanity.

During the reign of the Abbasids literary prose also began to develop. Writers were consumed by an insatiable curiosity for all kinds of knowledge, a curiosity that led them to compile and translate scholarly and philosophical works from other cultures. Ibn al-Muqaffa (d. ca. 756), a Persian, translated Persian works into Arabic, the most notable of which is the famous book *Kalilah wa Dimnah* (Kalilah and Dimnah), a collection of fables, folktales, and legends derived from the Sanskrit fables of Bidpai, an Indian sage. These stories provided Islamic culture with a seemingly inexhaustible fund of tales and parables from the animal world, comparable in some respects to the fables of Aesop and Jataka. Al-Muqaffa also introduced into Arabic the Persian *Shahnameh* (Book of Kings), a type of pre-Islamic mythology that sophisticated Muslims preferred to the rather meager accounts of the Arab pagan past. Al-Muqaffa's translations of writings on ethics and the conduct of government are the prototype of the "Mirror for Princes" literature that flourished during the late Middle Ages in both Iran and the West.

The rhetorical style of rhymed prose (*saj*) found its best expression in the *maqamah*, a literary term usually translated as "assemblies" or "séances." The twin strains of Arabic folk literature and the more sophisticated *adab* never came closer to fusion than they did in this genre. Full of wit and learned allusions, the *maqamahs* presuppose a knowledgeable audience that can appreciate them. This art form was invented by al-Hamadani (969–1008) in his *Maqamat*, in which the leading character is Abul Fath of Alexandria, the wandering Muslim scholar.

The greatest writer in *maqamah* form, however, was al-Hariri (1054–1122) of Basra, whose 50 *maqamahs* are closer to the Western notion of the short story than anything else in classical Islamic literature. Clearly imitations of al-Hamad-

hani's works from the century before, they decidedly surpass the works of their predecessor in skill and virtuosity.

SPAIN AND NORTH AFRICA

The processes by which the Islamic caliphate disintegrated into many separate states were diverse and complex. In two areas decentralized rules were established. The first of them was in Fatimid Shiite Egypt; the second was in Spain, where a lone survivor of the Umayyad Dynasty and his successors had established a respectable empire. The caliphate proper lasted from 929 to 1031, although Islamic power in Spain lasted for several more centuries. Despite being at the far end of Islamic hub, Spain experienced a simultaneous flourishing of literature during its Muslim period, one that prospered under its own Umayyad Caliphate. The culture of Muslim Spain contains some of the greatest names in Islamic literature. Outstanding in the discipline of philosophy were Ibn Hazm (994–1064), Ibn Sina (980–1037), Ibn Tufayl (d. 1185 or 1186), Ibn Rushd (1126–98), and al-Ghazali (1058–1111).

The theologian Ibn Hazm was called the greatest scholar and the most original thinker of Islamic Spain. He drew upon personal experiences to compose his *Tauq al-Hamama* (The Ring of the Dove), a prose work, interspersed with poetry, on pure love. Apart from being a perfect example of highly developed Arabic *adab*, it is considered a frank treatment of romantic love in addition to being the author's anthology of amatory poems.

The brilliant work of Ibn Sina in philosophy, science, and medicine was highly regarded in the rest of Europe. Ibn Sina also wrote a philosophical allegory in *Hayy ibn yaqzan* (The Living One, the Son of the Awaker). Ibn Sina portrays Hayy as the symbol of the eternal sage, at once youthful and old, seeker and guide. In the latter capacity, Hayy discourses with the author and his companions on the knowledge he has gathered and reveals to them its esoteric meaning.

Ibn Tufayl, a physician and a philosopher, was born near Granada. Ibn Tufayl's *Hayy ibn yaqzan* differs from Ibn Sina's work in character as well as in concept. Ibn Tufayl's Hayy is himself the self-taught seeker of wisdom who was washed to a remote island and raised by a doe; he reasons methodically toward an ordered cosmology and eventually a philosophical recognition of God, a far cry from Ibn Sina's Hayy, who is a sage guiding the ignorant through his immense knowledge and wisdom.

Ibn Rushd, court physician of the Berber kings at Marakech in Morocco, was the Arab translator and commentator on Aristotle whose work helped to lay the foundation of medieval Christian theology and scholasticism in Europe. Ibn Rushd was also famous for writing an attack on the Islamic mystic al-Ghazali, whose *Tahafut al-falasifa*

THE INCOMPARABLE IBN HAZM

Ali ibn Ahmad ibn Saeed ibn Hazm was born to a wealthy family in Córdoba in al-Andalus. His family claimed descent from Persians who had served in Islamic governments early in Islamic history, but it is possible that this pedigree was an invention, with ibn Hazm's family having Iberian Christian ancestors who converted to Islam. His father and grandfather held positions in the court of the Umayyad caliph of al-Andalus. Ibn Hazm's early teachers were women family members who conveyed to him the basic principles of rational thought and literary technique and helped him memorize the Koran. He eventually studied under Abu al-Hasan ibn Ali al-Fasi, a scholar who emphasized piety in his thinking.

Ibn Hazm lived during the period of the breakup of al-Andalus. His father was arrested by opponents of the Umayyads, and some of his wealth was confiscated by his enemies. When one of the Umayyads, Abd al-Rahman ibn Muhammad, tried to claim the throne, ibn Hazm joined him at Valencia. Abd al-Rahman was defeated in battle and ibn Hazm was captured and imprisoned until he was 25. The Umayyad princes Abd al-Rahman ibn Hisham and then Hisham ibn Muhammad gained control of Córdoba, and ibn Hazm served in their governments, rising to the rank of vizier. Hisham ibn Muhammad was toppled from power in 1031, ending the Umayyad line. Ibn Hazm's enemies confiscated much of his wealth, although he retained ownership of farmland and enough money to live comfortably.

He moved to Majorca, whose governor, Ahmad ibn Rasheeq, was a friend, but the governor died in about 1048, and ibn Hazm's enemies, both scholars and political opponents, chased him away. He then settled in Seville, where he had a difficult relationship with the governor, al-Mu'tadhid ibn Abbad, who claimed to rule by the authority of Hisham. When ibn Hazm said this claim was nonsense, the governor had ibn Hazm's books burned. During this period, ibn Hazm's writing became ever-more bitter.

He moved to his farm in Córdoba, where many students came to study Islamic law, philosophy, and literature with him. He was much admired for his strong will, exceptional scholarship, and brilliant literary style. Many in his time and since have disparaged him for the harsh criticisms in his writings about rival thinkers, but he was friendly and good humored.

(*Incoherence of the Philosophers*) is directed against Muslim theologians and their attempts at saving religious beliefs by casuistry and dialectics. The work elicited from Ibn Rushd the counter treatise *Tahafut al-tahafut* (*The Incoherence of the Incoherence*). Al-Ghazali, however, has a well-deserved reputation as the most influential of the mystic writers; his chief work is *Ihya ulum al-din* (*The Revival of the Religious Sciences*), which establishes his system of harmony between mysticism and theology.

Known to his disciples as a great master, the prominent mystic Ibn al-Arabi (1165–1240) was educated in the Spanish tradition but wrote poetry and prose that shaped large parts of Islamic thought for centuries afterward. His chief work is *al-Futuhat al-Makkiyah* (*The Meccan Revelations*), which establishes a complete system of Sufism based on his mystical experience. He also wrote a volume of love poems entitled *Diwan* (*The Interpreter of Desires*), in which he pours the sacred mysteries of “love” into profane phrases but in an esoteric sense, as symbols of spiritual experience; wisdom is the true object of his quest.

Perhaps the greatest world traveler of his time was Ibn Battuta (1304–68 or 69), a native of North Africa who explored the Far East, India, Sri Lanka, the Maldives Islands, and the region of the Niger in Africa. In all, it is estimated that he traveled and visited nearly every Muslim country. His *al-Rihlah* (*Travels*), written in about 1353, is filled with information about the cultural state of the Muslim world of his time. The account of travel is vivid, full of his personal experiences, which included contacts with high-ranking personalities in the countries he visited; these officials used Ibn Battuta as an emissary to other dignitaries and as a representative of foreign courts, as he used them to further his own travel plans.

The Tunisian Ibn Khaldun (1332–1406) was one of the great social scientists of all time. His original interpretations of historical phenomena from a sociological perspective won him the title “father of sociology.” Ibn Khaldun's masterpiece, *al-Muqaddimah* (*Introduction*), is filled with brilliant observations on the writing of history, economics, politics, and education—the nature of human history itself. It is the lengthy introductory discourse, rather than the history itself, that has earned him a place among the greatest thinkers of all time. His treatment of historical method has been judged brilliantly insightful along with his original and unique explanatory concept of *asabiyyah*, or group solidarity, in the formation of civilization.

Islamic Spain also produced outstanding poetry and two poetic forms in particular, *muwashshah* and *zazal*, which are based on refrain and are meant to be sung. The subjects include pleasures and sorrows of the days, love, friendship,

revelry, flora and fauna, and above all the land itself, al-Andalus. These poetic forms significantly influenced European romance vernacular lyrics. Among the foremost of Moorish poets were Ibn Zaydun (d. 1071), Ibn Guzman (ca. 1078–1160), Ibn Hazm, and al-Tutuli (d. 1126).

THE PERSIAN AND CENTRAL ASIAN INFLUENCE

During the Abbasid Caliphate a great Persian literature emerged, some of it in Arabic. Of the large number of Persian authors in this period, the most significant were Firdawsi (ca. 935–ca. 1020 or 1026), Awhad ad-Din Ali (known as Anvari; ca. 1126–ca. 1189), al-Biruni (973–1048), Omar Khayyam (ca. 1048–ca. 1131), Jalal ad-Din ar-Rumi (ca. 1207–73), Saadi (ca. 1213–92), and Amir Khusrau Dihlavi (1253–1325).

In the early era of Persian Islamic literature the greatest achievement was a long poem of Firdawsi. The poem was begun by an earlier obscure poet, ad-Da'iqi (d. ca. 976–81), and after his death Firdawsi finished his work, which contains more than 60,000 couplets. The most important aspect of his nationalist epic was that Firdawsi deliberately tried to use Persian words and avoid the Arabic vocabulary. The subject of *Shahnameh* is the history of Iran, its heroes and glory, from legendary times to the Sassanian kings. In content it is not an Islamic work, as it documents the history of warfare between the Iraj (Persians) and the Tur (Turks) from the Pahlavi historical sources of the early kings.

Anvari was the most accomplished writer of panegyrics, or formal eulogies, using the *qasida* form of poetry. His eulogy “Tears of Khorasan” mourns the glorious past of the Seljuk Turks. With an encyclopedic mind and bilingual in Arabic and Persian, Anvari was also skilled in music, philosophy, and the natural sciences. Besides excelling in the art of the *qasida* poetry, he used the genres *ghazal*, *robai*, and *masnavi* with virtuosity.

The most original scholar of medieval Islam, al-Biruni, was conversant in Hebrew, Turkish, Sanskrit, Persian, and Syriac in addition to Arabic. He, too, had an encyclopedic mind and accompanied Sultan Mahmud of Ghazna (r. 997–1030) to India, where he learned Sanskrit and studied Indian sciences and literature. His most famous works are *al-Athar al-baqiya* (Chronology of Ancient Nations) and *Tarikh al-Hind* (A History of India); these works are penetrating, with detailed descriptions, and are remarkable for their objectivity. Al-Biruni also wrote books on topics of scientific interest, including astrology, mathematics, and astronomy.

Another scientist and mathematician, Omar Khayyam, became famous in the West for his *Rubaiyat* quatrains, a series of independent epigrammatic stanzas conveying a philosophy of skepticism—defiant yet compassionate and not totally hopeless. Each quatrain is an independent poem but

is related to the others by the recurrence of common themes. Omar Khayyam's authorship of the *Rubaiyat* has been questioned. Some critics have suggested that his quatrains may have been written as pithy summaries of his lectures on science and philosophy, but it is really impossible to ascertain which of the hundreds of quatrains attributed to him are his own. In the East he is still known more as an astronomer and a mathematician than as a writer.

Farid od-Din Attar (ca. 1142–ca. 1220), born in Neyshabur, was a Sufi master who wrote much concerning the spiritual quest for God. His masterpiece, *Mantiq al-tayr* (The Parliament of Bird), is of humanity's spiritual and mystic journey toward union with God. The main plot is well structured but is interspersed with random subsidiary tales.

Jalal al-Din, widely known as Rumi, was the best-known writer of mystical poetry in the *masnavi* style and founder of the Mevlevi order of Sufis (the twirling or dancing dervishes). His finest work is known simply as the *Masnavi-i manawi* (Spiritual Couplets). In about 27,000 verse couplets Rumi provides an exposition of the basic ideas of Sufism, or Islamic mysticism, using fables, stories, and reflections cast in the highly poetic language of *ghazal* odes and *rubais* quatrains. Many Sufis (Islamic mystics) regard the *Masnavi* as second in importance only to the Koran. Rumi was also the author of love lyrics that surpass in beauty even the tales in his *Masnavi*.

Nezami (ca. 1141–1203 or 1217), Persian poet of the romantic epic, was born in Azerbaijan. Nezami, though not a Sufi, was a pious and tolerant Muslim. A man of wide learning, Nezami is famous for five epic poems, written in a highly allusive style abounding in metonymy (substituting an attribute for the thing itself). The most popular one in the Muslim world is the epic romance *Majnun layla* (Layla and Majnun), a Bedouin love story. Nezami established the *masnavi* as a form for long and continuous narrative, thereby setting a pattern that had a long-lasting influence.

A poet and popular moralist, Saadi was one of the greatest figures in classical Persian literature. Born in Shiraz and orphaned at an early age, he took to a wandering life, visiting central Asia, Syria, Egypt, and India and making a pilgrimage to Mecca. He was also taken prisoner during one of the Crusades. Shortly after returning to Shiraz, he dedicated to the local ruler his collected poems, *Bustan* (The Orchard), consisting of dissertations on justice, good government, earthly and mystic love, humility, contentment, and other themes. In sum, *Bustan* consists of stories illustrating the virtues that Muslims are supposed to possess. Saadi's other masterpiece, *Gulistan* (The Rose Garden), is a collection of gnomic anecdotes written in rhyming prose with verse passages; the work consists mainly of prose interspersed with short poems and contains advice, aphorisms, and humorous reflections. Saadi

was also a prolific writer of occasional verse—panegyrics, elegies, and particularly *ghazals*.

Amir Khusrau Dihlavi was one of India's most significant Persian-language poets and wrote panegyrics of the sultans of Delhi. His best work, *Khamasa* (Pentology), heavily influenced by ancient Persian literary tradition, is a collection of five long idylls in *masnavi* form and deals with broad themes of Islamic literature.

By the time of Amir Khusrau's death in 1325, the Abbasid Caliphate had disintegrated. The golden age of Islamic literature gave way to regional literatures of Persia, central Asia, India, and North Africa. During the first century of the period a number of great works were produced; among them were the *Sirat Antar ibn shaddad* (*The Romance of Antar*), the *ghazals* of Hafez (1325 or 1326–89 or 90), and *Alf laylah wa laylah* (*The Thousand and One Nights*). Islamic literature was not confined to the highly sophisticated, erudite, and witty *adab* literature of the court or the profoundly mystical works of the Sufis; there also arose a wide body of popular literature collected mostly from anonymous sources.

The *Romance of Antar* is a widely popular anonymous work in Arabic literature, attributed to many authors, including al-Asmai (ca. 740–828), a philologist. It is a work of pure romance, idealizing the Arab chivalry of the pre-Islamic era. The protagonist is a pre-Islamic poet, Antarah, who glorifies the Arab past of tribal wars and heroic deeds through his poetry and exploits. Most probably written and compiled in the 13th century, this work was the first attempt at constructing a national epic of the Arabs and their desert paternity.

The most prominent poet of this time was Hafez. Born in Shiraz of poor parentage, Hafez is considered the greatest lyric poet of Islamic Iran and the foremost writer of *ghazal*, the form he perfected. His pseudonym suggests that he had learned the Koran by heart. His works consist almost entirely of about 500 *ghazals*, or short lyrics, on the conventional themes of love and wine. The poems project at once the sweetness of the joys of this world and its shortcomings. However,

they have traditionally been interpreted as mystical Sufi allegories, but many critics argue that Hafez was not a true Sufi and that the “beloved” of the love poems stands for a human beauty or a princely patron rather than God. If there is anything divine, it must be found in the very human dimension of it. Hafez's *Divan* (collected works) is a symbolic rather than an allegorical expression of human condition, caught between yearning for God and limits of this world.

The most popular work of Islamic literature during this period, *The Thousand and One Nights*, is only partly Arab in origin, and the romances woven into it are from all cultures and civilizations of the Islamic world, mainly from Indian sources but translated into Persian as *Hazar afsana* (A Thousand Tales) and then into Arabic. Many of the tales come from India and were later expanded to include tales and anecdotes from Harun ar-Rashid's (r. 786–809) court in Baghdad. The collection was further expanded during the Mamluk Period in Egypt to include stories of rogues, tricksters, and tramps, mainly from the lower strata of society. Individual stories, such as the Sindbad cycle and the Aladdin narratives, were also added. Although it is a frame tale, much like *Kalila wa Dumna*, snatches of verse are interspersed into the prose narrative, as in many types of Arabic literature, without much relevance. There was no standard text of the work until the 15th century. The work is written mostly in simple Arabic with significant traces of the colloquial Egyptian Arabic, contrasting starkly with the complicated idiom and style of the acknowledged masters of verse prose of *adab* literature in classical Arabic.

See also ASTRONOMY; CALENDARS AND CLOCKS; DRAMA AND THEATER; EDUCATION; EMPIRES AND DYNASTIES; FAMILY; FESTIVALS; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; LANGUAGE; MIGRATION AND POPULATION MOVEMENTS; MUSIC AND MUSICAL INSTRUMENTS; NATURAL DISASTERS; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SOCIAL ORGANIZATION; WAR AND CONQUEST; WRITING.

Africa

“Why the Bat Flies by Night” (undated)

A bush rat called Oyot was a great friend of Emiong, the bat; they always fed together, but the bat was jealous of the bush rat. When the bat cooked the food it was always very good, and the bush rat said, “How is it that when you make the soup it is so tasty?”

The bat replied, “I always boil myself in the water, and my flesh is so sweet that the soup is good.”

He then told the bush rat that he would show him how it was done; so he got a pot of warm water, which he told

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the bush rat was boiling water, and jumped into it, and very shortly afterwards came out again. When the soup was brought it was as strong and good as usual, as the bat had prepared it beforehand.

The bush rat then went home and told his wife that he was going to make good soup like the bat's. He therefore told her to boil some water, which she did. Then, when his wife was not looking, he jumped into the pot and was very soon dead.

When his wife looked into the pot and saw the dead body of her husband boiling, she was very angry and reported the matter to the king, who gave orders that the bat should be made a prisoner. Every one turned out to catch the bat, but as he expected trouble he flew away into the bush and hid himself. All day long the people tried to catch him, so he had to change his habits and only came out to feed when it was dark, and that is why you never see a bat in the daytime.

From: Elphinstone Dayrell, *Folk Stories from Southern Nigeria, West Africa* (London: Longmans, Green and Co., 1910).

Africa

~ "Elephant and Tortoise" (undated) ~

Two powers, Elephant and Rain, had a dispute. Elephant said, "If you say that you nourish me, in what way is it that you do so?" Rain answered, "If you say that I do not nourish you, when I go away, will you not die?" And Rain then departed.

Elephant said, "Vulture! cast lots to make rain for me."

Vulture said, "I will not cast lots."

Then Elephant said to Crow, "Cast lots! who answered, "Give the things with which I may cast lots." Crow cast lots and rain fell. It rained at the lagoons, but they dried up, and only one lagoon remained.

Elephant went a-hunting. There was, however, Tortoise, to whom Elephant said, "Tortoise, remain at the water!" Thus Tortoise was left behind when Elephant went a-hunting.

There came Giraffe, and said to Tortoise, "Give me water!" Tortoise answered, "The water belongs to Elephant."

There came Zebra, who said to Tortoise, "Give me water!" Tortoise answered, "The water belongs to Elephant."

There came Gemsbok and said to Tortoise, "Give me water!" Tortoise answered, "The water belongs to Elephant."

There came Wildebeest, and said, "Give me water!" Tortoise said, "The water belongs to Elephant."

There came Roodebok, and said to Tortoise, "Give me water!" Tortoise answered, "The water belongs to Elephant."

There came Springbok, and said to Tortoise, "Give me water!" Tortoise said, "The water belongs to Elephant."

There came Jackal, and said to Tortoise, "Give me water!" Tortoise said, "The water belongs to Elephant."

There came Lion, and said, "Little Tortoise, give me water!" When little Tortoise was about to say something, Lion got hold of him and beat him; Lion drank of the water, and since then the animals drink water.

When Elephant came back from the hunting, he said, "Little Tortoise, is there water?" Tortoise answered, "The animals have drunk the water." Elephant asked, "Little Tortoise, shall I chew you or swallow you down?" Little Tortoise said, "Swallow me, if you please!" and Elephant swallowed him whole.

After Elephant had swallowed Little Tortoise, and he had entered his body, he tore off his liver, heart, and kidneys. Elephant said, "Little Tortoise, you kill me."

So Elephant died; but little Tortoise came out of his dead body, and went wherever he liked.

From: James A. Honeŷ, *South-African Folk-Tales* (New York: Baker and Taylor Co., 1910).

The Americas

~ “*The Myth of Quetzalcoatl*” (undated) ~

In Tollan dwelt Quetzalcoatl. And in Tollan all the arts and crafts that we know of were first practised, for Quetzalcoatl taught them to the people there. He taught them the smelting of silver and the clearing and setting of precious stones; he taught the craft of building with stones; he taught them how to make statues, and paint signs in books, and keep count of the moons and suns. All crafts except the craft of war Quetzalcoatl taught the people of Tollan. And they made sacrifice to him with bread, and flowers, and perfumes, and not as other peoples made sacrifice to the other gods—by tearing the hearts out of the opened breasts of men and women.

He lived in a house that was made of silver. Four chambers that house had: the chamber to the east was of gold, the chamber to the west was set with stones of precious green—emeralds and turquoises and nephrite stones—the chamber to the south was set with coloured sea-shells, and the chamber to the north was set with jasper. The house was thatched with the feathers of bright-plumaged birds. All the birds of rich plumage and sweet song were gathered in that place. In the fields the maize grew so big that a man could not carry more than one stalk in his arms; pumpkins were great in their round as a man is high; cotton grew in the fields red and yellow, blue, and black, and white, and men did not have to dye it. All who lived where Quetzalcoatl was had everything to make them prosperous and happy.

There was a time when they did not have maize, when they lived upon roots and on what they gained in the chase. Maize there was, but it was hidden within a mountain, and no one could come to where it was. Different gods had tried to rend the mountain apart that they might come to where the maize was; but this could not be done. Then Quetzalcoatl took the form of a black ant; with a red ant to guide him he went within the mountain Tonacatepetl, and he came to where the maize was: he took the grain, and laboriously he bore it back to men. Then men planted fields with maize; they had crops for the first time; they built cities, and they lived settled lives, and Quetzalcoatl showed them all the crafts that they could learn from him. They honoured

him who dwelt in the shining house. And Quetzalcoatl had many servants; some of them were dwarfs, and all were swift of foot.

Then it came to pass that Tezcatlipoca, he who can go into all places, he who wanders over the earth stirring up strife and war amongst men, descended upon Tollan by means of spider-webs. And from the mountain he came down on a blast of wind of such coldness that it killed all the flowers in Quetzalcoatl's bright garden. And Quetzalcoatl, feeling that coldness, said to his servants, “One has come who will drive me hence; perhaps it were better that I went before he drives me, and drank from a fountain in the Land of the Sun, whence I may return, young as a boy.” So he said, and his servants saw him burn down his house of silver with its green precious stones and its thatch of bright plumage, and its door-posts of white and red shells. And they saw him call upon his birds of sweet song and rich plumage, and they heard him bidding them to fly into the land of Anahuac.

Then Tezcatlipoca, that god and that sorcerer, went to where Quetzalcoatl stood, and took him into the ball-court that the two might play a game together. All the people of the city stood round to watch that game. The ball had to be cast through a ring that was high upon the wall. Quetzalcoatl took up the ball to cast it. As he did Tezcatlipoca changed himself into a jaguar and sprang upon him. Then Quetzalcoatl fled. And Tezcatlipoca chased him, driving him through the streets of the city, and out into the highways of the country.

His dwarfs fled after him and joined themselves to him. With them he crossed the mountains and came to a hill on which a great tree grew. Under it he rested. As he rested he looked into a mirror and he said, “I am grown to be an old man.” Then he threw the mirror down and took up stones and cast them at the tree. He went on, and his dwarfs made music for him, playing on flutes as they went before him. Once again he became weary, and he rested on a stone by the wayside; there, looking back towards Tollan, he wept, and his tears pitted the stone on which he sat, and his hands left their imprints upon it where he grasped the stone. The stone is there to

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this day with the pits and the imprints upon it. He rose up, and once again he went on his way. And men from Tollan met him, and he instructed them in crafts that he had not shown them before.

But he did not give them the treasure of jewels that his dwarfs and humpbacked servants carried for him. He flung this treasure into the fountain Cozcaapan; there it stays to this day—Quetzalcoatl's treasure. On his way he passed over a Fire-mountain and over a mountain of snow. On the mountain of snow his dwarfs and humpbacked servants all died from the cold. Bitterly he bewailed them in a song he made in that place.

Then Quetzalcoatl went down the other side of the mountain, and he came to the sea-shore. He made a raft of snakes, and on that raft he sailed out on the

sea. Or so some say, telling Quetzalcoatl's story. And those who tell this say that he came to the land of Tlappallan in the Country of the Sun, and there he drank of the Water of Immortality. They say that he will one day return from that land young as a boy. But others say that when he reached the sea-shore he divested himself of his robe with its bright feathers, of his snake-skin mask of the colour of turquoise, and that, leaving these vestments upon the shore, he cast himself into a fire and was consumed to ashes. And they say that Quetzalcoatl's ashes changed into bright-coloured and sweet-singing birds, and that his heart went up into the sky and became the Morning Star. After he had been dead for eight days that star became visible to men, and thereafter Quetzalcoatl was named the Lord of the Dawn.

From: Padraic Colum, *Orpheus: Myths of the World* (New York: Macmillan, 1930).

Asia and the Pacific

~ "Harisarman" (undated) ~

There was a certain Brahman in a certain village, named Harisarman. He was poor and foolish and in evil case for want of employment, and he had very many children, that he might reap the fruit of his misdeeds in a former life.

He wandered about begging with his family, and at last he reached a certain city, and entered the service of a rich householder called Sthuladatta. His sons became keepers of Sthuladatta's cows and other property, and his wife a servant to him, and he himself lived near his house, performing the duty of an attendant. One day there was a feast on account of the marriage of the daughter of Sthuladatta, largely attended by many friends of the bridegroom, and merry-makers. Harisarman hoped that he would be able to fill himself up to the throat with ghee and flesh and other dainties, and get the same for his family, in the house of his patron. While he was anxiously expecting to be fed, no one thought of him.

Then he was distressed at getting nothing to eat, and he said to his wife at night, "It is owing to my poverty

and stupidity that I am treated with such disrespect here; so I will pretend by means of an artifice to possess a knowledge of magic, so that I may become an object of respect to this Sthuladatta; so, when you get an opportunity, tell him that I possess magical knowledge." He said this to her, and after turning the matter over in his mind, while people were asleep he took away from the house of Sthuladatta a horse on which his master's son-in-law rode. He placed it in concealment at some distance, and in the morning the friends of the bridegroom could not find the horse, though they searched in every direction. Then, while Sthuladatta was distressed at the evil omen, and searching for the thieves who had carried off the horse, the wife of Harisarman came and said to him, "My husband is a wise man, skilled in astrology and magical sciences; he can get the horse back for you; why do you not ask him?" When Sthuladatta heard that, he called Harisarman, who said, "Yesterday I was forgotten, but to-day, now the horse is stolen, I am called to mind," and Sthuladatta then propitiated the Brahman with these words—"I forgot you, forgive

me”—and asked him to tell him who had taken away their horse. Then Harisarman drew all kinds of pretended diagrams, and said: “The horse has been placed by thieves on the boundary line south from this place. It is concealed there, and before it is carried off to a distance, as it will be at close of day, go quickly and bring it.” When they heard that, many men ran and brought the horse quickly, praising the discernment of Harisarman. Then Harisarman was honoured by all men as a sage, and dwelt there in happiness, honoured by Sthuladatta.

Now, as days went on, much treasure, both of gold and jewels, had been stolen by a thief from the palace of the king. As the thief was not known, the king quickly summoned Harisarman on account of his reputation for knowledge of magic. And he, when summoned, tried to gain time, and said, “I will tell you to-morrow,” and then he was placed in a chamber by the king, and carefully guarded. And he was sad because he had pretended to have knowledge. Now in that palace there was a maid named Jihva (which means Tongue), who, with the assistance of her brother, had stolen that treasure from the interior of the palace. She, being alarmed at Harisarman’s knowledge, went at night and applied her ear to the door of that chamber in order to find out what he was about. And Harisarman, who was alone inside, was at that very moment blaming his own tongue, that had made a vain assumption of knowledge. He said: “O Tongue, what is this that you have done through your greediness? Wicked one, you will soon receive punishment in full.” When Jihva heard this, she thought, in her terror, that she had been discovered by this wise man, and she managed to get in where he was, and falling at his feet, she said to the supposed wizard:

“Brahman, here I am, that Jihva whom you have discovered to be the thief of the treasure, and after I took it I buried it in the earth in a garden behind the palace, under a pomegranate tree. So spare me, and receive the small quantity of gold which is in my possession.”

When Harisarman heard that, he said to her proudly:

“Depart, I know all this; I know the past, present and future; but I will not denounce you, being a miserable creature that has implored my protection. But whatever

gold is in your possession you must give back to me.” When he said this to the maid, she consented, and departed quickly. But Harisarman reflected in his astonishment: “Fate brings about, as if in sport, things impossible, for when calamity was so near, who would have thought chance would have brought us success? While I was blaming my jihva, the thief Jihva suddenly flung herself at my feet. Secret crimes manifest themselves by means of fear.” Thus thinking, he passed the night happily in the chamber. And in the morning he brought the king, by some skilful parade of pretended knowledge into the garden, and led him up to the treasure, which was buried under the pomegranate tree, and said that the thief had escaped with a part of it. Then the king was pleased, and gave him the revenue of many villages.

But the minister, named Devajnanin, whispered in the king’s ear: “How can a man possess such knowledge unattainable by men, without having studied the books of magic; you may be certain that this is a specimen of the way he makes a dishonest livelihood, by having a secret intelligence with thieves. It will be much better to test him by some new artifice.” Then the king of his own accord brought a covered pitcher into which he had thrown a frog, and said to Harisarman, “Brahman, if you can guess what there is in this pitcher, I will do you great honour to-day.” When the Brahman Harisarman heard that, he thought that his last hour had come, and he called to mind the pet name of “Froggie” which his father had given him in his childhood in sport, and, impelled by luck, he called to himself by his pet name, lamenting his hard fate, and suddenly called out: “This is a fine pitcher for you, Froggie; it will soon become the swift destroyer of your helpless self.” The people there, when they heard him say that, raised a shout of applause, because his speech chimed in so well with the object presented to him, and murmured, “Ah! a great sage, he knows even about the frog!” Then the king, thinking that this was all due to knowledge of divination, was highly delighted, and gave Harisarman the revenue of more villages, with gold, an umbrella, and state carriages of all kinds. So Harisarman prospered in the world.

From: Joseph Jacobs, ed., *Indian Fairy Tales* (New York: G. P. Putnam’s Sons, 1912).

Europe

~ “How Gunther Won Brunhild,” excerpt from
the Nibelungenlied (ca. 1200) ~

Meanwhile their bark had come so near the castle that the king saw many a comely maiden standing at the casements. . . . He asked his comrade Siegfried: “Hast thou no knowledge of these maidens, who yonder are gazing downward towards us on the flood? . . .”

At this Sir Siegfried spake: “I pray you, spy secretly among the high-born maids and tell me then whom ye would choose, and ye had the power.”

“That will I,” spake Gunther, the bold and valiant knight. “In yonder window do I see one stand in snow-white weeds. She is fashioned so fair that mine eyes would choose her for her comeliness. Had I power, she should become my wife.”

“Right well thine eyes have chosen for thee. It is the noble Brunhild, the comely maid, for whom thy heart doth strive and eke thy mind and mood.” All her bearing seemed to Gunther good. . . .

Thus the brave knights and good rode to the castle. Six and eighty towers they saw within, three broad palaces, and one hall well wrought of costly marble, green as grass, wherein Brunhild herself sate with her courtiers. The castle was unlocked and the gates flung wide. . . .

Then the tidings were told to Lady Brunhild, that unknown warriors were come in lordly raiment, sailing on the flood. The fair and worthy maid gan ask concerning this. “Pray let me hear,” spake the queen, “who be these unknown knights, who stand so lordly in my castle, and for whose sake the heroes have journeyed hither?”

Then spake one of the courtiers: “My lady, I can well say that never have I set eyes on any of them, but one like Siegfried doth stand among them. Him ye should give fair greetings. . . . The second of their fellowship is so worthy of praise that he were easily a mighty king over broad and princely lands, and he had the power and might possess them. . . .”

Then spake the queen: “. . . If the mighty Siegfried be come unto this land through love of mine, he doth risk his life. I fear him not so sore, that I should become his wife.” . . .

“Be ye welcome, Siegfried, here in this our land! What doth your journey mean? That I fain would know.”

“Gramercy, my Lady Brunhild, that ye have deigned to greet me, most generous queen, in the presence of this noble knight who standeth here before me, for he is my liege lord. This honor I must needs forswear. . . . For thy sake are we come hither. Fain would he woo thee, however he fare. . . . He is hight Gunther and is a lordly king. An’ he win thy love, he doth crave naught more. . . .”

She spake: “Is he thy liege and thou his man, dare he assay the games which I mete out and gain the mastery, then I’ll become his wife; but should I win, ’t will cost you all your lives.” . . .

“He must hurl the stone and after spring and cast the spear with me. . . .” spake the lovely maid.

Siegfried, the bold, went to the king and bade him tell the queen all that he had in mind. . . . “I’ll guard you well against her with my arts.”

Then spake King Gunther: “Most noble queen, now mete out whatso ye list, and were it more, that would I all endure for your sweet sake. I’ll gladly lose my head, and ye become not my wife.” . . .

Meanwhile Siegfried, the stately man, or ever any marked it, had hied him to the ship, where he found his magic cloak concealed. Into it he quickly slipped and so was seen of none. He hurried back and there he found a great press of knights, where the queen dealt out her lofty games. . . . The ring had been marked out, where the games should be, afore many valiant warriors, who were to view them there. . . .

Then was come Brunhild, armed as though she would battle for all royal lands. . . .

Then was brought forth for the lady a spear, sharp, heavy, and large, the which she cast all time, stout and unwieldy, mickle and broad, which on its edges cut most fearfully. Of the spear’s great weight hear wonders told. . . . The noble Gunther gan be sore afraid. Within his heart he thought: “What doth this mean? How could the devil from hell himself escape alive?”

Were I safe and sound in Burgundy, long might she live here free of any love of mine." . . .

Upon her fair white arm the maid turned back her sleeves; with her hands she grasped the shield and poised the spear on high. . . . Gunther and Siegfried feared Brunhild's hate, and had Siegfried not come to Gunther's aid, she would have bereft the king of life. Secretly Siegfried went and touched his hand; with great fear Gunther marked his wiles. "Who hath touched me?" thought the valiant man. Then he gazed around on every side, but saw none standing there.

"'Tis I, Siegfried, the dear friend of thine. Thou must not fear the queen. Give me the shield from off thy hand and let me bear it and mark aright what thou dost hear me say. Make thou the motions, I will do the deeds." . . .

Then with might and main the noble maiden hurled the spear at a shield, mickle, new, and broad, which the son of Siegelind bore upon his arm. The sparks sprang from the steel, as if the wind did blow. The edge of the mighty spear broke fully through the shield, so that men saw the fire flame forth from the armor rings. The stalwart men both staggered at the blow; but for the Cloak of Darkness they had lain there dead. From the mouth of Siegfried, the brave, gushed forth the blood. Quickly the good knight sprang back again and snatched the spear that she had driven through his shield. Stout Siegfried's

hand now sent it back again. He thought: "I will not pierce the comely maid." So he reversed the point and cast it at her armor with the butt, that it rang out loudly from his mighty hand. . . . With all her strength she could not stand before the blow. In faith King Gunther never could have done the deed.

Brunhild, the fair, how quickly up she sprang! "Gunther, noble knight, I cry you mercy for the shot." She weened that he had done it with his strength. . . . The noble maid and good raised high the stone and hurled it mightily far from her hand. . . . The stone had fallen twelve fathoms hence, but with her leap the comely maid out-sprang the throw. Then went Sir Siegfried to where lay the stone. Gunther poised it, while the hero made the throw. Siegfried . . . threw the stone still further and made a broader jump. Through his fair arts he had strength enow to bear King Gunther with him as he sprang. The leap was made, the stone lay on the ground; men saw none other save Gunther, the knight, alone. . . . Brunhild, the fair, waxed red with wrath. To her courtiers she spake a deal too loud, when she spied the hero safe and sound at the border of the ring: "Come nearer quickly, ye kinsmen and liegemen of mine, ye must now be subject to Gunther, the king."

From: Donald B. Shumway, trans., *The Nibelungenlied* (New York: Houghton-Mifflin Co., 1909).

The Islamic World

~ *Al Hariri of Basrah: Maqamat* (The Assemblies, ca. 1100) ~

THE FIRST ASSEMBLY

Al Harith, son of Hammam, related: When I mounted the hump of exile, and misery removed me from my fellows, the shocks of the time cast me to San'a of Yemen. And I entered it with wallets empty, manifest in my need; I had not a meal; I found not in my sack a mouthful. Then began I to traverse its ways like one crazed, and to roam in its depths as roams the thirsting bird. And wherever ranged my glances, wherever ran my goings at morn or even, I sought some generous man

before whom I might fray the tissue of my countenance, to whom I might be open concerning my need; or one well bred, whose aspect might dispel my pain, whose anecdote might relieve my thirsting. Until the close of my circuit brought me, and the overture of courtesy guided me, to a wide place of concourse, in which was a throng and a wailing. Then I entered the thicket of the crowd to explore what was drawing forth tears. And I saw in the middle of the ring a person slender of make; upon him was the equipment of pilgrimage, and he had the voice of lamentation. And he was studding cadences

(continued)

(continues)

with the jewels of his wording, and striking hearings
with the reproofs of his admonition.

And now the medley of the crowds had surrounded
him, as the halo surrounds the moon, or the shell the
fruit. So I crept toward him, that I might catch of his
profitable sayings, and gather up of his gems. And I
heard him say, as he coursed along in his career, and the
throat of his improvisation made utterance:

O thou reckless in petulance, trailing the garment of
vanity! O thou headstrong in follies, turning aside to
idle tales! How long wilt thou persevere in thine error,
and eat sweetly of the pasture of thy wrong? How far
wilt thou be extreme in thy pride, and not abstain from
thy wantonness? Thou provokest by thy rebellion the
Master of thy forelock; in the foulness of thy behaving
thou goest boldly against the Knower of thy secret.
Thou hidest thyself from thy neighbor, but thou art
in the sight of thy Watcher; thou concealest from thy
slave, but no hidden thing is hidden from thy Ruler.
Thinkest thou that thy state will profit thee when
thy departure draweth near? or that thy wealth will
deliver thee when thy deeds destroy thee? or that thy
repentance will suffice for thee when thy foot slippeth?
or that thy kindred will lean to thee in the day that thy
judgment-place gathereth thee? How is it thou hast not
walked in the high-road of guidance, and hastened the
treatment of thy disease, and blunted the edge of thine
iniquity, and restrained thyself—thy chief enemy? Is
not death thy doom? What then is thy preparation? Is
not gray hair thy warning? What then is thy excuse?
And in the grave's niche thy sleeping-place? What dost
thou say? And to God thy going? and who shall be thy
defender? Oft hath the time awakened thee, but thou
hast set thyself to slumber; and admonition hath drawn
thee, but thou hast strained against it; and warnings
have been manifest to thee, but thou hast made thyself
blind; and truth hath been established to thee, but thou
hast disputed it; and death hath bid thee remember,
but thou hast sought to forget; and it hath been in thy
power to impart of good, but thou hast not imparted.
Thou preferrest money which thou mayest hoard before
piety which thou mayest keep in mind: thou chooseth a
castle thou mayest rear rather than bounty thou mayest
confer. Thou inclinest from the guide from whom thou

mightest get guidance, to the pelf thou mayest gain as
a gift; thou lettest the love of the raiment thou covetest
overcome the recompense thou mightest earn. The
rubies of gifts cling to thy heart more than the seasons
of prayer; and the heightening of dowries is preferred
with thee to continuance in almsgivings. The dishes of
many meats are more desired to thee than the leaves of
doctrines: the jesting of comrades is more cheerful to
thee than the reading of the Qur'an. Thou commandest
to righteousness, but violatest its sanctuary: thou
forbiddest from deceit, but refrainest not thyself: thou
turnest men from oppression, and then thou drawest
near to it; thou fearest mankind, but God is more
worthy that thou shouldst fear him. Then he recited:

Woe to him who seeks the world, and turns to it his
career: And recovers not from his greediness for it,
and the excess of his love. Oh, if he were wise, but a drop
of what he seeks would content him.

Then he laid his dust, and let his spittle subside; and put
this bottle on his arm, and his staff under his armpit.
And when the company gazed on his uprising, and saw
that he equipped himself to move away from the midst,
each of them put his hand into his bosom, and filled for
him a bucket from his stream: and said, "Use this for
thy spending, or divide it among thy friends." And he
received it with half-closed eyes, and turned away from
them, giving thanks; and began to take leave of whoever
would escort him, that his road might be hidden from
them; and to dismiss whoever would follow him, that
his dwelling might be unknown. Said Al Harith, son of
Hammam: Now I went after him, concealing from him
my person; and followed on his track from where he
could not see me; until he came to a cave, and slipped
into it suddenly. So I waited for him 'till he put off his
sandals and washed his feet, and then I ran in upon
him; and found him sitting opposite an attendant, at
some white bread and a roast kid, and over against them
was a jar of date-wine. And I said to him, "Sirrah, was
that thy story, and is this thy reality?" But he puffed
the puff of heat and went near to burst with rage; and
ceased not to stare at me 'till I thought he would leap
upon me. But when his fire was allayed, and his flame
hid itself, he recited:

I don the black robe to seek my meal, and I fix my
hook in the hardest prey: And of my preaching I make
a noose, and steal with it against the chaser and the

chased. Fortune has forced me to make way even to the lion of the thicket by the subtlety of my beguiling. Yet do I not fear its change, nor does my loin quiver at it: Nor does a covetous mind lead me to water at any well that will soil my honor. Now if Fortune were just in its decree it would not empower the worthless with authority.

Then he said to me, "Come and eat; or, if thou wilt, rise and tell." But I turned to his attendant, and said, "I

conjure thee, by him through whom harm is deprecated, that thou tell me who is this." He said, "This is Abu Zayd, of Seruj, the light of foreigners, the crown of the learned." Then I turned back to whence I came, and was extreme in wonder at what I saw.

From: Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*. Vol. 6: *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Rolena Adorno, ed., *From Oral to Written Expression: Native Andean Chronicles of the Early Colonial Period* (Syracuse, N.Y.: Syracuse University Press, 1982).
- M. H. Bakalla, *Arabic Culture through Its Language and Literature* (Boston: Kegan Paul International, 1984).
- Stephen Belcher, *Epic Traditions of Africa* (Bloomington: Indiana University Press, 1999).
- John Bierhorst, *The Mythology of North America* (New York: Oxford University Press, 2002).
- Elizabeth Hill Boone, *Stories in Red and Black: Pictorial Histories of the Aztecs and Mixtecs* (Austin: University of Texas Press, 2000).
- J. P. Clark-Bekederemo, ed., *The Ozidi Saga* (Washington, D.C.: Howard University Press, 1991).
- Ernst Robert Curtius, *European Literature and the Latin Middle Ages*, trans. Willard R. Trask (Princeton, N.J.: Princeton University Press, 1973).
- Ainslee Embree, ed., *Sources of Indian Tradition*, 2nd ed. (New York: Columbia University Press, 1988).
- Thomas A. Hale, *Griots and Griottes: Masters of Words and Music* (Bloomington: Indiana University Press, 2007).
- Robert Irwin, *Night and Horses and the Desert: An Anthology of Classical Arabian Literature* (New York: Penguin Press, 1999).
- Peter H. Lee, William Theodore de Bary, Yongho Ch'oe, et al., eds., *Sources of Korean Tradition* (New York: Columbia University Press, 1997).
- Miguel León-Portilla, *Pre-Columbian Literatures of Mexico*, trans. Grace Lobanov and Miguel León-Portilla (Norman: University of Oklahoma Press, 1969).
- Malcolm C. Lyons, *The Arabian Epic: Heroic and Oral Story-Telling* (Cambridge, U.K.: Cambridge University Press, 1995).
- Victor H. Mair, ed., *Columbia History of Chinese Literature* (New York: Columbia University Press, 2001).
- Alastair J. Minnis, *Medieval Theory of Authorship*, 2nd ed. (Philadelphia: University of Pennsylvania Press, 1988).
- Mustansir Mir and Jarl E. Fossum, eds., *Literary Heritage of Classical Islam: Arabic and Islamic Studies in Honor of James A. Bellamy* (Princeton, N.J.: Darwin Press, 1993).
- Ode Ogede, *Art, Society, and Performance: Igbo Praise Poetry* (Gainesville, Fla: University of Florida Press, 1997).
- Tanure Ojaide, *Poetry, Performance, and Art: The Udje Dance Songs of the Urhobo People* (Durham, N.C.: Carolina Academic Press, 2003).
- Oyekan Owomoyela, *Yoruba Trickster Tales* (Lincoln: University of Nebraska Press, 1997).
- "Popol Vuh:" *The Definitive Edition of the Mayan Book of the Dawn of Life and the Glories of Gods and Kings*, trans. Dennis Tedlock (New York: Simon and Schuster, 1985).
- Frank Salomon and George L. Urioste, *The Huarochirí Manuscript* (Austin: University of Texas Press, 1991).
- Annemarie Schimmel, *As through a Veil: Mystical Poetry in Islam* (New York: Columbia University Press, 1982).
- Theodore L. Steinberg, *Reading the Middle Ages: An Introduction to Medieval Literature* (Jefferson, N.C.: MacFarland, 2003).
- Karl A. Taube, *Aztec and Maya Myths* (Austin: University of Texas Press, 1993).
- Gary Urton, *Inca Myths* (Austin: University of Texas Press, 1999).



► metallurgy

INTRODUCTION

By the Middle Ages almost every culture on earth possessed some form of metalworking, except for those in Australasia. Some tribal peoples in the Americas and in southern Africa, however, also never developed or received metalworking technology. Among basic technologies only stoneworking and agriculture were more widely distributed.

Metalworking began in prehistoric times with native metals, that is, metals that occur naturally in a relatively pure state. This condition is especially common in the case of gold and silver. Such metals were worked by hammering with either wooden or stone implements. Native gold and silver generally were worked into ornaments and other items used to signify prestige, often with amazing craftsmanship even in very early times. This stage of development seems to have happened very late in the Americas, not long before the beginning of the Middle Ages. The next stage of development was the ability to melt and cast copper from ore. This may have been first accomplished accidentally when copper-bearing rocks were used in the construction of kilns for firing ceramics and some pure metal melted out. Eventually it was learned that copper could be combined with other metals like tin to produce harder and more useful alloys, such as bronze. Bronze implements are so useful that they fostered an expansion of wealth and a new organization of society. Bronze working became one of the key factors in the development of

the first urban cultures in the Old World. In the New World, however, bronze existed, but metal products never acquired a practical purpose.

One of the most important developments in metallurgical technology was the use of iron. Native iron had long been used for ceremonial and prestige objects because of its rarity and because of its seemingly miraculous origin as fallen from the sky (most of it coming from meteorites). The ability to work iron ore in bloomery furnaces had been invented by the Hittites toward the end of the second millennium B.C.E. This process eventually spread to the entire world, except Australasia and the Americas. Perhaps the highest-quality steel was used in the manufacture of swords produced in central Asia and in Japan: the so-called Damascus sword and the world-famous samurai sword.

Metallurgy drove technological change and itself changed rapidly during the medieval period, often by necessity or serendipity. Metalsmithing requires the burning of tremendous amounts of fuel. In some areas this resulted in serious deforestation. In Oman, for instance, deforestation meant the end of an important metalworking industry for several centuries during the Middle Ages and led to permanent ecological damage. In Europe, on the other hand, the same pressures resulted in improved forest-management techniques and eventually the switch to the use of coal as a fuel in the place of charcoal from wood (perhaps because coal occurred in abundance near the surface of the ground, especially in England, and had been used as a cooking and heat-

ing fuel since Roman times). Once gunpowder was developed in medieval China (and soon imported to the West), Chinese and European soldiers both found a ready means to exploit the new substance, by using bronze bell-casting technology to create the first cannons.

Perhaps the most important medieval metallurgical technology was the blast furnace. This technology had been developed in China in antiquity and continued in use throughout the Middle Ages. It was invented independently in Europe in the 12th century. In both cases the bellows were run by complex water-powered machines. The iron production of blast furnaces was measured in tons per year rather than the few pounds of iron produced by a traditional bloomery furnace. Moreover, the iron produced was molten and could be easily cast. The improvement and development of blast furnace technology in Europe was continuous and rapid. It led to the growth of the bourgeois middle class and ultimately to the Industrial Revolution. But no such transformation, either technological or social, took place in China. This difference in the development of the two cultures is an important problem for the field of historical study today.

AFRICA

BY KIRK H. BEETZ

By the beginning of the medieval era Africa had a long, ancient tradition of metallurgy. The only cultures that may not have smelted, refined, or forged may have been hunter-gatherers and pastoralists in the Kalahari Desert and southern Africa. Still, copper and iron were important parts of the lives of these peoples, who in their early recorded history would meet with outside traders who brought metal tools. They would trade mostly for ostrich feathers as well as for animal skins.

There were places in Africa where metal was not mined but where metalworkers flourished anyway. Iron and copper would be imported as ingots (a solid mass of metal), which were refined, if necessary, and then forged. There were very productive copper, iron, and gold mines in western Africa, in north-central Africa, in Nubia and Ethiopia in northeastern Africa, and in southeastern Africa, and archaeologists have made significant strides in identifying their furnaces and describing how the furnaces were used.

There is much disagreement among archaeologists about when and how Africans began working with metal. Some believe that Africans south of the Sahara learned how to work with metal from outsiders such as Carthaginians or Berbers, but archaeological evidence for this is scant. Others believe metalworking began independently in sub-Saharan Africa, perhaps several times in different places. Africans may have learned to work with copper first, possibly doing no more

than hammering naturally occurring copper nuggets, eventually learning to identify and work with copper ore and later using their knowledge of copper to help them recognize and work with iron ore.

At the start of medieval times the principal metalworking sites in Africa seem to have been in two places: the land of the mysterious Nok in western Africa and in northeastern Africa, where there is ample evidence of advanced metalworking in Nubia and Axum. In these areas one particular type of furnace for smelting ore predominated. This furnace consisted of a large hole dug at an angle in the ground. Around the surface of the hole was a bowl-shaped circle of clay. This circle varied from 3 feet to 6 feet in height. In western Africa and somewhat later in central Africa builders of the furnaces shifted from clay layered in circles to dried clay bricks and at an undetermined time in the middle of the medieval era to clay bricks that had been fired, probably by placing them directly into fires. The sides of the wall would be pierced with tuyeres—openings through which air could be forced into the furnace. Many furnaces for smelting and for refining had small holes in their floors apart from the main hole, and archaeologists speculate that religious or magical objects were placed in these holes to help guarantee that the smelting or refining went well.

These furnaces were filled with wood that was burned to make charcoal. Then the charcoal was supplemented by more wood and allowed to burn until it was very hot, at which time ore was placed inside and the top perhaps covered. Eventually metalworkers learned to use water to help cool the smelted metal, but this may not have occurred until late in the medieval era. In general, furnaces were allowed to cool on their own, perhaps for several days. When they were fully cooled, the furnaces were broken open, often with most of their walls knocked to the ground, and the smelted metal would be removed, usually mixed with ashes. It is possible that this resulted in the manufacturing of steel, which combined iron with carbon from ashes.

Sites in the grasslands south of the Sahara and in the central forests of Africa have ditches that were dug by making a furnace, breaking it open, then making a furnace next to the old one, and so on, apparently over many generations. The people responsible for these furnaces were probably nomadic pastoralists, who returned to the same locations to smelt their ore, perhaps because the spots had religious significance. Among those cultures in western Africa in which traditional smelting practices survived long enough to be recorded by outside observers, pieces of clay from the wall of a previously used furnace would be incorporated into the wall of a new furnace as a way of transmitting some of the spiritual power of ancient furnaces into new ones. Perhaps influenced by the

techniques of the ancient kingdom of Kush (900 B.C.E.–300 C.E.) in Nubia, the furnaces of the medieval Nubian kingdoms and of Ethiopia seem to have been more permanent, built for repeated use by leaving openings at the bottoms for extraction of the smelted metal.

The use of tuyeres may have been universal in Africa. These usually took the form of cones with the narrow end facing inside the furnace. There were typically three or four of these cones in a furnace and two bellows inserted into each tuyere. While one bellows was blowing air into the furnace, the other could reinflate, allowing for oxygen to be constantly blown into the fire to help it maintain a consistent temperature. This suggests the possibility of a mix of skilled and unskilled labor. The skilled metallurgists would build the furnaces and supervise their use, but unskilled workers could be taught to work the bellows.

For medieval Africans metallurgy usually had three steps: smelting, refining, and forging. The metal left after smelting seems to have been too adulterated with contaminants such as dirt and wood to have been useful. Medieval African metalworkers had a few choices of what to do with the metal they extracted through smelting. One was to take what was probably often a lump of metal and anneal it, that is, hammer it into some kind of shape for shipping elsewhere, perhaps in trade, where it would be further refined. They could take the slag, the refuse of the ore after smelting, and resmelt it to extract more metal because the basic smelting process would leave much metal still in the slag. This may have been done in Nubia. The third choice was to refine the metal, something that would have been done even after resmelting slag or annealing unrefined metal.

Typically, medieval African metalworkers built furnaces for refining metal on slopes. In central Africa down into Angola, members of the Kongo and Mbundu cultures often used termite mounds for slopes. Refining furnaces might be made of layers of clay or of clay bricks. They had tuyeres through which bellows blew air. The slope allowed refined molten metal to pour out a hole at the bottom of the furnace. The metal poured into open clay molds for ingots with the molds often lined with ashes. The ingots were in various patterns, such as H-shaped and crosses, and they seem to have been made in standardized sizes and weights. Ingots from western Africa have been found as far away as southeastern Africa, indicating that they were widely traded. Some ingots seem not to have been made in molds but instead to have been hammered into shape.

Blacksmiths were thought to be spiritually powerful. In some cultures village leaders would frequently consult the village's blacksmith on matters of public policy. Blacksmiths would sometimes be consulted by people who sought magi-

cal aid or help with a spiritual problem. In central Africa and southwestern Africa some blacksmiths became powerful enough to have their own armies. These were itinerant blacksmiths who were mostly concerned with keeping the narrow paths among small communities open so that they could travel safely, but some of these blacksmiths used their armies and spiritual authority to become kings.

The craft of smithing itself was often hereditary, with one family having a monopoly in a village. Smiths would pass on secret spiritual knowledge to their children that set their families apart from others. Archaeologists speculate that this may have served to help smiths remember their methods. Each technique, from hammering out a hoe to drawing out wire, would have a ritual to be followed, and in this way smiths could manufacture goods with tried-and-true methods without knowing exactly why they worked.

Smithing required hammers, punches, and adzes as well as a furnace or hearth and an anvil. The last of these items was seldom elaborate. Even in the present-day, traditional African blacksmiths use stones for anvils, perhaps no bigger than a person's foot. The furnace of a blacksmith would have required only one bellows—just enough to heat burning charcoal to a temperature high enough to soften metal. During the medieval era most tools produced by smiths were made of iron, while copper, bronze, silver, and gold were used for jewelry and coins.

Whether working in a city or a small village, blacksmiths tended to have a large set of tools. Hammers seem to have been used by all, and a typical tool kit would have hammers of different sizes, from big ones used to pound large ingots into the general form of the object to be made to small hammers used to create minute details or to smooth the surface of an object. Chisels were used to emboss objects and perhaps to work in fine details. Punches were used to make holes in sheets of metal. Adzes were used to chip at objects, perhaps to flatten a side. Wire was used for jewelry, for binding plates of iron together for suits of armor, and for binding metal to wood. The start of the process of making wire was probably like that for making nails. An ingot was heated and then worked with a hammer to form a rod. Holes of different sizes would have been punched through an iron plate. To make sure the holes were the correct width, the blacksmith would slip needles of various widths through them. Then the rod was heated to near melting, inserted into a large hole, and pulled through by tongs. The now narrower rod would be heated again and pulled through a smaller hole. This process continued until the resulting wire was of the desired width.

Smithing tended to be a home industry, except in parts of northeastern Africa such as Axum, where there may have been foundries where several furnaces and several black-

smiths may have gathered together to mass-produce goods. This may have been the continuation of a tradition begun in the city of Meroë in Kush in ancient times or may have been influenced by practices in the Byzantine Empire. From what archaeological discoveries have so far revealed, elsewhere most smiths worked indoors, either in their homes or in a building within their family's compound, or they worked outside next to their homes in small-scale family businesses. In western Africa and central Africa the women usually took care of the sale and trading of products manufactured by the men.

THE AMERICAS

BY PENNY C. MORRILL

The story of metallurgy in Latin America had its beginnings in 1500 B.C.E., along the north coast of Peru, where renewal and innovation remained constant over many centuries. The remarkable work of Moche goldsmiths, discovered in the royal tombs of Sipán, is a triumph of artistic skill and imagination. Produced in 300 C.E., the intricate works of art reveal a well-developed level of technology that encouraged experimentation.

In Moche ceramics royal priests are represented in sumptuous ritual dress. The discoveries in the Sipán tombs indicate that these priests were buried in many layers of the same opulent costumes and jewelry they had worn in ritual performances. Such splendor could have been possible only in a hierarchical society governed by a small powerful, elite able to garner and control vast material wealth and employ a large contingent of artisans.

Gold and silver beads found at the Sipán site are conical, trapezoidal, or peanut shaped, and some end in spheres. They are representations of human, owl, or feline heads. One necklace of 10 beads, each composed of numerous layers to form the shape of an anthropomorphic spider atop its web, is a technological wonder. The base of each bead is a half sphere, produced from a gold sheet on a doming block, with additional chasing. A frame fits onto the open side of the dome and holds in place the gold wires that make up the diagonal lines of the spider web. The connecting lines of the web form ever-smaller circles into the center beneath the spider's body, which was also formed on a block. Gold-wire spider legs attach to the body. Fitted over the body and legs is the top of the spider, on which appears a human face in repoussé. This technique required the goldsmith to hammer the design into the back of the gold sheet. To form the gold wire used in these spider beads, Moche goldsmiths cut thin strips from gold sheets and then hammered, twisted, and rolled them into rods. These were pulled through a series of holes of decreas-

ing diameter until the proper size had been achieved, with little or no waste of the metal.

Another marvel from the tombs at Sipán is the octopus pectoral. This large-scale chest ornament measures just over 35 inches across, is made up of eight large curved tentacles cut from gold sheets, and is adorned with almost 100 gold and shell beads. The small gold beads that were soldered to the tentacles were produced either from two hollow hemispheres soldered together or by the lost-wax method. In the latter technique a ceramic bead was covered with a thin layer of wax and then placed in an outer mold made up of clay and pulverized charcoal. The artisan melted gold in a heat-resistant ceramic crucible and poured it through a hole in the mold. The molten metal replaced the wax, forming a gold bead around the ceramic core, which remained inside the bead.



Gold pendant; Mixtec culture, Mexico, 1100–1520 (Los Angeles County Museum of Art, The Phil Berg Collection, Photograph © 2006 Museum Associates/LACMA [M.71.73.249a])

The goldsmiths of Sipán were masters at combining gold or copper with shell and stone, as exemplified by a massive owl headdress. The owl at the center of the headdress is three-dimensional, its eyes inlaid with white shell and turquoise. Goldsmiths attached bangles to the owl's large gold wings with gold wire, an ensemble that must have created impressive sounds and reflected light as the priest walked in procession.

The explosion of creativity that took place after 500 C.E. throughout Central America, in Costa Rica, and in Panama was mostly influenced by developments in Colombia. Gold and copper were abundant in Panama, where gold indicated status, both in life and death. Panamanian metalsmiths worked in *tumbaga*, an alloy with a high percentage of copper mixed with gold. These artisans embossed gold plaques with representations of fantastic creatures. Human and animal figural pendants were also formed in lost wax, as was the openwork, or false filigree, that ornamented these works.

In Costa Rica gold casting began around 500, with influences from Panama and Colombia. Costa Rican goldsmiths were adept at depletion gilding, a technique that produced a seamless surface layer of gold. A good example of this kind of work, a frog pendant from Chaparrón, was first formed of *tumbaga*. The goldsmith removed the surface copper by heating the piece in an open hearth until the copper oxidized. He then used a plant-based acid solution to dissolve the black oxidized copper from the surface, leaving behind a thin layer of almost pure gold that could be burnished to a high finish.

After 500 in the Caribbean lowlands of Colombia, Zenú caciques, or leaders of chiefdoms, had become powerful and resourceful and were commissioning gold adornments to indicate their status. Near important sources of raw gold, the Cauca and Nechí rivers, Zenú metalsmiths mastered gold casting and depletion gilding. The artisans imitated the appearance of plumage on the figure of a bird by using false filigree and cast-wire swirls and spirals. The Zenú also embellished wooden idols with sheets of gold. Twenty-four of these idols were discovered in a temple in the ceremonial center at Finzenú. A significant development among the Zenú was that a portion of the gold production was meant for trade, for Zenú pieces have been discovered at some distance.

In the Cordillera Oriental mountain range of Colombia, the Tairona and Muisca people had very different approaches to metalsmithing. For the Muisca (after 800), votive objects in gold with copper alloy were cast in the lost-wax technique, but with a difference. These artisans used a stone matrix, with several designs carved in high relief on one stone. The carving was impressed into the clay, which when dry was coated with beeswax on the outer surface. The wax was impressed with the stone relief, thus creating a negative and positive

imprint in the wax. Several objects could be produced from the one wax model, imprinted with different designs from the single stone.

In contrast to the Muisca, the Tairona goldsmiths created elaborate clay core images that were destroyed at the time the mold was broken open and the gold object removed. The Tairona were less interested in producing multiples and more focused on a refined finished piece. These pendants are highly symbolic, very unlike the simpler votive figures of the Muisca.

In the northern coastal region of Peru, the Sicán (after 900) had access to copper and arsenic-bearing ore deposits. They could acquire gold and silver from the northern highlands. The Sicán metalsmiths worked in high-carat gold alloys, silver, arsenical bronze, silver alloyed with copper, and *tumbaga*. They added small amounts of arsenic to improve the hardness and malleability of copper, giving the metal a silvery appearance.

These artisans were particularly adept at producing gold sheets and enhancing their designs with repoussé, chasing, and joining. In one Sicán tomb, archaeologists found thousands of depletion-gilded *tumbaga* squares that had originally been sown onto a costume, creating a resplendent display. The Sicán metalsmiths also did surface depletion of silver from gold. Masks and ceremonial headdresses are indicative of the sophistication reached by these artisans, in terms of alloying, combining metals and stones, and of their technical expertise. Movement and articulation became part of the design of the piece. One headdress, measuring 3 feet high by 2 feet wide, included gold bangles, some with turquoise inlay, portrait heads of deities cut from silvery-colored gold alloy sheets, feline heads of gold alloy, and the mask itself, which was made up of several sheets of gold and *tumbaga*.

The Chimú, at their capital of Chan Chan on Peru's north coast, developed (after 1000) a distinctively elegant and aesthetic approach to gold ornament and jewelry. Meant for ostentatious display for the Chimú nobility, most pieces were produced from gold sheets. Reflective of this preference is a pair of ear spools, each comprising more than 100 tiny gold pieces, soldered or stapled into a profuse and extravagant pattern. Chimú goldsmiths also mastered the technique of granulation. They cut out small pieces from a gold sheet, placing them on a heated charcoal block. During the melting process, surface tension caused the gold pieces to become spheres. To adhere the tiny beads to a gold surface, the Chimú used copper-salt reduction or reaction soldering. In this technique the granules were placed on an organic glue that had been mixed with a finely ground copper salt, like malachite. With heat, the glue burned off and the copper salt was reduced to metallic copper in a liquid state. At the points where the granules

came into contact with the metallic copper, they became soldered to the surface.

Western Mexico seems to have had a trading relationship with the coastal people of Peru and Ecuador. Copper artifacts dating as early as 600 reveal that western Mexican metalsmiths had acquired the ability to work in lost-wax casting and with various alloys. Around 1200 the techniques of metallurgy spread to the Oaxaca, Maya, and Huastec regions, a development that may have been the result of several points of influence.

The earliest finely crafted work in gold in Mesoamerica was taken from the sacred cenote (well) at Chichén Itzá and dates to around 1000 to 1200. The gold masks and large discs worked in repoussé provide evidence for the mythic status accorded Toltec goldsmiths by the Aztec. The gold discs, approximately 6 to 8 inches in diameter, represent themes that are specific to Chichén Itzá, with aspects borrowed from central Mexico (Tula) and the Maya region. A depiction of a human face emerging from an eagle's beak before a kneeling figure resembles a vision serpent. Another disc represents a figure descending from a serpent's mouth at the dramatic moment of a heart sacrifice.

In the past these works were thought to have been produced in Panama. It seems more credible that the Toltec-Itzá were trading with the Panamanians for gold. The artisans of Chichén Itzá would have learned goldsmithing techniques from the Panamanians. This interaction between these two regions had been taking place over many centuries, as indicated by Olmecoid jade figurines discovered in Costa Rica. While influence from western Mexico is evident, it is more likely that the Toltec-Itzá were precursors of the Mixtec goldsmiths in Oaxaca, where gold was plentiful.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

As far as archaeologists have determined, during the medieval era the people of Oceania—the lands of the Polynesians and the Australians—did not practice any form of metallurgy. Among the peoples of central Asia and Siberia metal objects came from people of the Near East, from whom pastoralists of central Asia and Mongolia learned to work metal and perhaps passed their knowledge on to Koreans. The Chinese had learned to manufacture bronze early in their history, perhaps from the ancient cultures of the Near East or perhaps on their own. In about 500 B.C.E. the Chinese learned to smelt iron ore and within about 100 years had mastered most of the techniques for working with iron. The speed of this development, which seems to have taken at least several hundred years in the Near East, has led many archaeologists to con-

clude the Chinese learned how to work iron from people of India or the Near East. During medieval times metallurgists from the Sassanian Empire (226–651) fled the Arab invasion of their homeland and settled in China, bringing with them advanced techniques for making alloys and for decorating metal objects. The Koreans were heavily influenced by Chinese metallurgists, and most of their medieval practices were identical to those of China. Japan followed a unique path in its development of metallurgy. For example, the Japanese had an iron age before they had a bronze age because they depended on foreign supplies of metal, and they imported iron from Korea before importing copper and tin, which are both used in making bronze.

Medieval Indian documents on metallurgy do not seem to have survived, and the archaeological history is spotty. Relics from the 500 years before medieval times, however, show that the skills of Indian metallurgists were already extraordinary and included one or more techniques for making steel that would not rust and an ability to cast steel objects weighing tons. Most of the metallurgy of southern Asia seems to have followed the practices of India, with the exception of northern Vietnam, which was dominated by China. The metallurgical practices of Indonesia are not well known. The peoples of Java and Sumatra manufactured their own metal weapons and tools.

The extensive religious literature of medieval India includes explanations of the duties of Hindu castes such as blacksmiths. From this literature and archaeological remains, some aspects of their metallurgical practices can be determined. The Indians exploited their rich deposits of ore; good ore high in metal content was probably selected by eye. Iron, copper, and other metals were smelted in furnaces equipped with bellows. The metal was either made liquid and poured into molds to make ingots or came out of the furnaces as misshapen masses still mixed with slag. The slag would have been refined by reheating in a furnace, worked free of the contaminants, or reshaped by hammering.

The most famous Indian metal was *wootz* steel. This was made by melting low-carbon iron with a measured amount of carbon in a crucible, which was sealed and heated to about 2,200 degrees Fahrenheit. The crucible was then shaken, and it made a distinctive sound when carbon and iron had formed steel. The crucible was allowed to cool for days, resulting in an alloy of iron with about 1.5 percent carbon. This *wootz* steel was highly valued for its flexibility and strength and was exported to the Near East, central Asia, and the Far East.

The principal tools of blacksmiths were hammers and tongs. They also used anvils and worked close to the furnace in which they heated the metal. They heated the metal until it was white-hot and then, using tongs, withdrew it from the furnace. Next they hammered, twisted, and hammered the



Bronze water pot; Japan, Kamakura Period, 13th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1965-26a-c)

metal again, cut it to desired lengths, reheated it, again hammered and twisted, then quenched it in water and repeated the process. In this manner they made mostly iron tools such as spades, saws, hammers, tongs, plowshares, and sickles. They also made needles for sewing, scissors for cutting cloth or nails, razors for shaving, machetes for hacking through brush, and surgical instruments. Household goods such as cooking utensils were made of various metals such as iron, copper, zinc, lead, and meaning tin.

Specialists among smiths were those who worked with gold and silver. Gold beaters spent their time beating golden ingots into thin sheets. Goldsmiths used touchstones to test their metal. A touchstone was basalt or jasper, which were hard, black stones. Gold was rubbed against a touchstone to see whether it left a streak the color of pure gold, adulterated gold, or a fraudulent piece of metal; the same was done for silver. Some dishonest goldsmiths made imitation touchstones that would make their fake goods seem to be made of gold. Indian governments usually had well-trained agents who regulated the goldsmiths and tested the goldsmith's scales, touchstones, and products. The smiths used small crucibles to melt their precious metals into liquid form, and they were masters at making alloys by mixing metals.

Exactly how Indian techniques spread is not clear. Routes through northeastern India were probably used by Indian metallurgists to migrate to China. In Southeast Asia metallurgical techniques probably traveled by the migration of metallurgists, most notably to Funan (a kingdom in the Mekong Delta) prior to the medieval era and to Indonesia with Hindu and Buddhist clergy throughout the medieval times. It is unlikely, but not known for certain, that blacksmiths existed in the Khmer Empire (802–1432) in the density that they did in India, although some must have worked in the villages near the great religious complexes built by the Khmer, manufacturing and repairing tools.

People in both India and China cast metal. The techniques they used were ancient, using either clay models or the lost-wax technique. By 1000 B.C.E. the Chinese were using extraordinarily complex molds and making them so that they could be mixed and matched; these included molds for bottoms, for central vessels, and for tops, such as round mouths. This meant that at that early date the Chinese could mass-produce bronze or copper objects for everyday use. The lost-wax technique involved making a wax figure, then adding wax columns around which clay was pressed. When heated, the wax melted out the openings left by the wax columns. These were stopped up, and molten metal was poured in an opening that had been left unstopped. After cooling, the clay was broken open, leaving a unique object. The bumps or ridges left by the molds were filed down. The rules for making objects with the lost-wax method were so precise among Indians that many objects seem nearly identical, their makers having sought to copy a masterwork rather than deviate from what tradition required of them. The Chinese so excelled at casting metal that objects cast using clay molds and those using the lost-wax technique sometimes showed no sign of seams or wax bumps and so required no filing.

The medieval Chinese had a sophisticated bellows system that could simultaneously suck in air from outside while blowing it into a furnace, allowing Chinese smelters to maintain consistent temperatures while ore was heated. They added phosphorus to their mix in the furnace, which enabled iron to melt at lower temperatures than would otherwise have been needed. This meant that their iron ore became fully liquid, which resulted in bountiful amounts of cast iron. The furnaces were fairly small and made of heat-resistant clay. Coal was used to provide the heat.

Steelmaking was a tricky business. Too much carbon mixed with iron made for a hard but fragile product that fragmented easily. Too little carbon made for soft steel that was easy for a blacksmith to work but unsuited for any tool that needed to be resistant to hard blows. This was wrought iron, with a carbon content of about 0.06 percent. To be strong and

not brittle, steel required a carbon content greater than 0.06 percent but less than 1.8 percent; the lower the percentage, the softer the steel. In the 400s C.E. Chinese metallurgists melted iron with a high carbon content and placed bars of wrought iron into the liquid; it seems to have been a trial-and-error process of development before the metallurgists learned the best proportions of wrought iron bars to carbon-rich iron liquid that resulted in tough steel. Chinese blacksmiths developed a process of hammering out bars of hard steel, welding soft steel to them, hammering them into rough shape, and repeating the process many times, quenching the steel in water after each period of hammering. The result was a steel object that was hard yet flexible.

This process made its way into Japan in the 600s, most likely via Korean metalworkers whose skills were in demand in Japan. At the time Japan depended on imports from Korea to meet its need for metal. Copper was discovered in Japan during the medieval era, although historians disagree with one another by about a thousand years over when exactly the discovery was made. In any case, Japan had to import copper and iron to meet its needs during most of the medieval era; as the era waned, however, the Japanese were increasingly using iron smelted from sand mined from their rivers. This iron was considered particularly fine and was desired for making swords. The medieval Japanese used furnaces similar to those of China, and they made a very high grade of steel.

In medieval Japan steel was thought to carry within it supernatural power; each step in the process of making steel was part of religious ritual. Sword smiths wore ceremonial clothing and surrounded their workplaces with ropes of rice straw, just as shrines and sacred objects would be. What set Japanese smiths apart from others was their constant effort to innovate in how they worked with metal. Master smiths developed their own secret formulas for mixing alloys, working different grades of steel together to make tools or weapons, and annealing and quenching. One of the secrets of their steel's high quality was the annealing process. They not only welded soft steel to hard steel, as had the Chinese, but they also flattened out the welded steel and folded it, quenched it first in water and then in oil, reheated it, welded again, and then hammered, folded, and quenched it, eventually no longer adding weldings but continuing to fold and hammer, quench, heat, and fold and hammer again. Even an ordinary sword had more than 4 million total layers. Many swords had the added dimension of a casing of soft steel out of which the cutting edge of the layered blade protruded. Making the best Japanese steel objects was very labor intensive, and during the 1400s the demand for the export of swords to China resulted in a reduction of the quality of Japanese smithing

as smiths spent less time on each sword in order to produce more to meet demand.

EUROPE

BY MARCOS MARTINÓN-TORRES AND THILO REHREN

The decline of the Roman Empire and the related weakening of the central authority that began in the third century led to a regional fragmentation of the metallurgical industry. Although miners and smelters continued to serve local needs, they generally worked at a small scale, leaving little room for technological innovation. This decline affected particularly silver, lead, copper, and tin; iron and steel were still necessary for axes, knives, spades, and plowshares. Not until the ninth century, when the political situation became relatively more stable, did the metallurgical innovations associated with the Middle Ages start to appear.

A few books of the period illustrate the metallurgical knowledge of the time. The most important is *De diversis artibus* (On Divers Arts), written by Theophilus (d. ca. 1125), a Benedictine monk interested in many crafts. The book provides detailed instructions on building furnaces and technical descriptions of processes such as copper smelting and refining, silver cupellation (refining in a cup), manufacturing gold foils, refining by amalgamation, brass making, tin soldering, bell casting, and iron welding. Textual information gathered from the archaeological remains of mines, workshops, and metal objects provide clues regarding the technology, skill, and trade of the metallurgist.

However, little was written about iron and steel, the main metals produced and used throughout the Middle Ages. Archaeological evidence shows that the direct or bloomery process was used ubiquitously to produce lumps of soft iron (blooms), which were then carburized (combined with carbon) if steel was needed. Suitable iron ores were available almost everywhere: bog ores in the wetter climates of northern Europe and siderite, hematite, and other rock ores as well as lateritic surface formations in drier regions. The diversity of ores and cultural traditions led to regionally different furnace types, but the ubiquity of iron ores meant that most demand was met by local or regional production. The high demand for charcoal in iron smelting resulted in exploitation of surrounding woodlands, and woodland management, primarily coppicing (cutting back to encourage regrowth) and rotating, became necessary to sustain production.

The heart of medieval nonferrous metallurgy was in areas of central Europe that were rich in ores, timber for charcoal fuel, and streams for transport and hydraulic power. Particularly productive areas were the Black Forest, the Harz mountain range, Saxony, Bohemia, Silesia, and Hungary. These

regions were progressively colonized by Flemish, German, and French settlers, who became the most renowned metallurgists of their time. Beginning around the ninth century the rich mines of Hungary were smelted by captives under the rule of Charlemagne. The discovery of rich silver ores in Freiberg, Saxony, in the 12th century led to a “silver rush” and the subsequent development of a full metallurgical town with some 30,000 inhabitants. From mountains in the Harz range, including Rammelsberg and Mansfeld, ores were exploited for silver, copper, zinc, and lead; however, Stora Kopparberg in Sweden became a serious competitor in the 14th century.

Important metallurgical centers also developed outside central Europe. In England, for example, tin production in Cornwall rose steadily, reaching an average of 700 tons a year in the 14th century, and the silver mines of Devon were leased by wealthy Florentine investors. Lead production was also very important in England, reaching levels comparable to those of central Europe. In 1316 lead ores containing silver were discovered in Languedoc. Other important silver and copper ores were exploited in the Alps. Zinc ores in the Meuse Valley and elsewhere were utilized for the production of brass, an alloy of copper and zinc that was increasingly used for household implements as well as civil and ecclesiastical

furnishings. This led to a steady rise in the demand for copper. Other important metals in the period were pewter, an alloy of lead and tin used by the middle classes for tableware and jewelry, and caldarium, a heavily leaded and impure copper obtained as a by-product of silver extraction by liquation and used for cauldrons and other large domestic vessels.

Casting church bells posed important technical challenges because the molds were much larger than those used for any common object, and the high-tin bronzes employed resulted in objects that had a very fine sound but were extremely heavy and fragile. The first large bronze bells were cast in the eighth century, and in the following centuries they became widespread in western European churches. The experience of itinerant bell founders became crucial when, following the invention of gunpowder, the first bronze cannons and cannonballs were cast.

The need to produce arms and armor prompted both ornamental and practical improvements in metal manufacturing. Techniques for gilding shields and helmets and improved methods of metal inlay in general were introduced from the East. Since the seventh century Western metallurgists had developed a peculiar technique of pattern welding, forging together strips of steel and soft iron to create very sharp and durable swords and other weapons. Their products were in demand even in Arab countries but did not reach the quality of the damascene blades made from central Asian crucible steel. Bronze firearms and cannons came into use from the mid-14th century in Germany, but within a few decades they were replaced by cast iron.

Mints and alchemical laboratories were important focal points for developments in analytical chemistry used in metallurgy. Both the need to meet a legal standard for coin composition and the practical experiments in transmuting metal triggered significant improvements in refining and analyzing chemically inert metals and the discovery of mineral acids.

One of the most important technological innovations affecting medieval metallurgy was the use of waterwheels to power bellows and hammers. In most cases this advance was sponsored by the initiative of monastic orders. Waterwheels used for bellows are first recorded in the 11th and 12th centuries in the Alps, Silesia, and France, and there is evidence for their use in Germany beginning in the 13th century.

The impact of water-driven bellows was particularly noticeable in the iron and steel industry, where larger furnaces could operate at higher temperatures. As a result, metal extraction became more efficient, and production from previously unsuitable ores increased significantly. However, the larger furnaces consumed fuel at a much higher rate, further increasing the pressure on the available woodlands. The new process first produced high-carbon pig iron, which was then



Knight on horseback, the earliest hollow-cast pewter figure known in England and one of the earliest examples of a mass-produced medieval metal toy; Britain, ca. 1300 (© Museum of London)

decarburized in a fining hearth to produce malleable wrought iron similar in quality to the earlier bloomery iron. This technology not only increased production but also gave smelters better control over the carbon content of the iron. Consequently, some smelters could produce carbon-free wrought iron, low-carbon steel, or high-carbon cast iron, depending on the intended application. However, archaeological remains throughout Europe show very significant regional variations in metalworking technologies, depending on local traditions and environments, demand and production scales, and technical knowledge. For example, steel was produced both by decarburization of cast iron and by carburization of bloomery iron in a process called cementation.

Among the improved furnaces are the Catalan forge, used in parts of Spain and France; the Osemund furnace, used in Germany and Scandinavia; and above all the Stückofen, used in central Europe, the Alps, and eastern France. The Stückofen reached 13 feet in height and yielded pieces of wrought iron weighing about 815 pounds in 1430 and 1,320 pounds by the end of the 15th century. The output of the improved furnaces was 40 to 50 tons a year, about three times that of more rudimentary furnaces. Mechanical hammers powered by waterwheels and weighing up to 3,525 pounds were used to forge the iron.

The use of fossil coal rather than vegetal charcoal as a fuel, first introduced in the 12th century, came as a partial solution to the insidious deforestation, and it was widely employed in forges in England, France, the Low Countries, and Italy. Being much stronger than charcoal, mineral coal also could be used in larger furnaces. Ultimately, the availability of waterpower and coal led to the development of blast furnaces, much larger and more efficient than the older bloomery furnaces. Still, even though bigger furnaces were in use in the 13th century, they did not function on a large scale until the 15th century, and charcoal remained the main fuel for smelting until the advent of the Industrial Revolution. Traditional bloomery smelting remained the typical iron-production technology throughout the medieval period.

The huge scale of medieval metallurgical industries and their impact on the European economy were primary factors behind the development of new middle classes, such as the merchants and bourgeoisie, and increasing labor specializations, such as charcoal burners, miners, smelters, iron founders, and bell founders. Miners' and metallurgists' guilds gained increasing control of their trades through negotiations with emperors, kings, and civil and ecclesiastical patrons and lords, who typically owned the natural resources and kept an important share of the profits. The monetary system also developed in this period, and metal prices were adjusted by the law of demand and supply.

From the second half of the 14th century, the Black Death (1348–50) and the Hundred Years' War (1337–1453) resulted in a shortage of labor and a general decline in the production of metals. Widespread deforestation added to this crisis in the industry. Despite legislation intended to prevent it, charcoal and metal prices increased sharply as workers left smelting industries in favor of the farms.

Around 1450 the industry began showing signs of a recovery. However, the richest ore deposits in the Harz mountains, Saxony, Bohemia, Hungary, Alsace, Sweden, and Cornwall had been exhausted, and poorer and deeper deposits had to be exploited. A major development was the invention of liquation to extract silver from copper ores, significantly increasing the supply of silver in central Europe and changing the economic landscape for many copper and lead producers. Larger technological investments became necessary for draining mines and assaying ore samples to guide subsequent exploitations. Because smaller operations could not face these economic and technical challenges, centralization and capitalization became necessary. Larger smelting installations were created, with external investors financing the maintenance of the more efficient technologies and mechanical power. Capital and labor were thus progressively separated as mining and metallurgy entrepreneurs emerged to provide the funds without being involved in the practical exploitation of ores and metals.

Nonferrous metals were traded across the continent on a large scale from markets such as Nuremberg and Venice, leading to the rise of merchant families, among them, the Fuggers and the Turzos. At the same time learned metallurgists such as Lazarus Ercker (1530–94) and Georg Agricola (1494–1555) started to bridge the divide between metallurgical practice and intellectual education, thus paving the way for more efficient metallurgical engineering and a more empirical understanding of nature that would contribute to the rise of modern science.

By the end of the Middle Ages, German metallurgists were increasingly renowned and sought internationally as the experts of their time. German specialists and their metallurgical tools such as crucibles are documented in France, Scandinavia, England, and later in the New World colonies. The prosperity of European metallurgy lasted only until 1530, when the stream of precious metals from America and a crisis in credit led to another upheaval of the industry.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

The products of metalworkers in the medieval Islamic world were famous throughout Asia and Europe. Damascus steel swords were legendary for their suppleness and toughness.

Inlaid objects were coveted for their brilliance and beauty. The achievements of the Islamic world's metalworkers came from a synthesis of foreign and local knowledge as well as materials and from a passion for excellence revealed in the graceful outlines even of everyday dishes for ordinary people.

Most of what survives is brass. One reason for this is that objects made of gold or silver were commonly melted down so that their metal could be reshaped to suit the latest style fashions, and they were often melted down for the minting of coins. The other reason is that brass objects were so well made and so beautifully decorated that they were in high demand not only throughout the Islamic world but also in Europe. Brass itself was not so valuable as to make it worth someone's while to melt it down, but brass objects were manufactured in enormous quantities, making brass a metal that archaeologists have found almost everywhere in the Islamic world.

People in the Arabian Peninsula had been smelting copper since about 300 B.C.E. By the 500s C.E. their smelting techniques were fairly complex. Metallurgists set up their furnaces at the locations of copper mines, even living with their families at the sites of their work. One site in Oman was organized by household, with each house corresponding to smelting pits and furnaces that may have been used exclusively by members of the family of the household. Most sites do not show such correspondences. Arabian metallurgy may have reached its height in skill and productivity in the mid 800s to the late 900s. In the mid 900s mining and smelting sites were abandoned, perhaps because nearly all the surrounding trees had been felled to provide wood for the fires the smelters needed. Some archaeologists have speculated that the felling of trees in Oman for smelting resulted in an ecological catastrophe in which fruitful land became desert because of the loss of trees. Mining and smelting restarted in the mid 1100s but on a much simpler basis.

Typically, copper ore was placed on stone slabs and then hammered, probably with large stones. The crushed ore was placed in pits lined with clay, surrounded at their edges by stone, and containing burning charcoal. The resulting mixture of copper and slag was then placed in a furnace. Furnaces were typically built on slopes, sometimes with leveled platforms in front of them where metalworkers stood. Furnaces were 4 to 5 feet tall and about 18 inches wide. Their shafts were lined with mortared stone. The previously roasted ore was poured into the furnace from the top. Bellows attached to pipes were used to pump air into the furnaces to keep their fires hot. When mining and smelting revived in the 1100s, furnaces were just shallow concave circular pits in level ground, lined with stone.

When Arabs conquered the Near East and North Africa, they tended to follow the practices of Byzantine and Sassanian



Canteen; brass with silver inlay, Syria or northern Iraq, 13th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1941-10)

metallurgists. The status of metalworkers varied according to region. In western North Africa, metalworkers were classified the same as butchers—as people without shame. Thus metal shops in cities tended to be located in the worst parts of town. Metalsmiths in North Africa often were Jews, some of whom had migrated south of the Sahara, bringing their skills and knowledge to Mali and other African cultures. On the other hand, the skills of metalworkers in Syria and Iran were admired, and they frequently were rewarded with important government posts.

The two metal products for which Islamic medieval metalsmiths are nowadays most famous both have the description of “damascened,” which can be confusing. Inlaid metal objects were called *damascened* because European traders first encountered them in Damascus. Linguists are not entirely in agreement as to why a certain type of high-quality steel also came to be called *damascened*, but it is likely that the name was attached to Damascus swords, which were made of Damascus steel. This steel was probably called *Damascus* because European traders first bought the swords in Damascus.

Copper was mined not only in Arabia but also in the regions of modern-day Pakistan and Afghanistan, and it may have been imported into the Islamic world from sub-Saharan

Africa and India. Metallurgists combined the copper with tin, which was usually imported, and zinc to make bronze and brass, respectively. The finest brass of the medieval world may have been manufactured in Lahore and other locations in modern-day Pakistan. Finding a good way to mix zinc and copper to create brass was a challenge in medieval times. Often, brass was an inconsistent mixture of copper and zinc, with the two metals bonded together in a process of annealing and hammering. In the region of present-day Pakistan, metalworkers figured out how to melt copper and zinc together into liquids in a process archaeologists are still learning about. Perhaps the metalworkers used crucibles similar to ones used in India. The resulting alloy was over 33 percent zinc and required no annealing to make it brass; it emerged from furnaces so well mixed that metalworkers could cool it in thin sheets without the need for hammering.

This brass had many functions. It was used to make scientific instruments and is best known as the metal used to make the plates in astrolabes and other astronomical instruments, but it was used for scales and surgical instruments as well. The brass became part of everyday life in the Islamic world, turned into simple plates, cooking utensils, lamps, and other common objects. The metallurgists became so adept at making the alloy that they could vary the percentage of zinc in it to create different effects in the finished product. For instance, they would increase the percentage of zinc to make a brass that when polished had a brilliant sheen that resembled gold. This meant that people who could not afford gold still could have objects in their homes that had the luster and beauty of gold.

Inlaying metal objects was a craft in itself, apart from smithing. Smiths and casters would make objects that would then be given to inlayers. Both casting and smithing techniques resembled those of India and the Byzantine Empire, with India's techniques slowly becoming dominant from Islamic India to Egypt. There were two ways that medieval metalworkers of the Islamic world inlaid objects. Both were borrowed from India and China but were brought to their height in Iran. The first was introduced to the Islamic world through eastern Iran, which produced fine inlaid objects throughout the medieval era. A sharp-edged steel tool was used to gouge images into the object's surface. Sometimes acid was used to deepen the scratches. Then wire or metal sheets were applied to the scratches, usually wire for copper and silver and sheets for gold. This was a laborious process begun by pressing the wire or sheets into the scratches and then using awls and punches to fix the inlay into the object's surface. When this process was completed, the object was reheated to perhaps 1,400 degrees Fahrenheit to fix the inlay in place, after which the object would be polished. Although

most inlaid objects were brass, some were iron, steel, bronze, copper, silver, or gold. Precious and semiprecious stones were sometimes fixed in the object's surface.

The other form of inlay was faster and less expensive but yielded a less satisfactory product. This involved roughening the surface of a metal object so that it was covered by shallow incised lines and pits. These incisions and pits would hold inlaid metal no matter what pattern was used, so an image could be drawn on the surface to be followed by inlaid metal, or the metal inlay could just be applied freehand to form patterns or images. The inlay was mostly sheets of very thin metal that were pressed or tapped into place using punches and hammers. The principal drawback to this technique was that the inlay tended to peel off the surface over time. It became a common form of inlay in the Islamic world during the last few centuries of the medieval era.

Damascus steel swords were recognizable by the wavy patterns on their blades. These patterns probably resulted from a refining process that produced carbon nanotubes (microscopic tubes, with a diameter measured in nanometers) that swirled during the annealing process. The steel came from India. Modern-day archaeologists and metallurgists have long debated how the steel acquired its toughness and flexibility and have proposed several possibilities. In general, they agree that Damascus swords were the best weapons in the medieval Islamic world, perhaps equaled or surpassed by some swords in China but truly surpassed by swords made in Japan. Iron from some Indian mines contained trace amounts of vanadium, at about 0.003 percent. It is possible that the vanadium helped the carbon nanotubes remain smoothly mixed in the iron rather than clustering in brittle clumps, and it may have prevented the carbon from becoming graphite, which would have deprived the steel of its toughness.

Steelworkers moved from Iran through much of the eastern Islamic world. The Mongol invasions of the 1200s caused some to flee their homes in Syria and migrate to North Africa and al-Andalus. The finest manufacturers of steel products seem to have been Yemen and Syria, but the details of how they turned Indian iron into Damascus steel do not seem to have been recorded, perhaps because working with steel tended to be a hereditary occupation with its techniques passed on as secrets from one generation to the next, thus ensuring the future prosperity of the family. Steel was occasionally cast to make objects, but it seems to have usually been worked by smiths. The process for making Damascus steel resembled processes used in China and Japan. The steel from India, now known as "wootz steel," was heated, hammered, quenched in water or other liquids, heated, hammered, and quenched again until it had the desired shape. In the case of a sword or knife, this was a narrow bar. This process seems to

have created layers of vanadium that developed during cooling. This process yielded a very sharp, durable edge.

Some smiths seem to have welded wrought iron to the steel. Wrought iron is iron with .06 percent or less carbon. It is soft, flexible, and relatively easy to shape. The wrought iron would be welded to the steel bar in a furnace, then the bar would be folded on itself, hammered, quenched, reheated, folded, hammered, quenched and so on. The wrought iron could make the blade more flexible. In any case, the flat sides of the blade would have iridescent swirls caused by the carbon nanotubes. Smiths in Afghanistan and perhaps elsewhere became so adept at working with Damascus steel that they could choose special patterns of swirls by how they heated and quenched the steel.

See also ADORNMENT; ALCHEMY AND MAGIC; ART; ASTRONOMY; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FORESTS AND FORESTRY; HEALTH AND DISEASE; HOUSEHOLD GOODS; INVENTIONS; MIGRATION AND POPULATION MOVEMENTS; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; SACRED SITES; SCIENCE; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; TRANSPORTATION; WEAPONRY AND ARMOR.

FURTHER READING

- Walter Alva and Christopher B. Donnan, *Royal Tombs of Sipán* (Los Angeles, Calif.: Fowler Museum of Cultural History, 1993).
- Jeannine Auboyer, "The Manual Crafts." In her *Daily Life in Ancient India, from Approximately 200 B.C. to 700 A.D.*, trans. Simon Watson Taylor (New York: Macmillan, 1965).
- Paul T. Craddock, *Early Metal Mining and Production* (Edinburgh: Edinburgh University Press, 1995).
- Robert J. Forbes, "Metallurgy." In *A History of Technology*, Vol. 2, *The Mediterranean Civilizations and the Middle Ages, c. 700 B.C. to c. A.D. 1500*, eds. Charles J. Singer, E. J. Holmyard, A. R. Hall, and Trevor I. Williams (Oxford, U.K.: Clarendon Press, 1957).
- Dorothy Hosler, *The Sounds and Colors of Power: The Sacred Metallurgical Technology of Ancient West Mexico* (Cambridge, Mass.: MIT Press, 1994).
- D. Scott MacKenzie, "The History of Quenching." Available online. URL: http://www.dolcevoce.com/Quenching_History_short.pdf. Downloaded on September 22, 2007.
- Colin McEwan, *Pre-Columbian Gold: Technology, Style and Iconography*, exhibition catalogue (Chicago: Fitzroy Dearborn, 2000).
- Eugene L. Mendonsa, "The Advent of Metallurgy: Tools and Art." In *West Africa: An Introduction to Its History, Civilization and Contemporary Situation* (Durham, N.C.: Carolina Academic Press, 2002).
- John U. Nef, "Mining and Metallurgy in Medieval Civilisation." In *The Cambridge Economic History of Europe*, Vol. 2, *Trade and*

Industry in the Middle Ages, 2nd ed., eds. Michael M. Postan and Edward Miller (Cambridge, U.K.: Cambridge University Press, 1987).

- Roland Oliver and Anthony Atmore, "The Land of the Blacksmith Kings." In *Medieval Africa, 1250–1800* (New York: Cambridge University Press, 2001).
- Oscar Ratti and Adele Westbrook, "The Art of Swordsmanship." In their *Secrets of the Samurai: A Survey of the Martial Arts of Feudal Japan* (Rutland, Vt.: C. E. Tuttle, 1973).
- Theophilus, *On Divers Arts*, trans. John G. Hawthorne and Cyril S. Smith (New York: Dover, 1979).
- Joseph O. Vogel, ed., *Ancient African Metallurgy: The Socio-Cultural Context* (Lanham, Md.: AltaMira Press, 2000).
- Rachel Ward, "Metalwork." In *Medieval Islamic Civilization: An Encyclopedia*, ed. Josef W. Meri (New York: Taylor and Francis, 2005).

► migration and population movements

INTRODUCTION

In the Old World the concept of the Middle Ages as a distinct period in history was conditioned by a series of migrations that fundamentally changed the demographic, cultural, and political shape of Eurasia and Africa. The most important of these migrations, the one that brought about the collapse of the Western Roman Empire and initiated the Middle Ages in their narrowest and original sense as post-Roman European culture, was the out-migration of Hunic and Turkic peoples from inner Asia. This process, which was not completed until the 13th century, had even more far-reaching effects than the fall of Rome. It changed the entire political and cultural geography of Eurasia.

The Huns and Turks lived as nomads tending herds of horses and other domestic animals in the vast area of steppes between Europe, India, and China. They had no settled homes or country and followed their herds, wandering hundreds or thousands of miles a year and living in tents and wagons. Accustomed to the life of the steppe, the peoples of inner Asia produced the finest cavalymen in the world. The steppe tribes usually had little trouble attacking and overcoming more settled populations when they wished. In the Middle Ages the steppe tribes gained a tremendous advantage through adopting the stirrup. It made their way of life virtually living in the saddle far easier and made them still more effective as cavalry fighters. The history of the stirrup is not well understood. There is evidence that a loop for the rider's big toes was used in India in ancient times. Other evidence suggests a true stirrup may have been invented in China. However, it was used in the Kushan Empire in inner Asia by the second century C.E. and spread quickly from there to the nearby nomad populations.

Why the medieval migration took place is far from clear, but Hunic raids against China were heavily repulsed as early as the first century. By the early fourth century Huns were in the Ukraine, and in 392 they had conquered the Kushan Empire on the southern fringe of inner Asia, but the decisive wave of migration was to the west. The Huns initially displaced Iranian-speaking Sarmatians and Alans from the steppes of the Ukraine and Caucasus. Turned back from Gupta India also, they brought more pressure to bear on the Germanic tribes in the West, both the nomadic Visigoths in the Ukraine and eventually those in the German homeland between the Visula and Rhine and all the way to the borders of the Roman Empire. This caused a flood of displaced Germanic peoples into the empire that broke up the Western Roman Empire. Attila unified a state among the Huns and Germanic peoples in Europe and raided the empire himself as far as Orléans (in present-day France) and Rome.

Turks followed hard on the heels of the Huns out of inner Asia and entered in large numbers into the Islamic Empire, especially as mercenaries, though without losing their tribal identities. The Seljuk and then the Ottoman Turks came to rule the center of the Islamic world. The Ottomans, in particular, expanded their rule into Europe, conquering the Byzantine Empire and capturing Constantinople in 1453 and eventually advancing to the gates of Vienna (in present-day Austria). Other steppe nomads, the Magyars, who spoke a Finno-Ugric language, invaded Europe in the ninth and 10th centuries and contributed to the chaos of the period.

The last great wave of out-migrations from inner Asia was the Mongols under Genghis Khan. He and his successors conquered an empire that endured throughout the later Middle Ages and stretched from China to include all of inner Asia, Iran, the Near East as far as Baghdad, Russia, and much of India. Mongol forces had won victories in the region of today's Poland and conquered modern-day Hungary and were preparing to attack western Europe. Except for the death of the Great Khan Ögedei and a recall to Mongolia to elect his successor, the planned campaign to reach the Atlantic may well have succeeded. In the 14th century Tamerlane, a Mongol nobleman (leading a mainly Turkish army), conquered northern India, and his successors in the Mogul Dynasty later overran nearly the entire subcontinent.

The nomadic horse-breeding tribes of Arabia also had an out-migration that helped to condition the formation of the medieval world. Their rapid conquests in the mid-seventh century from inner Asia and northern India through the entire Near East and across north Africa to Spain spread Islam as one of the great world religions and Arabic as one of the world's most common languages. They entirely absorbed the

Sassanian Empire and took half the territory of the Byzantine, or Eastern Roman, Empire.

The cultures of Africa and of Polynesia also took on new characters during the medieval period as the result of migration. Bantu-speaking peoples spread over southern Africa from their homeland somewhere in the Congo basin, completing their movements by 400 C.E. They supplanted or absorbed existing cultures and spread agriculture, pastoralism, and ironworking into areas where many of the previous inhabitants had been hunter-gatherers. Also in about 400 a new wave of Polynesian migration moved out across the Pacific, reaching Hawaii and New Zealand. A few may have ventured as far as the coast of North America; that, at least, is one explanation offered for the presence of domestic chickens in the pre-Columbian Americas.

In North America, Athabascans and farming tribes from the Great Basin moved south throughout the Middle Ages, displacing many tribes, including the people who eventually settled in the basin of Mexico and became the Aztec. Many tribes have legends of extensive wanderings in the past, but the era in which this occurred cannot always be easily determined. Most migrations in the Americas during the Middle Ages were on a very small scale of population and often quite slow.

AFRICA

BY CHARLES W. ABBOTT

Migration and population movements characterize Africa as far back as our knowledge extends. Generalizing about medieval times is a challenge because written records are scarce and patchy during most of the period. Only the regions of Egypt and the Nile Valley corridor have abundant written records dating back to 500. These same regions have been studied most intensively by archaeologists as well. Arabic language documents begin to mention Sudanic states such as Ghana sometime around the year 800. Except for the Swahili coast, we have almost no written information about the southern half of Africa until the coming of the Portuguese. Written history being nearly blank, our knowledge about much of central and southern Africa is based largely on linguistic and archaeological evidence.

It is tempting for us to focus on empires, large states, big events, and well-known ethnic groups, but by doing so we impose our own biases on events. The glory of major states often meant suffering for their neighbors, and in speaking of Bantu peoples, or Berbers, or Nilotics we may imagine uniformity when Africans who lived through these times saw variety, identifying with close kin groups and experiencing conflict with those just like themselves.

A HISTORY OF MOBILITY

The African setting provides some peculiarities relative to Eurasia, distinctions that set the context for a discussion of population movements. There were few economically valuable “hearth areas” in sub-Saharan Africa comparable to the Fertile Crescent. The Fertile Crescent hosted sophisticated urban civilizations for thousands of years, as did China’s great river valleys. In those areas individual communities might suffer war and conquest, but the urban fabric endured or was quickly restored. Even in Europe many cities date back to Roman times. In contrast, Africa seems to have always been a thinly populated continent with few urban hearths that endured permanently. Large-scale irrigation south of the Sahara was unknown outside a few favored settings such as the Niger River’s inland delta (in present-day Mali), and rains were uncertain.

In *States and Power in Africa*, Jeffrey Herbst summarizes the issue: Land was abundant; it was people to work the land who were scarce. Much of the land had low productivity and was prone to drought or soil exhaustion—it wasn’t great land, but there was plenty of it. In most places the ox-drawn plow was rare or nonexistent; instead, people worked the land with hand tools. Low productivity, poor soils, and variable rains combined to make it hard to maintain large numbers of people in one place (to inhabit a city permanently, for example). African states often based their power not on control of valuable agricultural territories but on control of long-distance trade routes. With land abundant relative to people, property rights in people were well defined. Much of the labor market was not a system for wage labor; it was instead a market for slaves. Throughout Africa family ties were conceptualized and described in extremely elaborate terms. Kinship provided a key method for mobilizing labor, maintaining cooperation, sharing risk, and protecting oneself from outsiders.

In such circumstances people were relatively free to flee bad conditions or to move toward good ones. Cities might hold large populations for a time, but such settlements periodically appeared to outlive their usefulness. We can discuss migration in terms of “push-and-pull factors.” Push factors drive people away; they are conditions such as drought, sickness, and war. Pull factors draw people closer; they are conditions such as peace, abundant resources, and just rule. Africans were sensitive to these factors, and often they moved quickly in response to them rather than stay put. Pull factors might aggregate people in one place, but often push factors dispersed them again.

Despite migrations, linguistic evidence indicates that most communities remained small. From our present-day perspective, sub-Saharan Africa is home to about 12 percent

of the world’s population but hosts roughly 29 percent of the world’s 6,912 living languages enumerated by *Ethnologue*, an encyclopedia that catalogs known living languages. Such linguistic fragmentation implies a corresponding political fragmentation—the tendency for many people to live their lives within small communities, indifferent to empires or bigger states. Large empires tended to rise and then fall, but it was the kin group and the local community that mattered.

We can distinguish between pastoralists and cultivators. Pastoralists specialized in caring for and herding large animals; cultivators specialized in planting, weeding, and harvesting crops. In Africa these specialties were sometimes performed by separate groups that belonged to different cultural and political communities. Relations between pastoralists and cultivators were often good—the two groups had complementary livelihoods and a strong incentive to trade with one another (milk for grains or pasturage in crop stubble for the manure left by herds). With respect to population movements, pastoralists are of special interest because they found it easier to migrate over long distances in short periods of time; cultivators moved more slowly.

If pastoralists were prone to move long distances quickly, some (but not all) cultivators were prone to move shorter distances. Scholars often distinguish between “shifting cultivation,” in which farmers actually relocate their dwellings as they exhaust local soils, and “bush fallow,” in which fields are abandoned for long periods to restore fertility, while farmers continue to reside in a permanent settlement. Shifting cultivation facilitates mobility—households relocate periodically in any case, and they may continue to move in the same direction indefinitely. If a farm hamlet moves 2 miles every two years, it can move 100 miles in a hundred years, or 1,000 miles in a thousand years.

POPULATION DYNAMICS

As the medieval age dawned in Africa, most Africans lived in small, close-knit communities. Farming peoples lived in dispersed households or small villages; hunter-gatherers and pastoralists were more mobile and often lived in temporary encampments. Pastoralists might associate themselves in small bands that split up and regrouped periodically during the year as they moved with their herds to find good pasture. Egypt was the most populous place in all of Africa. It was largely a Christian land, and its people still spoke Coptic (ancient Egyptian) not Arabic. The Sahara may have been smaller than it is in modern times, and its fringes may have been wetter.

By 400 a process called the Bantu expansion had drawn to a close. It left most of Africa south of about 5 degrees north latitude inhabited by peoples who spoke languages in

the Bantu family. The peoples associated with the Bantu expansion made iron tools, practiced farming, and knew cattle husbandry. The expansion apparently was not the result of simple migration; it probably resulted from a combination of migration, intermarriage, and the spread of technology and culture over several thousand years. The recently arrived Bantu speakers were not alone in their region of Africa, since preexisting communities speaking languages in the Khoisan language family remained in southwest Africa, and Pygmoid peoples who continued to practice foraging remained in isolated pockets. The expansion is of great significance to us because in the absence of written records, linguists detect more recent migrations by subsequent disturbances of a largely Bantu linguistic landscape.

EGYPT, THE NILE CORRIDOR, AND THE HORN OF AFRICA

The human record (historical, linguistic, and archaeological) leaves an impression of the development of shifting states and centers of power as the medieval era progressed. One visible change was the Islamization and sometimes Arabization that proceeded from the Middle East after Arab armies conquered Egypt in the years 639 to 642. Arabs did not replace the previous inhabitants of Egypt and did not move into Egypt in large numbers. Instead, over time, the Egyptian language (Coptic) became relegated to a local and household language; Arabic became a language of higher status and was mandated for most public purposes. After 650 peoples as far distant from Arabia as Morocco, Mauretania, and Sudan slowly became progressively Arabized, a process that continues in Africa up to the present-day. Other communities became Muslim without being Arabized—Berbers of the Maghreb and Sahara and Somalis of the Horn of Africa became Muslims without becoming Arabs. Thus our understanding of migration requires careful analysis. One language community can replace another through war and the flight or domination of the vanquished. Alternatively, a group can remain in the same place and undergo linguistic conversion.

The Nile Valley and its corridor had historically served as a “bridge” for migrations between Egypt and the rest of Africa. Nubia (the area of the Nile Valley between the first and sixth cataracts) was the home of ancient kingdoms such as Kush and Meroë, and it remained Christian for hundreds of years after the Arab conquest of Egypt. Nubia’s forces were finally defeated militarily by Egypt under the Mamluks after 1260; this opened the upper Nile to Arab invaders and camel-herding pastoralists. One eventual result was the isolation of highland Ethiopia, which had become Christian around the year 500. Following the fall of Nubia, Ethiopia became an island of Christianity surrounded by Muslim peoples

(Arabs, Somalis, and the peoples previously called Galla and now known as Oromo who moved out of Somalia, harassing the Ethiopian highland peoples). The Nile corridor became a pathway between the Muslim Middle East and the states of the Sudanic zone. After the conversion of Sudanic Africa to Islam, the Nile became one pathway for the pilgrimage to Mecca as well.

SUDANIC STATES

As the Middle Ages progressed, we find clear and abundant evidence of large imperial states in the Sudanic zone, that is the band of savanna between the Sahara and the equatorial forests. Ancient Ghana, then ancient Mali (neither should be confused with the modern-day African countries of the same names), and later Songhai were three of the largest such states. These states served the trans-Saharan trade, as did the later-arising Hausa city-states (such as Kano, Katsina, and Zaria), Kanem-Bornu, and Darfur.

Sudanic states influenced population movements in four ways. First, they structured space in a particular way, providing law and order (if not equality and democracy) for the relatively large numbers of people who were governed by them in their core territories. The concentrations of people within the core territories represented agglomerations of market demand, agricultural and craft skills, political power, and military might.

Second, such states were foci for long-distance trade, and they attracted foreign experts of all kinds. Foreign merchants journeyed across the Sahara for trade, and by the 800s these trans-Saharan merchants were usually Muslims. The Sudanic states were thus incorporated into an Islamic system, facilitating the migration of specialist scribes and clerics. Sudanic states had market niches for specialists of various sorts, such as healers, court historians, teachers, and military advisers. In this sense, we are reminded that there are various types of migration. We may think first of all of the migration of peoples *en masse*, but also noteworthy is the migration of specialists.

Third, the Sudanic states tended to have predictable impacts on their neighbors. They were politically well organized and militarily powerful, and they thrived in part by enslaving their neighbors. The Sahara was almost empty, but nearby and to the south of the Sudanic states were various peoples who became prone to enslavement; often they were from numerically small and politically unorganized groups who were unevenly matched against Sudanic armored cavalry. The capture and enslavement of neighboring peoples itself produced migration (in this case forced migration); slaves were forcibly transported hundreds of miles from their place of origin so that escape through flight was nearly impossible. Some enslaved persons were sold across the Sahara to North Africa;

some toiled in open-pit salt mines within the Sahara. Some, such as eunuchs, attendants, or soldiers, became court slaves of inestimable value to kings or elites. As the Sudanic states' harried neighbors struggled to defend themselves, they often evolved into tributary states, protecting themselves from raids by paying tribute with slaves that they themselves went and captured from farther away.

Such tributary status was facilitated by conversion to Islam. Islamic thought and culture distinguished between *dar al-Islam*, lands under Muslim rule where peace should prevail, and *dar al-Harb*, lands under non-Muslim rule where war and raiding for plunder was legitimate. Slave raiding affected not only those persons captured but entire societies as well. Those persons who were not captured often migrated away from open landscapes favorable to horses, retreating into settings unfavorable for cavalry, such as dense forests, rugged terrain, or swamps. In this way each Sudanic state concentrated power in its core territory south of the desert, but it emptied out some lands on its fringe as vulnerable neighbors fled from its predations.

Fourth, as the Sudanic zone became Islamized, Sudanic cities became nodes on the path of the hajj, the pilgrimage to Mecca. The hajj was physically demanding—most routes followed one of several paths north across the Sahara, while eventually an eastern course developed that ran past Lake Chad through Darfur, traversing semiarid lands but skipping nearly all of the Sahara proper. Even if Sudanic peoples made the hajj, it provided a means for the transmission of information, technology, ideas, and news about the wider world. The hajj linked Sudanic Africa to the medieval Middle Eastern empires that were for hundreds of years the largest and most sophisticated states outside China.

FORESTS AND SOUTHERN REGIONS

The Sudanic states exemplify state formation on a larger scale, and their impacts on population movement were considerable. In the forests to the south we see similar dynamics on a much smaller scale. We see differences as well, because several factors contributing to the vitality of the Sudanic states and their impact on population movements were absent in the forest. To begin with, Sudanic states were termini for trade routes across the desert to North Africa, channeling the North African demand for such products as gold, ivory, and slaves. In addition, the Sudanic zone was free of disease-bearing tsetse flies that sickened and killed camels, horses, and cattle, and the use of cavalry favored the expansion of large states. This advantage of cavalry faded out in the forest zone, where horses and camels quickly sickened and where dense vegetation checked their maneuverability and favored defense measures and the ambush of invaders.

South of the Sudanic belt proper lay a transitional zone—what in Nigeria is called the middle belt, and farther west in present-day Ghana was the land of the Mossi states. In this zone a variety of small monarchical states imitative of the large Sudanic empires arose. Farther south lay the true forest, with a closed canopy of trees and tsetse flies deadly to horses and cattle, where the texture of life was different: more rain and food crops of yam rather than grains. Portions of the western forest generated states and kingdoms of their own, such as Benin, Asante, and Ife. These states, especially in gold-producing portions of the forest, were linked by trade to the Sudanic states. Besides gold, other valuable commodities were slaves, ivory, and kola nuts.

The trade networks in many places represented an ethnic diaspora—they depended on the strategically scattered presence of coethnics who had left their home areas and settled elsewhere as strangers to do business. In present-day Nigeria many of the traders were Hausa-speaking Muslims; in modern-day Ivory Coast they were often Dyula.

Some places in the forest belt of western Africa, such as Iboland (southeast Nigeria), were honeycombs of autonomous local societies where most persons never traveled or migrated at all. The average person would have found it unsafe to leave his own cluster of villages—the area was a patchwork of village republics, each of which lived in a state of armed truce if not open warfare with its neighbors. The people of this area were “stateless,” meaning that they had no government above the level of a cluster of villages. In regions such as Iboland wealthy individuals joined politico-religious associations that enabled them to move unmolested between communities. In Iboland the Aro were one such group; they were not an ethnic group but rather a trading network with links to their sacred oracle at Arochuku.

A still different pattern yet holds among peoples of the Guinea Coast, such as the Biafada and Kru. They traveled along the Atlantic coast in large canoes, fishing, harvesting kola nuts, transporting trade goods back and forth along the coast, and sailing up coastal rivers to exchange with Mande traders who were linked to the trans-Saharan trade. After the Middle Ages Mande groups from inland successfully fought their way down the coast.

The central African rain forest that comprises much of the Congo basin made for relatively inhospitable territory. The area was thinly populated, and polities were quite small. Pygmoid peoples continued to dwell there as hunter-gatherers, even after the Bantu expansion. We might note that in major portions of central and southern Africa there was no local source of gold, no links to North Africa and the greater Muslim world, no horses, no camels, and no mounted warrior knights. The growth of states, with their internal security

WHERE DID THE PEOPLE OF GREAT ZIMBABWE COME FROM?

The ruins of the city of Great Zimbabwe, once capital of an empire, have mystified and entranced people for hundreds of years. It was situated on the Zimbabwe plateau at the confluence of trade routes for gold, animal hides, feathers, and gems, and its people became rich and prospered. Historians generally agree that the people of Great Zimbabwe were Shona, people from woodlands hundreds of miles to the west who in the 1000s gradually expanded eastward all the way to the coast, where the city of Sofala flourished as a center for exporting gold and importing goods from across the seas. They expanded their range to the north to the Zambezi River.

The origins of the Shona are uncertain. They may have been of the Bantu language group, part of the centuries-long migration of Bantus from western Africa eastward and southward. They would have been just one of several waves of southward migration as Bantu farmers moved into central African rain forest only to abandon its poor soil and tsetse flies and only to be replaced by new migrants, while they themselves discovered that the open woodlands south of the rain forest also had poor soil and the tsetse fly. If this was so, their migration eastward may have been a matter of trying to survive by searching for richer and healthier lands.

On the other hand, the people of Great Zimbabwe brought with them a cattle-herding tradition. The capital city and its many satellite settlements had corrals for keeping cattle. This suggests either Khoi ancestry from South Africa or a different Bantu lineage coming from the Bantu descendants who migrated southward along the eastern coastal plain. Both had cattle-herding traditions. The Khoi were rarely farmers, but the people of Great Zimbabwe were. After the migrations of the Bantu cattle herders followed Bantus who were farmers. Both groups of Bantus could have spread westward into the heartland of the Shona to become the Shona, yet this does not entirely rule out the Khoi or other pastoral cultures of the interior. Those people who migrated south through the interior of Africa often settled among and intermarried with people who were already there. The Shona could have been a culture formed out of the mixing of cultures, forming their own tradition of mixed farming and herding.

and external predation, was on an altogether smaller scale. Enslaved persons were more likely to be retained locally or to be used as porters for loading trade goods.

In central Africa portions of the Congo River supported seasonal and permanent migration via canoe for harvesting fish; the surplus could be traded to peoples who lived far from good fishing. Farther to the east and south the area between the Zambezi and Limpopo rivers had resources of copper, gold, and ivory; it was also close enough to the trading towns of the Swahili coast to be integrated into the Indian Ocean trade system. It was this area that produced the community of Great Zimbabwe.

PASTORALIST MIGRATIONS

One major example of pastoralist migration is that of the Fulani people, also known as the Fulbe. They are striking in appearance because of their tendency to be tall and light skinned, and all evidence indicates that they are indigenous to the Senegal River valley. Specializing in cow-based pastoralism, they have expanded their pastoral range century by century, moving into and over the Fouta Djallon highlands and thence ever eastward through the Sudanic zone. Becoming Islamized over time but often retaining an identity separate from their sedentary neighbors, the Fulani have always been

a minority relative to their settled neighbors; when inhabiting cities, they have rarely become farmers but often clerics, rulers, and judges. By 1500 they had reached the Hausa cities of northern Nigeria.

If the Fulani provide an example of a pastoral ethnic group remaining largely coherent in its migration, the general contours of a contrasting example appears in East Africa, where cow-based pastoralists moved south from the upper Nile valley into the interlacustrine (situated between lakes) region of East Africa. Waves of these groups moved into the Great Lakes area and farther south after about 1300; they appear to have spoken Nilotic or in some cases Kushitic languages. They interacted with the preexisting Bantu people of the area in a number of ways: disrupting, displacing, conquering, and being assimilated by them.

One key factor driving this migration was probably population pressure—not from people but from their cattle. Based on ethnographic knowledge of similar groups in historical times, we know that many ethnic groups viewed cattle as a status symbol and a durable store of wealth to be owned but rarely killed. In addition, many pastoralist groups had a segmentary lineage system that promoted external aggression to preclude internal conflict. A final element is an age-grade system and manhood ceremonies in

which young men were required to demonstrate their martial prowess. When these are combined, the result is societies of land-hungry cattle herders who are eager to find fresh new pasture before they start fighting among themselves. The vanguard of such a people is young men itching for a fight that they consider desirable and inevitable. Some of this is conjecture, though similar movements are documented in historic times. The primary evidence is archaeological, anthropological, and linguistic.

Aside from land-based migration and population movements, two seaborne movements bear mentioning. The first is that centered on the Swahili coast of East Africa, where seaborne traders traversed the coast, traveling as far as the Persian Gulf and India to establish Swahili cities. The Swahili cities were settled by a fusion of Arab and local African population. These cities served as trade links between the interior of East Africa and the Indian Ocean trading system, but they did not exercise much influence on the interior of East Africa, remaining relatively small, outward-looking cities.

Toward the end of the medieval period Portuguese mariners rounded the bulge of Africa for the first time. When they did so, they ended the isolation of the Atlantic coast of western Africa; from then on it would not be an isolated periphery of the continent, but one of Africa's links to the wider world. As maritime trade began to link Africa to the rest of the world, trading systems started to reorient themselves away from the Sudanic zone and the Sahara. Isolated coastal fishing villages on the Atlantic coast were fated to grow slowly into more substantial mercantile settlements. Some of their earliest new residents would be mixed race Portuguese-Africans and the growing number of Africans who moved to the coast in pursuit of trade.

THE AMERICAS

BY LAWRENCE WALDRON

By the beginning of the Common Era most of the major migrations of indigenous American peoples had already taken place. From the first great Siberian crossing over the Bering Strait to the colonization of the Caribbean islands, these migrations had led to the emergence of hundreds of ethnicities. However, these groups seldom stayed put in the ecological niches to which they had first adapted. In the case of hunting-and-gathering societies, some American peoples would remain mobile well past the dawn of the Common Era, even into modern times. The development of agriculture by ancient Native Americans did not guarantee that nations would remain sedentary, since farming often could not match the diversity or quantity of food sources provided by the natural

environment. Additionally, climate changes, ecological collapses, warfare, religion, and long-distance trade all contributed to the dispersal of populations.

Several millennia after their first arrival, the original American groups were joined by newer waves of people making separate crossings from Asia. The ancestors of the modern Navaho and Inuit arrived in Alaska in the ninth millennium B.C.E. and 5,000 years later, respectively, adding to the thrust of internal American migrations. The former group, the Athabascans, would continue to migrate south, displacing other groups, well into the age of the Anasazi (ca. 900–ca. 1300 C.E.). Thus, numerous migrations within the Americas, coupled with the arrivals of new groups from Asia, caused many ethnicities to relocate from earlier homelands, sometimes more than once.

NORTH AMERICA

Of the Americas, the most internal mobility was exhibited in North America, with its extremely wide range of populations, including many loosely organized groups of hunter-gatherers. The continent's hunter-gatherer migrations followed a seasonal cycle, as bands of Native Americans followed bison, which were themselves seeking out the greatest concentrations of edible grasses. Thus, groups from Saskatchewan to Texas behaved much like particles in a convection current, leaving one grazing expanse on either the north or south end of bison territory to follow the animals deep into the Great Plains or the Great Basin, then returning to their original territories the following year. With respect to these movement patterns, the archaeological record is sometimes difficult to read because groups occasionally used such different tools in the different parts of their migrations that they appear to be different peoples by the evidence left behind. Spear and arrow tips changed in shape and size as people moved from areas with more diverse game to areas where bison was the only source of meat. Nomadic groups also used different natural materials to make their tools, vessels, and clothing as they moved from one ecological environment to another. From remains in graves and trash heaps (called middens), archaeologists often can identify the times of arrival or dispersal of very large groups who used stone, clay, or bone implements. On the other hand, tracing the movements of groups who used biodegradable tools, weapons, and containers is much more problematic. In the case of the American Southwest a record of the great population movements has been preserved by the relatively dry and undisturbed desert environment, but in the wetter woodlands elsewhere in the United States and Canada, water activity, bacteria, and other agents have destroyed much of the evidence of early peoples.

Of course, not all groups in pre-Columbian North America were constantly mobile. The area that is now the United States in fact produced several different models of human settlement, some of which defy easy classification. Agrarian groups living along the Mississippi River and farther east are known to have mixed a settled, agriculture-based lifestyle with regular hunting and gathering. From the Adena, Hopewell, and Cahokia peoples to the ancestors of the Iroquois ethnicities, eastern Native Americans practiced a kind of occasional migration in and out of territory where they owned permanent homes, attended ceremonial observances, and raised children. Even after the introduction of maize as an essential staple sometime in the fourth or fifth century, Eastern Woodland peoples continued to migrate to the forests to obtain meat, fish, and other foods during some part of their yearly cycle.

Along the Pacific Coast from California to Alaska, fishing and foraging for nuts and fruit provided rich stores of nourishment to local residents. In fact, the wealth of this environment may have been the very reason that some groups remained mobile. New groups sometimes arrived from inland to compete for coastal resources, perhaps even waging war on and displacing the people already living there. In general, the abundant rich fisheries along coasts and rivers seemed to deter many Native Americans from settling down into agriculture, as the natural environment was able to provide for all the needs of the expert fisher-forager. The migration patterns of groups who practiced this lifestyle were far more conservative than those of their bison-hunting contemporaries deep inland but certainly more mobile than those of their neighbors just to the east, who were among North America's first maize farmers.

The farming lifestyle could be a fragile one, since changes in rainfall, frost, and snow could easily ruin crops. In fact, climate change had dramatic effects on the western United States and was one of the main forces driving rapid changes in lifestyle and settlement patterns. In the 13th century a drought brought on by the Little Ice Age seems to have caused several agrarian groups in the Great Basin area to abandon their sedentary lives and again become mobile. With masterly adaptability, many Native American groups simply moved farther south in search of better hunting, grazing, and gathering, as well as better vegetable-fiber sources for their clothing. However, every movement southward caused these migrating groups to come into direct competition or conflict with groups already there. War, intermarriage, and further migrations could all be results of these cultural collisions.

Historians have presumed that some of the Great Basin farmers migrated into the American Southwest, but even in this relatively dry region, one of the best in North America

for preserving artifacts, some migrations have proved very difficult to track. Many different groups arriving in a given area can greatly complicate the archaeological record. Also, the fact of a migration may be evident to archaeologists from the sudden appearance or cessation in the production of certain cultural artifacts, but the routes by which that culture left one territory and arrived in another might remain undiscovered. A lack of large numbers of skeletons might likewise assure scientists that a people did not die in one spot from disease or warfare but either moved to a certain unknown location or dispersed in various directions.

With a sudden cessation of artifacts and a lack of any apparent route of out-migration, the Anasazi of the Colorado Plateau are one of those peoples whose departure from their territory is of a nature undetermined by historians. The Anasazi were a powerful first-millennium culture spread out over the Four Corners region, with trade contacts as far away as Mexico and the Pacific Northwest. The disappearance of these enigmatic cliff-dwelling people seems to have coincided with the southerly migrations into their territory of several new linguistic groups, including the Athabascan-speaking Navajo. Not far behind the southbound Navajo and Apache were groups of Great Basin farmers, including the Ute, Paiute, and Shoshone, all fleeing the drought farther north. The term *Anasazi* is in fact a Navajo word meaning "ancient enemies," such that many archaeologists have drawn conjectures regarding the coincidence of Navajo arrival and Anasazi cessation.

The rapid decline and disappearance of the Anasazi in the early second millennium have remained a matter of great interest for archaeologists and anthropologists. They do not appear to have wholly died out from epidemic or warfare, although signs of war have been found in some Anasazi settlements. One possibility is that after being swamped by waves of northern newcomers who cut off their trade routes and access to natural resources, they may have simply abandoned their increasingly beleaguered towns and cliff dwellings and dispersed throughout the Southwest. They would have then reverted to small-scale agriculture and also may have intermarried with other peoples. Thus, the combination of migration and cultural shift would have caused them to essentially become a different people. The Hopi have always referred to the Anasazi as the *Hisatsinom*, meaning "ancestors," which suggests that some of the Pueblo Indians of the present day are descendants of the dispersed Anasazi.

CENTRAL AMERICA

During the great population movements from the Great Basin to the Colorado Plateau and beyond, a humble group of hunter-gatherers left the Southwest and migrated even far-

ther south through the Mexican desert. On their journey they encountered many strange and beautiful ruins, the likes of which they may have beheld only at the southernmost Anasazi sites. These Mexican cities, known today as Teotihuacán and Tula, stood in ruins, their inhabitants having disappeared centuries earlier; they may have gone south as well. Perhaps inspired by the magnificent empty ruins, the wandering band of southwesterners finally arrived in central Mexico. There, they were repeatedly forced to move farther by rival groups until they finally settled in a swamp in the Basin of Mexico sometime in the 14th century. They would in time manage to drain the swamp, reclaim the land, and build the most magnificent city in central Mexico, the capital site of Tenochtitlán. In view of their mythic home in the American Southwest, a place they called Aztlán, they became known as the Aztec.

While the abandonment of the cities encountered by the Aztec on their way south is a matter of speculation, with archaeological work continuing at both Teotihuacán and Tula, the fate of the Teotihuacanos and Toltec is partially known. The inhabitants of Teotihuacán seemed to have exerted great cultural and possibly military influence on the Classic Maya as far south as Tikal, in Guatemala. The kings of Teotihuacán may have moved their capital south into the Mayan region or else demanded a sort of asylum there from their subordinate Maya regents after being expelled by the subjects of Teotihuacán. Such overthrows were known to happen in Mesoamerica following droughts, military defeats, and natural disasters, all believed to be punishment from patron deities.

The dissolution of Tula, like that of Teotihuacán, is couched in myth. Mexican and Mayan histories tend to agree that the city of Tula was abandoned sometime in the mid-12th century. In these accounts the Toltec king Topiltzin Quetzalcoatl had been expelled two centuries earlier by a local rival and had arrived at the Mayan city of Chichén in 987. Taking power there, he set up a dynasty that would give way to another northern invasion by an obscure people called the Itzá in the 13th century. Thus, over a period of four centuries the city now called Chichén Itzá lived through a succession of Maya, Toltec, and Itzá rulers, all of whom had migrated there from other parts of Mesoamerica.

Against the overall southward trajectory of American peoples from Idaho to Yucatán, only one major group seems to have moved northward—the Maya. Expanding, in fact, in all directions, the Maya seem to have emerged already fully formed as a nation out of Mesoamerican prehistoric time to become the most diverse, most powerful culture in the region's Common Era history. The influence of the Maya stretched far beyond their known migratory routes, although some of the migrations themselves were quite expansive. Evidence of Mayan contact has been found as far north as the

Mississippi Delta, as far south as the Andes, and as far east as the Caribbean islands, but these travels do not seem to have been conducted with the intent to settle. The Maya were an agrarian culture with a royal tradition of leadership that derived its authority from both military and religious power.

The only major migrations conducted by the Maya seem to have been the Late Classic (ca. 650–ca. 900) movements out of the Petén, the Mayan homeland in highland Guatemala, onto the flat plains of the Yucatán Peninsula, where they founded many great cities, including Uxmal, Rio Bec, and Palenque. As did many of the cultures that preceded and followed them, the Maya eventually abandoned their great cities after various environmental and military upheavals. Sometime between the 10th and 12th centuries they dispersed throughout the Central American rain forests. By the first landing of Europeans the Maya were too scattered to be summarily conquered. At that time they spoke more than 30 dialects and lived in small agrarian settlements from Nicaragua to Mexico.

SOUTH AMERICA

Like the earlier Maya kingdoms to the north, the Inca of the 15th century were known to have covered vast areas, not in search of new homes but in attempts to expand the boundaries, influence, and wealth of their centralized kingdoms. Thus, their population movements had trade and annexation rather than settlement as their impetus. In fact, the Inca often migrated to conquer, and Incan conquests typically were followed by unusual forced migrations: The royal children of conquered kingdoms and chiefdoms would be transported back to the Inca capital of Cuzco, where they would be educated in Incan customs, sciences, and history. This sequestering of conquered territories' heirs had several intended functions. The royal children were at once hostages and future representatives of the Cuzco administration while being inculcated into Inca loyalty. Upon being returned to their native territories in other parts of Peru, Bolivia, and Ecuador, they would govern on behalf of the Inca.

The Inca were not the first South Americans to control large areas through the annexation of adjacent territories, as the Nazca, Moche, and other cultures earlier in the Common Era had established tribute empires. Some of the peoples of these civilizations migrated up and down the continent's Pacific coast in the process of conquering smaller groups and maintaining power. Many Andean peoples also undertook religious pilgrimages to holy sites, called *huacas*. The routes between these *huacas* frequently were clearly marked. Sacred stones, ruins, rivers, mountains, and other natural features could inspire visits from pilgrims who lived hundreds, even thousands of miles away.

In the case of the Nazca, such devotional ambulation may have inspired the design of the famous Nazca lines, gigantic geoglyphs (a symbolic figure sketched in the earth) visible only to flying birds and modern aircraft. Some of the geoglyphs were simple geometric shapes, but many delineated the figures of various rain forest and marine creatures; both groups of species were associated with environments far wetter than the pampas that were home to the Nazca. The Nazca fashioned their geoglyphs by removing thin layers of topsoil, revealing differently colored earth just beneath. This color difference was enough to create clear lines on the vast, flat landscape, and with the use of basic surveying techniques, both straight and curved lines could be drawn with precision.

The fact that the Nazca lines resolve into pictures only from far above has inspired many outlandish speculations about archaic balloons and even alien spacecraft. Few scholars debate the origins of the figures, however, since the creatures depicted in the geoglyphs are very similar in style to Nazca and earlier Paracas textile patterns. Also, in Andean textile craftwork, the artist often cannot see the image she or he is making; weavers must maintain their concentration in visualizing the intended design, which in some weaving techniques appears only near the very end of the process. Thus, visualization was an important aspect of Nazca artistic and religious thought, such that Nazca pilgrims may have envisioned spiders, whales, or monkeys with fair facility as they walked the courses of the geoglyphs. While the origins of the geoglyphs are little disputed, their exact function remains a topic of scientific and popular speculation.

THE CARIBBEAN

By the beginning of the Common Era the Caribbean had seen no fewer than three waves of American Indian settlers, spanning some 5,000 years. Paleo-Indians had been followed by several groups of Arawakan-speaking settlers, each migrating out of the Orinoco Delta to the islands of the Lesser Antilles. Arawaks leaving South America may have been responding to pressures from groups within the continent encroaching on their former territories in the Amazon basin and through Colombia and Venezuela. Thus, migrations to the Caribbean islands may have actually begun far up the Orinoco, in Colombia's Andean piedmont.

Into the first millennium colliding waves of South American Indians began to develop an artistic, social, and religious syncretism in Trinidad that would later culminate in the unified chiefdoms of Puerto Rico, Hispaniola, and Cuba. By the second millennium the Greater Antilles were united under a few great caciques, or chiefs, in a loose Taíno confederation. Yet indigenous migration did not end with this consolidation of Arawak power, and in fact one last great wave of In-

dian settlers would arrive—the Caribs. Departing the South American mainland from along the coasts of Guiana and Venezuela, these adept seamen navigated the waves in large dugout canoes. When the Caribs arrived in the Lesser Antilles sometime in the latter half of the first millennium, they quickly began to take over Arawak territories. The Arawaks were driven further into the larger islands, most of which were in the northwest. Pressures from the northward thrust of successive Carib groups may have lent urgency to efforts to consolidate Taíno power in the Greater Antilles. The Taíno nations were still resisting Carib encroachment by the time of Columbus.

Ultimately, the Spanish were the ones to stay the Carib expansion into the Greater Antilles. The skilled and cunning Carib warrior parties had proved too difficult for even the great Taíno caciques to handle. When Taínos told Christopher Columbus that the encroaching Caribs ate human flesh, they may have been inveigling the European strangers, who bore frightening and novel weapons, into helping them fight their Carib enemies. From that time, the Arawak word for “Carib” quickly evolved into the word *cannibal*, carrying a dark connotation for Spaniards. This term, frightening for many, also became a convenient label for Native Americans whom Europeans sought to eliminate in the competition for colonial territories and resources.

ASIA AND THE PACIFIC

BY KENNETH HALL

During the medieval era there were four major migrations of peoples in the regions of Asia and the Pacific, each of which would have substantial regional consequences. A second wave of Polynesian migration occurred in the Pacific basin from initial settlements in Samoa, Fiji, and Tonga as Polynesians crossed the Pacific to settle in Hawaii and Easter Island beginning around 400 and the islands of New Zealand beginning around 1000. On the Asian mainland Burmese, Thai, Lao, and other populations from the mountainous foothills of the Himalayas in modern-day southern China entered Southeast Asia and migrated south, where they were foundational to the emergence of the present-day states of Myanmar, Thailand, and Laos. The major migrations of consequence in southern Asia, in contrast to movements of nomads and pastoralists, were those of the Huns into what is now Afghanistan and northwestern Pakistan during the era of the Gupta monarchs (320–550) in India and the later migrations of Turkish peoples from central Asia into southern Asia from the sixth through the 11th centuries. Both the Hun and the Turkish migrations from central Asia also had consequence to the neighboring eastern European and Middle Eastern regions.

PACIFIC BASIN MIGRATIONS

The widely scattered islands of the Pacific basin, stretching from New Guinea eastward across the Pacific Ocean, were populated by seagoing people with initial roots in Southeast Asia. Having migrated from mainland Southeast Asia sometime before 10,000 B.C.E., some Polynesian maritime sojourners left New Guinea around 1500 B.C.E. and settled in the Solomon Island chain and then the Banks, Vanuatu, and Samoan archipelagos.

In roughly 400 C.E. Samoa, Fiji, and Tonga had special roles as the strategic points for the next wave of Polynesian voyages of migration, as these are mentioned in local traditions as the points of origin. These Polynesians navigated the Pacific in double-outrigger canoes. Their boats consisted of two hulls connected with lashed crossbeams and covered with a central platform. Although it was referred to as a canoe, the vessel was driven by wind and used sails made of natural-fiber matting. The two hulls gave the craft stability and resiliency in the open ocean and the capacity to transport people and supplies over long distances. A medium-size boat 50 to 60 feet long could carry two dozen people and their belongings, including plants and animals, such as chickens, pigs, and goats, to introduce on the new islands they settled. Over time settlers from diverse points and mixtures of cultures and languages arrived. Local legends emphasize their movements, their heroic voyages of discovery, their observations of such natural signs as the stars and ocean currents, and their mixed cultural heritage to become a unique Polynesian island culture rather than the transplant of an Asia-derived heritage. The name *Polynesian* came to represent the shared cultural heritage of the islands and does not imply a geographic or political unity. Polynesian cultural traditions also distinguish Polynesians from neighboring populations in the Pacific island regions of Micronesia and Melanesia, who derived from different Southeast Asian points of origin in the ancient era.

Current knowledge of the initial voyages of migration to and settlement in Hawaii comes from a mix of oral tradition and archaeological discovery. Scholars debate whether the original Polynesian voyagers arrived from the Marquesas Islands, Tahiti, or both, from about 500 to 600. One theory attributes the Marquesas as the original source and argues that the Tahitian settlers did not arrive until 1300 as a second-wave migration. In both the “one-migration” and “two-migration” theories, there was not a single settlement voyage but a continuous series of migratory voyages that populated the Hawaiian Islands. Local folk tradition attributes the initial voyages to the legendary Hawai’i Loa, the chief of a band of voyaging fishermen who discovered the island of Hawaii,

which was named after the chief, and then the island of Maui, which was named for his son. The initial band of voyagers returned to their home island and then made a return voyage with Hawai’i Loa’s wife and children, for whom the other Hawaiian Islands were named. They mixed with the other male voyagers to originate the Hawaiian race.

Known by its native population as Aotearoa (“land of the long white cloud”), New Zealand was the last Pacific island region settled by migrating Polynesians known as Maori between the mid-12th and the 14th centuries. The Maori traveled there by boat from islands, possibly the Society Islands, in eastern Polynesia. This is considered the Hawaiiki, or “homeland,” in local legend. These voyages of settlement were led by the legendary Whatonga and his grandfather Tai. They followed an initial 10th-century contact by traveling in double-outrigger canoes (*waka hourua*) led by the adventurer Kupe from Hawaiiki. According to Maori legend, he found what he named Aotearoa uninhabited by “people of land” (*tangata whenua*). The discoveries of archaeologists confirm the potential truth in these legends, since the earliest evidence of settlement is an early 10th-century Maori settlement in the Bay of Islands and gardening at Urimatao, on Motura Island, but then an absence of settlement until later. Sometime later Te Awa populations arrived and settled the Dargaville area on the North Island’s western coast, from which they moved farther to the south, where they built other fortified villages (*pa*) at Rawhiti and Manawaora. The final migrating voyagers, called the Ngare Raumatī, landed in the Bay of Islands area in the later 14th century, where they intermarried with the earlier settlers. By the time the first Europeans arrived in the late 16th century about 5 percent of the Maori population lived on the South Island, while most Maori lived on the tropical North Island’s northern coastline.

TIBETO-BURMAN, THAI, AND LAO MIGRATIONS FROM SOUTHERN CHINA

In response to the migrations of other ethnic groups from the central Asian steppes into the southern China region, during the medieval era populations migrated from the Himalaya foothills into the hills and lowlands of Southeast Asia. Among these were the Burmese, who by the second millennium had become the dominant ethnicity in Myanmar; the Thai, including one group who occupied the fertile rice plain of the Chao Phraya River in modern-day Thailand in the 11th century and who are still known by the Thai name today, and others who migrated into the hill regions of Myanmar’s north, where they became known as Shans and Karens; and the Lao, who migrated into the hill regions east of the Mekong River between Thailand and Vietnam.

The waves of migration resulted from the nomadic hunting and gathering and shifting cultivation lifestyles, internal rivalries, and inability to establish unity among the various cultures. These migrating populations were originally residents of the hills and valleys of Sichuan, Guizhou, and Yunnan, where people of similar ethnicity remain today. According to the oral traditions of the earliest migrants, which were recorded in the Shan chronicles sometime after 1500, the major movements of populations began in the sixth century, when the Shans moved from southern Yunnan into Myanmar. There they established many city-states, which linked their diverse villages, each ruled by a local chief, and collectively took the name “Great Thai” (*Thai long* or *Thai*). Later waves of migrating Thai who entered Thailand and Laos were pejoratively referenced as “Little Thai” (*Thai noi*).

The Shan chronicles assert that the earliest migrants were skilled farmers who settled in areas where the soil quality was good and water plentiful and initiated long-term irrigated cultivation. By the 14th century the Shans had a highland “kingdom” led by two brothers who, around 1350, led a network of 99 allied chiefs on a series of military expeditions against their lowland Thai and Lao neighbors to the east and their Burmese lowland neighbors downstream to the south and west. These Shan raids also extended into the Assam region of modern India, where some Shan warriors and their kinsmen settled and became settled farmers in the Brahmaputra River system.

According to Burmese inscriptional and chronicle records, in the ninth century ethnic Burmese migrated into the upper Irrawaddy River valley from Yunnan. As they moved south, they encountered Mon ethnic groups, who were long-time settled farmers near the downstream Irrawaddy and Salween rivers and practiced the Buddhist and Hindu religions. Gradually the Burmese absorbed these Mon populations and their Indianized civilization into their Bagan polity. This reached its height in the mid-11th century under King Anawrahta (r. 1044–77), who patronized the reformed Theravada Buddhist tradition that was based in Sri Lanka. From that time Burmese kings apportioned a manpower and tax-collection system to princes, officials, and members of the extended royal family, who “ate” the resources of their provinces. The state council (Hlutdaw), dominated by four chief ministers, claimed to exercise administrative and judicial authority directly on the king’s behalf. The king retained control over state finances, which were managed by his inner council of four “inner ministers,” who also controlled the royal palace. At the death of the monarch, rivalries between the Hlutdaw and the “inner council” of the king resulted in factional alliances that involved military officers, royal princes, and regional nobles and officials.

In the 11th century a new wave of Thai populations migrated from southern China into today’s Thailand. Initially they were subject to the authority of Khmer monarchs based in Angkor, in present-day Cambodia. According to Thai legend, the earliest Thai highland state was called Nan Chao, or Nanzhao, said to have existed since 738 in the upstream borderlands between China and Thailand. The Thai chief Rama Khamheng (r. ca. 1275–1317) freed the Thai from Angkor’s authority to begin the Sukothai Buddhist monarchy in the Chao Phraya River basin. In part the new Thai state was a result of a 1253 Mongol China military expedition into Myanmar around 1253, which set in motion a new wave of migrations. Among these were groups of Thai hill cultures who migrated south from the Nan Chao region to settle and became the population base for the new Thai Sukhothai monarchy, which governed a now-settled Thai wet-rice agricultural society. During this period another Thai monarchy known as Lanna formed at Chiangmai in the northwestern upstream mountainous region of modern Thailand. At various times it ruled over parts of northern Myanmar, Laos, Yunnan, and northern Vietnam. A Lao kingdom known as Lang Sang also formed, based in the mountains adjacent to the Mekong River on the eastern borders of the Angkor Cambodian realm and the western borders of Vietnam.

In 1438 Ayudhya replaced Sukhothai as the dominant regional Thai power and, annexing the previous Angkor-dominated Mun River basin agricultural lands to the east of the Chao Phraya River basin, claimed to be the rightful heirs to Angkor’s political authority. King Trailok (r. 1431–88) was the architect of a Thai system of government that would last for the next 400 years. Trailok issued the Law of the Three Seals in 1466, a law code divided into civil, military, and provincial components, which created a realm-wide hierarchy based on assignments of numerical rank to everyone in the kingdom. This inclusive hierarchy grouped the Thai region into functional or territorial units for administrative and military purposes. The realm was partitioned into civil (Mahatthai) and military (Kalahom) divisions. The Mahatthai controlled the ministries of the capital, the palace, agriculture or lands, and the treasury (Phrakhleng), each with subdivisions and provincial units. The Kalahom was divided among four generals. All Thai were attached to a specific department of the government to which they owed compulsory labor service.

HUN MIGRATIONS FROM CENTRAL ASIA

Migrating pastoral populations called Xiongu by the Chinese, Chionites by the Greeks, and Hunas by Indians moved from the central Asian steppes into northern Iran and modern-day Afghanistan in the fourth century. They used that base to launch a series of fifth- and sixth-century attacks against the

settled agrarian societies of the Roman West, Iran, and Gupta India. The most famous of the Hun leaders in western records was Attila (r. 434–53), who led the western Hun hordes then based in eastern Europe to victories against Rome.

In Asia several waves of eastern Hun warriors were defeated by the Persian Sassanid empire in the early fourth century, but in 392 another horde seized the regions known as Bactria and Gandhara on the northwestern border of India, absorbing the remnants of the Kushana and other Indo-Greek states that were successors to the conquests of Alexander the Great (r. 336–323 B.C.E.). They launched regular attacks against Gupta India's northwestern frontier from the mid-fifth to the mid-sixth century. The Gupta kings successfully blocked their armies from entering the Gangetic Plain, but the continuing effort drained the Gupta realm's resources and led to the end of the dynasty around 550.

The original language of the Huns has been lost; they absorbed the languages of the regions they conquered or settled. Most scholars believe that the original Hun language differed from the Mongolian or Turkish languages. According to the Chinese Buddhist pilgrims who report their encounters with the Huns on their travels to India during the sixth century, they had no script and instead used tally sticks to communicate. Remaining coins, however, which imitated those of the Kushana and Sassanids, demonstrate that the eastern Huns used the Bactria script of their predecessors. Their language was a mixture of the Greek and Persian languages, and it used a Greek alphabet. The Chinese pilgrims as well as the Chinese dynastic records indicate that the Huns followed several of their predecessors' cultural practices, including cremation of their dead, the use of the straight sword and compound bow, and the strange custom of artificially elongating their skulls upward, which is depicted in their coinage portraits. Chinese pilgrim accounts note that most Huns practiced the Zoroastrian religion, which included the worship of heaven and fire. Archaeological remains along the Silk Road caravan network between India and China demonstrate that some Huns also were patrons of the Buddhist religious tradition.

Like the later Mongol nomadic hordes, Hun warriors were expert horsemen. Each kept several small, tough horses. In battle they would make quick cavalry charges, shooting arrows at their enemy, and then retreat to mount a new horse. Using his string of horses, a Hun warrior could continue charging indefinitely. Their opponents feared them so much that they paid them not to attack. Hun warriors lived most of their lives in tents. The tributary payments by their neighbors, the use and sales of war captive slaves, and collections of ransoms on war prisoners subsidized their comfortable lifestyle. Huns also traded in horses and furs, which they exchanged for grain, weapons, and luxuries such as Chinese

silk. Until the time of the Mongols, most Eurasian populations thought the Huns the symbol of ferocious barbarian cruelty and deceit.

India's Gupta rulers had to defend their territories against waves of Hun migrants, known in Sanskrit as Sveta-Huna, "White Huns." Their migrations are thought to have been set in motion by China's Han rulers (202 B.C.E.–220 C.E.), who drove the nomadic steppe populations the Chinese knew as Xiong Nu from their borderlands in the first century. Subsequent Hun migrations pushed all the way to the doors of Rome. White Huns from the 400s repeatedly attempted to invade India. From their base in Afghanistan they attacked India in 455 and again in 464, but they were defeated each time by Gupta forces led by the Gupta king Skanda Gupta (r. ca. 455–67). However, between 465 and 470 the Huns took control of most of modern-day Pakistan, where they set up a *tegin*, a tribal state led by Mehar Gul ("Sunflower"), who ruled from his capital at Sakala. Their success against a Gupta military alliance allowed them to enter northern India around 500, but when they were decisively defeated by Gupta forces in 528, their remaining forces retreated into Kashmir. The remaining Huns in Pakistan and northern India gradually assimilated into the local populations. In 565 western Turks defeated the Huns and replaced them as the rulers of the regions of on India's western frontier until the mid-seventh century, when waves of migrating Turkish Muslim warriors replaced them as the rulers of India's northwestern frontier.

Persian writers knew these White Huns as Heithalites or Epthalites ("big power"), who by the sixth century had a tribal empire on the northern and eastern peripheries of Iran. In China they were variously known as Yanda, Ye-tai, or Xiong Nu. Between 507 and 531, under a ruler the Chinese called Ye-dai-yi-li-tuo, they sent 13 emissaries to the Northern Wei Dynasty (439–534). According to the Chinese dynastic records, the White Hun realm at that time consisted of 30 "states" that stretched across central Asia to Iran. In 558 they paid tribute to the Northern Zhou Dynasty (557–89) and in the 610s to the Sui Dynasty (589–618) but then disappeared, falling to migrating Turkish forces.

The White Hun migrations based in modern-day Afghanistan and Pakistan became the dominant ethnicity and heirs to Afghan and Pakistani civilizations and that of neighboring Rajputana in northwestern India. These include the modern Afghan-Pathan peoples and most of the Rajput and Jat clans of the Punjab and Sind. Perhaps the greatest legacy of the Huns was their militant clan system, which continues to be the basis of regional social hierarchy and political authority throughout their former regions. In India the Rajput name resulted from the attempts by Indian Hindu scribes to represent the Rajputs as a militant caste group of *ksatriya*, re-

ferring to warrior and ruler stature. *Rajput* was the composite of *raja* (“king”) and *putra* (“son”), the king’s son, or a member of a ruling family or clan.

TRUTHISH MIGRATIONS FROM CENTRAL ASIA

Turkish populations spread across central Asia between the sixth and 11th centuries. In central Asia they displaced remnants of the White Huns and Iranian populations. Their ancestors are thought to be the Xiong Nu of Mongolia or from the Siberian regions farther north. The first record of their existence appears in sixth-century Chinese sources, which call them Tujue. Their earliest surviving records are Turkish-language inscriptions of the early eighth century. Linguistically, from the medieval era the Uralic-Altaic central Asians divide along Turkish and Mongolian lines. In the west the Turkish languages accommodated Arabic and Persian, while in the east the linguistic patterns derive from the Mongolian language.

The first Turkish state was the sixth-century Gokturk (*gok* for “blue” or “celestial”), which gave its name to the states and populations that followed. The early Turks were led by the head of a clan. The earliest Chinese dynastic records report that the Turks were excellent metalworkers who provided Turkish warriors with high-quality weaponry. Turkish warriors wore armor that was covered by quilted cloth garments, felt, fur coats, and leather. Their armor consisted of metal plates that were laced together in rows. Metal helmets were riveted together; the warriors’ lower legs and arms were protected with metal armor, and they wore boots that extended over the knee. They used a shield that was strapped across the arm to allow the use of bows and arrows in horseback combat. While the bow was the main means of combat, warriors also used a sword that was initially straight and single-edged, although curved swords later became popular.

By the eighth century Turkish populations included the Karluks, Uyghurs, Kyrgyz, Oghuz, and Turkomans, who controlled tribal clan states that stretched across central Asia to Iran. In the west their contact with Muslim populations led some of them to adopt the Islamic religion by the end of the first millennium, while others continued to practice the regional religious traditions of their predecessors in central Asia, including Buddhism and Zoroastrianism. By the 13th century Turkish soldiers in the army of the Abbasid caliphs were the rulers of the Muslim Middle East.

In central Asia the Kyrgyz and Uyghurs continuously warred with each other and the Chinese empire. The Kyrgyz eventually settled in the region now known as Kyrgyzstan. After their 13th-century submission to the Mongol conquests of Genghis Khan (r. 1206–27) the Tatar Turks conquered and settled the lands of the Volga Bulgars (remnants of a central

Asian population that had migrated into modern-day Bulgaria in the seventh and eighth centuries) in what is today Tatarstan. Turks in the western part of central Asia who had embraced Islam formed the Ghaznavid, Saljuq, and Khwarazmian dynasties in the years previous to the Mongol conquests. Remnants of a Turko-Mongol people, after the breakup of the Mongol Golden Horde in the late 15th century, settled in present-day Kazakhstan and Uzbekistan.

By the end of the 10th century Turks were in power in northern India thanks to the aggression of Mahmud of Ghazna (r. 997–1030), whose base of power was in Afghanistan. In 1008 his troops defeated an alliance of Rajputs in India, and they followed with periodic raids into India to plunder Indian temples. Rather than staying to rule, he retreated to his Ghaznavid power base, leaving behind a network of Hindu, Jain, and Buddhist vassal states in the modern Punjab region. The year 1008 is significant in Indian history as the date of the initial penetration of Muslim authority into India. Later armies of Turkish and Afghan warriors would stay to form what became known as the Delhi Sultanate (1206–1526).

Like the Huns, the early Turks left a continuing legacy of a clan-network system, known as the *ghuzz*, that allied diverse groups. The initial written records of the Turks, the eighth-century Orkhon inscriptions from the Yenisey River valley in today’s eastern Turkistan, document the “nine clans” that were then allied in a Turkish tribal confederacy. These Orkhon records, which are attributed to the Orkhon Uighur Khanate (Qaghanate; 745–840), are inscribed on gravestones, stele, and obelisks that describe the important events in the life of the buried Turkish warrior and highlight the distinguished enemies killed by the deceased. The two largest monuments, erected in 732 and 735, honor the Turkish prince Kul (d. 731) and his brother, the “emperor” Bilge (r. 716–34) of Mongolia.

These inscriptions contain references that allow the reconstruction of the local belief system characteristic of the Turkish clans, although they are primarily epic tales of battles waged by the Turks against their neighbors and their efforts to maintain the unity of the “nine clans.” There is disagreement among scholars as to whether the inscriptions record commitment to a monotheistic faith derived from the Zoroastrianism that was patronized by their Hun predecessors and focused on a heavenly divine, as would have been appropriate to their centralizing ambition, or whether the inscriptions instead are indicators of worship dependent on traditional local shamanism, consistent with the reality of the fragmentary nature of their clan alliance.

The Orkhon inscriptions use the eclectic Uighur language, which is a mixture of Persian, Russian, and Turkish and which also was used in other contemporary historical paper documents recovered from this region. Together they

demonstrate a high level of literacy among these Uighur Turks during the medieval era. Among the recovered documents are numerous religious texts, including those of the Buddhist, Manichean, and Christian religions that were translations from Sanskrit, Chinese, Persian, and other languages. The main purpose of these religious documents was their transmission from an original source to eastern Turkistan, Mongolia, and China. There were also legal documents that record the sales and purchases, loans of money and property, borrowing of cattle, rental of property, and orders and references of authorities concerning the economic activities of landlords and farmers. In the 12th and 13th centuries the Mongols adopted the Uighur script and took Uighur clerks, administrative officials, and the local khans' children as educators to the Mongol courts, including the Mongol Yuan Dynasty in China (1279–1368).

In the post-Gupta age of the seventh century Buddhism was losing its support in India and had not yet been accepted by China's rulers. Thus, this eastern Turkistan region became a temporary hub for Buddhism, with hundreds of Buddhist monasteries and thousands of resident monks. Buddhist scholars came to central Asia to purchase religious books, participate in Buddhist rituals, and engage in theological discussions. As a consequence of this demand, the old method of book copying became overly expensive and was too time-consuming to satisfy demand. In response, at Turpan, a Silk Road caravan center east of Uighur on the western edge of modern China, book printing by xylography, or woodblock printing, was invented. Uighur became a vital source of paper from the bark of a mulberry tree, which was treated with flower, fruit, and tree sap, and it was a producer and recipient of these earliest printed religious texts. Its climate allowed the preservation of these and other paper records, which provide a vital window into the affairs of central Asia during the medieval era.

EUROPE

BY BAILEY YOUNG

Three great epochs of migrations and population movements occurred during Europe's medieval millennium (ca. 500–ca. 1500 C.E.). The first two took place during the earlier centuries, which have traditionally been seen as marked by invasions of barbarian peoples trying to move into the more civilized centers to plunder or at least share in the wealth. The third, which took place during the centuries when medieval civilization was itself at its height—the High Middle Ages—was, on the contrary, characterized by migrations of peoples from the centers outward, to claim new lands to settle and civilize rather than to invade and plunder. Recent research

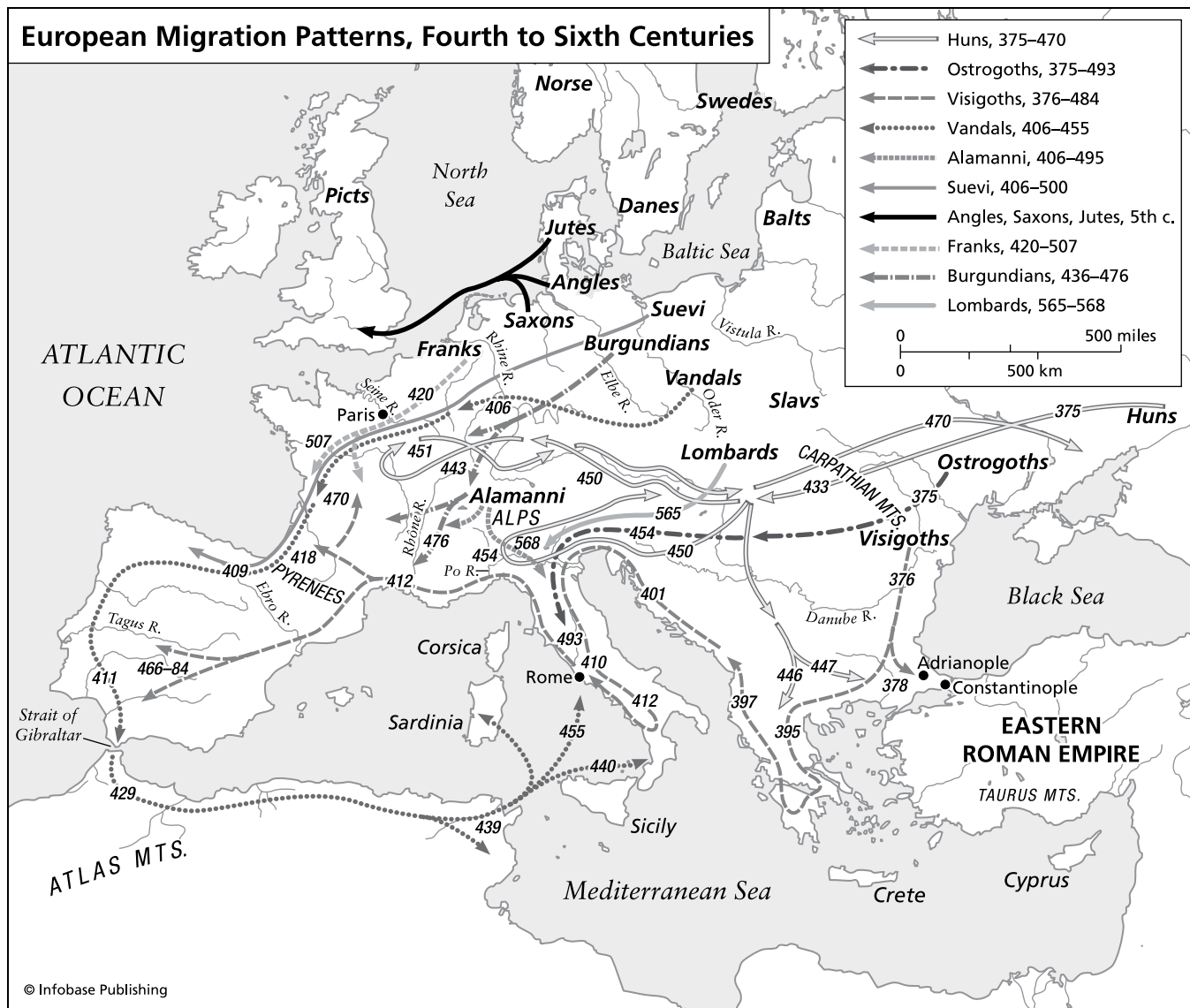
shows that the reality in each of these epochs was much more complex than the traditional views indicate, with elements both of violent invasion and of more peaceful settlement and cultural adaptation in all epochs.

INVASION AND ASSIMILATION

In the traditional interpretation, as developed by the great 18th-century historian Edward Gibbon, barbarian invasions are understood to have been one of the main causes of the fall of the Roman Empire, which brought on the Middle Ages. Indeed, so much movement of peoples then took place that this time is called the “Migration Period” in several different European languages. The story of this period begins dramatically in the 370s, when a central Asian people called the Huns, skillful mounted warriors feared for their ferocity, swept westward across southern Russia and the Balkans, spreading terror among the Germanic peoples living there. Some of them, the Visigoths, crossed the Danube River into the Roman Empire, seeking refuge, but when they were mistreated by the Roman authorities, they decided to fight.

In 378, at the battle of Adrianople, the Visigoths defeated a major Roman army and killed the Eastern Roman emperor; afterward they began 40 years of restless wandering about the empire in search of a place to settle in safety. Although they became notorious for sacking the city of Rome itself in 410, the Visigoths were eventually offered the chance to change their status from dangerous enemy to valued ally and partner, as they were no longer the only barbarians within the gates. The Huns by then had taken control of the old province of Pannonia (modern-day Hungary) and were using it as a base from which to stage devastating raids on Roman territory, afterward allowing themselves to be bribed by the emperor into retreating—for a time. Under their great chief Attila, the Huns became ever richer and more powerful through such means. Meanwhile, in 406 a confederation of other tribes (mostly Germanic but including central Asians, too, such as the Alans) crossed the Rhine River and broke into the Western Roman Empire; for a century, then, invasions, the sacking of cities, and population movements over great distances were indeed the order of the day.

During this period one of the Germanic peoples, the Vandals, not only passed quickly through Gaul (present-day France) into Spain but also proceeded into North Africa; by 439 they had seized control of the richest lands there, with King Genseric ruling from the great city of Carthage (modern-day Tunis) and learning how to attack the Romans from the sea. Other Germanic groups did not move so far. The Burgundians were content to seize control of the Middle Rhine valley; farther north, the Franks, who had always lived around the Lower Rhine, slowly pressed to the south



Early medieval Europe was heavily affected by the movements of such peoples as the Huns, Visigoths, Franks, Burgundians, and Lombards.

and west, settling the largely deserted countryside and imposing their language where Celtic or Latin dialects had been spoken. Their eastern neighbors, the Saxons, and southern Scandinavians, such as the Angles, rather adventurously took to sea and by about 450 were seizing the eastern parts of the former Roman province of Britain, so that the land took on their name (*England*, literally being the “land of the Angles”). Far to the west the Celtic Irish, then called Scoti, also took to sea to plunder and, in more limited numbers, to migrate and settle in coastal areas. Thus, the Scoti who settled the isles and coasts of northwest Britain (then called Pictland) eventually bequeathed it the name of Scotland.

Scholars have long debated how much of this moving about involved massive and lasting population shifts and

how much involved the adoption of new cultural fashions by indigenous peoples. Specific cases have been the best sources of perspective. After long wandering about after their sack of Rome, the Visigoths found themselves in the rich Roman province of Aquitaine (modern-day southwest France) in 418 when the emperor offered them a deal—in Latin, a *foedus*. They could stay in Aquitaine as legal residents, to claim a regular one-third share of its wealth, live under their own laws and customs, and be ruled by their own king; in return they would swear to be loyal allies of the empire and be on call to fight its enemies. Accepting the deal, they were sent right over into Spain to chase out the Vandals, and they did. (It was not their problem that the Vandals moved on to Africa.) When Attila the Hun invaded

Gaul in 451, the Visigoths loyally joined the Roman general Aetius to stop him.

By this time deals were being made with other barbarian peoples as well. One of the Frankish warlords in the north, Childeric, ruling from the Roman town of Tournai, seems to have helped the Romans defeat Saxons and other invaders. After Childeric's death, his son Clovis (r. 481–511) decided that he would rather rule everybody, Franks and Romans alike, and his warlike career established a kingdom that became the basis of France. Clovis even defeated the Visigoths and drove them out, over the mountains into Spain. Although they had ruled Aquitaine for a century, they left so little trace there that archaeologists cannot even identify a "Visigothic grave" from that time. In addition, certain questions remain: Did not the Franks of Clovis spread all over the land that came to bear their name (France)? Are not the thousands of graves archaeologists have found with "Frankish" weapons and jewelry proof of this? The answers have proved far from clear, largely because indigenous peoples can adopt whatever customs and dress are in favor with new elites in power, just as invading or migrating peoples can adopt cultural features from them. Thus the Franks, originally Germanic speakers, came to be the French, speaking a Romance language. Indeed, modern historians continue to debate how much of what happened in those distant days was due to significant migrations of whole peoples—as opposed to movements of smaller elite groups who would soon mix with indigenous peoples—and how much was due to cultural adaptation and the forging of new senses of group identity.

All scholars would agree that the early Middle Ages were a time of great instability, when new movements of peoples were set in motion by new threats and opportunities. In the 530s the Byzantine emperor in Constantinople, Justinian, decided to send his armies west to retake lands that had come to be ruled by barbarian groups. In two years the Vandals of North Africa were defeated, to abruptly disappear from history without a trace. Italy had been ruled for 40 years by another group of Goths who had originally migrated in with Byzantine approval. After 20 years of savage wars, they, too, disappeared from history, but their place was soon taken by another Germanic people called the Lombards, then living over the Alps, in present-day Austria. The Lombards had been feeling pressure from the east, from the Avars, a new group of mounted central Asian warriors who had replaced the long-vanished Huns. Deciding they would rather fight the Byzantines for Italy than risk facing the Avars, the whole people in 568 crossed the Alps and seized the plains of the Po Valley, which have borne their name (Lombardy) ever since. The Byzantines held on to the seacoasts, for the longest time to the south, around Bari, set-

ting in place a cultural contrast between these regions that a visitor to Italy still feels today.

By about 600 a western European core area had emerged, and the migrations seemed to have subsided. In all the lands from Rome to the borders of Scotland, from the Rhine to the Atlantic, power was intensely localized, as the heirs of indigenous peoples and of migrants from outside strove to forge new cultural identities as Franks or Lombards, as Irish or Anglo-Saxons. Only memories of Roman grandeur and a Christian faith based on Latin liturgy and scriptures gave these peoples a vague sense of common culture. This sense was sharpened by hostility to those peoples on the outside who did not share in that culture, such as the Avars, considered dangerous, to the east and the Slavic peoples who were likewise pagan and were considered primitive. In the late 700s a mighty figure would arise to unite most of these lands for the first time, creating an "empire" with a sense of Christian identity. This was Charlemagne, who before dying in 813 waged war upon bloody war to extend his power northeast into Saxony, forcing the people there to become Christian; he so smashed the Avars that they, too, vanished from history. Yet for all his success, Charlemagne's last years were troubled by the stirrings of what was to become the second great early medieval epoch of invasions and migrations, bearing in on the core area of western Europe. To the south, a dynamic and destabilizing force of unprecedented proportions—at least from Charlemagne's point of view—proved to be Islam.

Bursting out of Arabia in the 630s, Islamic armies swept over North Africa, conquered most of Spain, and by the 730s were raiding far to the north in France. Their defeat near Tours in 732 by Charlemagne's grandfather stopped their advance in the west; in the 770s Charlemagne led his armies into northeast Spain, thus beginning the Christian reconquest, which would take more than 700 years to finish. During the centuries up to 1100 the Muslims were most often the aggressors, but their usual interest was not land to settle and control but loot—including slaves—with which to return home.

From 800 to 1000 the danger of the frequent Islamic raids from the south was matched by that of attacks by other warlike outsiders from the north and the east. The Magyars were a migrant people from the Asian steppes who in 895 seized the same mid-Danubian plains earlier occupied by Huns and Avars. At first, like these earlier peoples, they used the region as a base from which to raid and plunder, riding their powerful horses to attack deep in Italy and Germany. After a defeat by the German ruler Otto I in 955, however, they settled down to develop a society based on agriculture, and, significantly, converted to western Christianity. In 1000 their ruler was baptized with the name Stephen, accepting the Latin rites of the Roman Catholic Church. From the

north the Scandinavian warriors known as Vikings attacked in their famous longships, marvelous clinker-built vessels sturdy enough to withstand the cold stormy seas but so light and shallow of draft that they could penetrate far up the river systems of western Europe. They often came in war bands of a few score men to raid and carry plunder home, but migration and settlement was also an important part of the Viking story. The Swedes traveled thousands of miles along the river systems of Russia, setting up trading stations that would grow to become the region's first significant towns, such as Kiev, on the Dneiper River (in modern-day Ukraine). In 989 their chief Rurik was baptized into the rites of the Byzantine (Greek Orthodox) Church and took the name Vladimir, a sign that the Scandinavian migrants were assimilating into the Slavic majority.

Western Scandinavians launched some major invasions and migrations. Throughout the 800s Danish and Norwegian (Norse) Vikings attacked France and the British Isles in increasing numbers and with much success. By 911 their control of the English Channel coast was so strong that the Frankish king forged a treaty recognizing their leader Hrolf as duke, and the region itself came to be called Normandy (land of the Northmen). The trading settlements established by the Vikings in Ireland, like Dublin, grew into the first towns on that hitherto rural island, and they assimilated into the Celtic population. In England their invasions were much more massive and destructive, as they wiped out the Anglo-Saxon kingdoms on the eastern side of the island and replaced them with new ones of their own. Extensive excavations at York have revealed many details of life during the days of the Viking kingdom there. Although Alfred, king of Wessex, was able to stop their drive westward in 878 and lay the basis for a reconquest of the Danelaw (the region ruled by Danish law) in the 900s, renewed invasions from Denmark brought all of England under the rule of the Danish king Canute (r. 1016–35). But by then the Vikings, like the Magyars, were settling down and assimilating into the culture of the western European core area by adopting Christianity. In 966 the Danish king Harald Bluetooth, Canute's grandfather, was baptized and built a church beside the pagan burial mound of his father Gorm, which can still be seen today.

Norway was converted largely through the efforts of the saintly king Olaf (1016–29). From Norway's shores, too, came perhaps the most daring migration venture of the era: the settlement of Iceland, an empty North Atlantic island discovered about 860, which was accomplished by 930. The Norwegians' descendants still live there today. Early Iceland had no king; in the year 1000 the settlers met together and decided to adopt Christianity.

OUTWARD EXPANSION

By 1100 the basic pattern from the previous centuries, with western Europe being under pressure from outside forces, was reversing in favor of a new dynamic of outward expansion. This trend had a very visible political and military aspect, aptly symbolized in 1100 by the establishment of the Latin Kingdom of Jerusalem, as ruled by knights from the old Frankish core area who had led the First Crusade. In Spain, too, the once poor and weak Christian kingdoms of Castile and Leon, in the northwest, had begun to turn the tide against the dominant Muslim powers and were reclaiming lands for Christendom. By the end of the Middle Ages, the core Christian area of Europe had doubled from Charlemagne's day; the modern historian Robert Bartlett has shown how this can be understood as the result of the energetic efforts of knights, peasants, merchants, and churchmen alike, as driven by a complex mixture of religious (or ideological) and economic motives. Migration, settlement, conversion to Christianity, political domination, development, and trade were all inextricably bound together in degrees that differed considerably from place to place.

The crusaders who seized control of Palestine around 1100 were able to hold on to this land so far from home for as long as they did (almost 200 years) only because European ships (mostly from Italian cities like Venice and Genoa) controlled the sea and could bring human reinforcements and material supplies. But these Frangi, as the native Arabic speakers called the Franks, were never more than a small military elite dominating a society made up largely of peasants and townspeople who were not all Muslims—many were Jews or Eastern Christians—but were all foreign to them. The Franks were never numerous enough to affect the sociocultural matrix durably, and powerful Muslim states like Egypt surrounded them; in 1292, in fact, an Egyptian ruler expelled them. A contrast is provided by southern Italy and Sicily, which were dominated in 1000 by the Byzantine Greeks and Muslims, respectively. In the later 1000s bands of Norman knights (descended from the converted Vikings of Normandy) invaded the area and captured its strongholds, one by one. The pope, whose prestige as the spiritual leader of Christendom was growing, approved their cause. The combination of military might and religious valorization, as helped by closer contact with Europe's economic dynamism and by the political skills developed by the Norman rulers, was enough to bring about the annexation of these areas to Europe; still, residents of these areas never fully embraced European culture.

The expansion of Christian Europe was most thorough and culturally transformative in the three exotic "frontier" areas Bartlett discusses: the "Celtic fringe" lands to the

northwest, the Iberian lands being recovered from Islam, and the vast Slavic lands of Europe east of the Elbe River. Ireland may seem an unlikely frontier—after all, Saint Patrick had brought Christianity there before 500 C.E.—but when the Norman king of England Henry II claimed the right to rule there in 1170, sending knights to seize lands and build castles to hold them, he had the support of the pope, who deemed the Irish form of Christianity corrupt and in need of reform. Within a few years Dublin had become the stronghold of Anglo-Norman rule, as surrounded by an area about 50 miles wide, called the Pale, held by barons loyal to the English king. An enterprising baron seized another area in Ulster, to the northeast, that also became a center of foreign power. Irish chieftains continued to rule the western parts of the island, which remained Celtic in language and culture until modern times, but the English king and the Anglo-Norman barons encouraged English peasants and townspeople to immigrate into the areas they controlled. This was thus a kind of migration different from any seen before, a deliberate “colonization” meant to change the culture to fit an approved pattern, as directed by the politically dominant group for its own benefit. It was successful. The actual population influx was limited in scale, but by the end of the Middle Ages, English was well on the way to replacing Irish as the dominant language, and English political control was destined to extend across the whole island.

INFLUENCE OF CHRISTIANITY

Actual migration and fundamental change in the character of the population were much more significant in the other two frontier areas, as was religious change. The Christian reconquest of the Iberian Peninsula involved much more than military victories and a change in political power. After the capture of Toledo, in 1085, the kingdoms of Castile and Leon more than doubled in size; after a decisive victory in 1212, all of Spain except the mountainous kingdom of Granada, in the far south, was soon conquered. Although the Christian rulers at first promised the Muslim and Jewish populations that they could stay and practice their religions, they also actively encouraged resettlement by Christians from the north, especially peasants who could convert underpopulated and war-devastated regions into productive farmland and sheep ranches. Some of these immigrants came from France, since French knights had assisted in the wars and French peasants had been developing useful land clearance and development skills in their homeland. The overall European population was growing in the core area at an unprecedented rate, as a result of improved food productivity deriving from technological progress and the increases in farmland, so the opportunities on the Spanish frontier were attractive.

By 1300 the balance of the Spanish population was shifting, as were royal policies and popular attitudes. Arabic could no longer be used in court cases, and the remaining Muslims were under increasing pressure to convert, as the church took an ever-harder stance against non-Catholics. Granada finally surrendered to the Catholic majesties Ferdinand and Isabella in 1492, and in 1504 the Muslim population was faced with the choice of converting or leaving; many migrated to North Africa. The Jewish population, once the richest, best integrated, and perhaps the largest in Europe, was faced with the same choice. Some converted, but tens of thousands of Sephardic Jews scattered throughout the Muslim-ruled Mediterranean lands or migrated to the Low Countries, one part of Christian Europe with a more tolerant attitude. Spain was now officially and uniformly Catholic, and the Inquisition was set in place to ensure that it stayed that way.

In Europe east of the Elbe River, invasion, plunder, conquest, migration, colonization, development, and profound cultural change through forced or voluntary conversion to Christianity were played out on the largest scale seen throughout the later Middle Ages. After Charlemagne’s death a warlike frontier developed between the now Christian Saxons and the pagan Slavic tribes—including the Wends, Prussians, Poles, and Balts—beyond the Elbe. The success of the First Crusade inspired some German knights in 1198 to found a new crusading order dedicated to conquering and converting these heathens. The pope approved, and in 1232 the Holy Roman Emperor granted all of East Prussia to these Teutonic Knights. Some of the Slavic leaders had by this time converted on their own, founding new Christian states like the Kingdom of Poland. In any case, adopting Christianity also meant adopting the cultural features (writing, the Latin liturgy) and socioeconomic institutions (manorial estates supporting feudal lords, towns run by privileged merchant guilds engaged in brisk trade) of the core area of western Christendom.

EASTERN IMMIGRATION

As Bartlett shows, Germanic lords and bishops and Slavic princes alike actively sought to encourage the immigration of a skilled labor force from the west, offering many inducements. Peasants who cleared new land were promised ownership rights without servile duties; craftsmen and merchants who settled in new towns were granted charters of self-government. The immigrants came from German-speaking areas, like Flanders and the Rhineland, in such numbers and over such a long period that by the end of the Middle Ages some lands (such as the Wendish homeland and Prussia) had become German rather than Slavic. Even in the Slavic polities, such as Poland, Bohemia, and Lithuania, towns were often dominated by wealthy German-speaking minorities. The

organized and collective character of much of this migration merits special attention.

Peasant families did not usually set off on their own, like pioneers in 19th-century America; rather, for example, an eastern lord with land to develop would make contracts with an entrepreneur, perhaps himself a peasant who had come from Flanders with an earlier group, to find takers for so many farms by such a date. Still, most of this settlement was not so closely tied to a strong central government as tended to be the case in Ireland and Spain. Teutonic Knights, bishops, kings, noble lords great and small, and even chartered towns and their guilds would encourage new settlers in accord with the changing needs of the moment.

Some of the eastward movement of populations involved Jewish communities, largely because this High Medieval migration period also saw the rise of anti-Semitism in the western core areas. Jews in the Rhineland were massacred during the First Crusade; around 1300 the rulers of both England and France expelled all Jews from their kingdoms; and in some places in the mid-14th century they were blamed for the Black Death, or bubonic plague. Lords in the east, eager to acquire the skills for which the Jews were known, notably with respect to trade and money, were often more welcoming. The Jewish migrants eastward were culturally Germanic, or Ashkenazi. Thus, by the end of the Middle Ages the elements that would thenceforth long characterize the eastern European cultural matrix—a volatile mixture of Germanic, Slavic, and Jewish communities—were in place.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

HEGIRA

The word *hegira* is often translated into English as “flight,” as in “to flee” from something, probably because it is associated with Muhammad’s flight from Mecca in the fall of 622 to escape a plot to murder him. Its closest English translation is actually “migration,” as in the movement of people from one place to another. There were two notable hegiras during Muhammad’s lifetime: one to Axum in Africa, across the Red Sea, and one from Mecca to Medina. When capitalized, *Hegira* customarily refers to the movement of Muhammad’s followers from Mecca to Medina.

The migration to Axum is sometimes called the first *Hegira* to signify its importance to the Islamic faith. In Arabia in Muhammad’s era, family relationships were more important than law or government, and governments often were no more than agreements among families about how public policy should be run. In the 610s Muhammad’s teachings were

creating problems for the leaders of the major clans of Mecca, especially his assertion that all gods save Allah were merely idols, a doctrine that they found very insulting. Further, his insistence that all human beings were spiritually equal was seen as an incitement to rebellion. Muhammad and most of his chief followers were protected from harm by their families, and for the time being their enemies did not threaten them. Those of Muhammad’s followers who were poor, without a family, or slaves were not protected, and by 615 Muhammad’s enemies had begun murdering them. Therefore, Muhammad sent these men and women out of Mecca, across the Red Sea to Axum, a trading empire in northeastern Africa.

The people of Axum were descendants of mixed African ethnic groups and Sabeian ethnic groups from Yemen. Sending followers to Axum may have been a gamble on Muhammad’s part because the king of Axum probably had no reason to regard Muhammad as a friend. However, Muhammad’s followers seem to have gotten along well with Christians, and Axum was a Christian kingdom. When Muhammad’s followers reached Axum, they petitioned the king for sanctuary, and he gave it to them. Emissaries from Mecca asked the king to return the refugees, claiming that they had fled illegally and that some were slaves. The laws of Axum apparently allowed people to plead their cases before the king, and the refugees did so. The king rejected the arguments of the Meccan emissaries and gave the refugees permanent residence status in Axum. Muslim scholars of medieval times interpreted this act as a sign that the king accepted the truth of Muhammad’s teachings. Some of the refugees settled in Axum; others eventually rejoined Muhammad. Those who settled formed their own community, and with the aid of other Muslims, in the eighth century they drove the Axumites out of the Axumites’ lowlands into the Ethiopian highlands, where the Ethiopian Empire was established.

In 622 the leaders of Mecca decided to take direct action against Muhammad by assassinating him and his father-in-law, Abu Bakr (ca. 573–634). When the assassins entered Muhammad’s residence at night, they found someone else in his bed because Muhammad had known about the threat on his life. He and his followers had left for the town of Yathrib, where he had admirers. Thereafter the town was called Medina, meaning “the city.” Muhammad’s followers were called the *muhajirun*, meaning “emigrants,” and those who welcomed them in Medina were called the *ansar*, meaning “helpers.” This migration, the *Hegira*, was marked by the Islamic world as the moment their faith began to expand, and consequently it is year 1 in the Islamic calendar. In Medina, Muhammad gained a measure of temporal power, which he used to drive out two of the leading Jewish clans and to execute all of the men and sell all of the women and children

into slavery for their hostility toward him. From Medina he waged war against his enemies in Mecca.

NEAR EAST

To appreciate the next stage in Islamic migrations, it is important to understand what Muslims meant by the term *jihad*. The complete idea actually was *jihad fi sabil Allah*, meaning “striving in the path of God.” Although the most memorable way of acting upon this idea was to wage war against infidels, *jihad* actually took two forms, both inspired by the Koran. *Jihad* could be an attack on pagans or a defense against attacks on Muslims. Medieval scholars often cited passages in the Hadith, accounts of the life and sayings of Muhammad, which show Muslims waging war on others, arguing that the passages justified attacks against nonbelievers. These ideas formed the basis for the concepts of *dar al-harb*, meaning “the abode of war,” and *dar al-Islam*, meaning “the abode of Islam.” Where Islam dominated was *dar al-Islam*, but everywhere else was *dar al-harb*. People in *dar al-harb* were outsiders who were to be brought into *dar al-Islam* either by persuasion or by force.

By the time of his death Muhammad had brought much of Arabia under his rule. After his death his followers debated whether his revelations were for Arabs only or for the entire world. This issue was not yet resolved when Muslims decided to take military action against the major powers of the Near East, the Sassanian and Byzantine empires. The Sassanian Empire had seized control of much of Yemen in the late sixth century, and it had taken control of the northeastern Arabian kingdom of Lakhmid in 602. In 631 the Sassanian Empire accepted Muslim authority in its Yemen territory. In 627 the Byzantine Empire took control of formerly Sassanian lands around the Tigris and Euphrates rivers and formed alliances with peoples in northwestern Arabia. Both empires had expended many lives of soldiers and much of their wealth in their recent war, enabling the great expansion of the Islamic world out of Arabia and into the rest of the Near East and into North Africa. About 1 million Arabian Muslims spread in the lands of 40 million to 60 million people, migrating into Egypt, into the eastern Mediterranean coast, and across the Near East into Iran.

The Muslims were a small minority trying to govern a vast territory filled with people of many different religions and cultures. As would often be the case with Islamic armies, many soldiers chose to settle in the lands they had conquered. The Islamic community had not yet decided whether Islam was only for Arabs or for the world at large. Muslims were concerned about maintaining the purity of their bloodlines because family and clans were still the basis for their social organization and a clear relationship to a particular family

was still the way for people to claim social privileges. As a result, Muslims built garrison towns, such as Basra and al-Kufa in Iraq.

In 636 a Muslim army destroyed a Sassanian settlement south of modern-day Basra and established a camp there. In 639 Basra was made a garrison city for the troops who conquered Khuzistan (639–42). Thereafter Basra served as a base of operations for invasions of Iran. Al-Kufa was founded in 637 or 38 near the city of Hira and served as a base of operations for the invasions of Iran. Al-Kufa attracted several clans from Arabia, and by 642 it had taken on a life of its own. Both Basra and al-Kufa became important intellectual centers, with Basra contributing much to medieval Islamic legal scholarship; both cities became embroiled in the theological disputes among Shiites and Sunnis. These cities represented a pattern that was followed elsewhere. Both began as encampments for Muslim soldiers. Basra was established where most of the local population had been killed or driven away, whereas al-Kufa was established near a still-functioning city. Al-Kufa served as a place where Arabs could live apart from local peoples and be protected from attacks by non-Muslims, who constituted perhaps 95 percent of the population in the late seventh century. The prosperity of each city may have attracted local peoples to the Islamic faith—to get ahead in Islamic society and to escape the *jizya*, special taxes paid by Christians, Jews, Zoroastrians, and other “people of the book” (non-Muslims who had received divine revelations from God). Such cities as Basra and al-Kufa also contributed to the urban culture of Islam because the early gathering of Muslims in garrison towns helped orient their culture toward cities.

NORTH AFRICA

Egypt may have been the biggest prize of the early Islamic conquests. It was a rich source of grain, art, and science. Those populations who resisted the Muslim invaders were put to the sword, but once the change of regimes from the Byzantine Empire to the Islamic Empire was assured, the earliest Muslim migrants behaved with tolerance toward Christians and Jews. During the medieval era Egypt remained a majority Christian land. The building of garrison towns was more of a conscious act in Egypt than had been the case with Basra and al-Kufa, which grew out of temporary military necessity. Such places as al-Fustat were intended to be bastions of the Arab elite.

In September 641 an Arab army under the command of Amr ibn al-Aas (d. 663) conquered the Egyptian city of Alexandria. Because of its long history of commercial, political, and intellectual achievement, Alexandria seemed to be the logical place for the capital, but Umar I, “the Great”

(r. 634–44), the second Rashidun caliph, wanted Egypt to have its capital on the east side of the Nile, making it more accessible from Arabia than was Alexandria. Earlier Amr ibn al-As had camped on the eastern side of the Nile. When a bird laid an egg in his tent, he interpreted the event as a sign that the tent was on holy ground. He marked the spot, and after seizing control of most of Egypt, he returned and pitched his tent on the spot, and his lieutenants planted their tents around his, resulting in the place being called Misr al-Fustat, meaning “town of the tents.” A mosque eventually replaced the tent of Amr ibn al-Aas, and using local labor, the Arabs built a walled city, mostly out of stone taken from ancient Egyptian monuments. The idea was to create a place where Arabs could live apart from the local people and maintain their Arabian bloodlines without intermarriage. The people of Egypt were allowed to live as they wished as long as they acknowledged Muslim superiority and paid their taxes.

This situation resulted in severe problems for the immigrants from Arabia to al-Fustat because they had little experience in running such a complex economy and government as those of Egypt therefore, they allowed Christian and Jewish government officials who had served the Byzantine Empire into al-Fustat to run the government. Not spreading out more into the lands of Egypt may have made the governing elite especially vulnerable, and in 969 the Fatimid Shia sect from the Maghreb, where Tunisia is today, invaded and seized control of Egypt, beginning a migration to Egypt from the rest of North Africa. Al-Fustat became one of the great cities of the medieval world, attracting from throughout the Islamic world migrants who came to attend its schools, to become merchants, to serve in its government, or to take advantage of its commercial opportunities for craftsmen.

In 670 or 71 Kairouan was founded as a site for a garrison in the Maghreb, in a forest, and it was used as a defensive position against Berbers and for launching attacks against Berbers and others in North Africa. Initially a settlement for Arabs, it became a way station for migrations of Arabs westward and for migrations of Western peoples eastward. From Kairouan the faith of Islam spread among local peoples. In 910, with the support of Berber soldiers, the Fatimids captured Kairouan and later spread their power to Egypt, drawing with them the Berbers, who spread their presence across North Africa. At this time the people of the region were primarily settled agriculturalists. Kairouan fell out of control of the Fatimid Dynasty in Egypt, and the political structure of the Maghreb fragmented into small, independent principalities. In the 11th century the Banu Hilal and other nomadic Arabian tribes migrated into the Maghreb, overturning the agricultural order, replacing it with pastoralism.

SAHEL

The Sahel was a region stretching west to east along the southern edge of the Sahara. During the medieval era it was the site of the empires of Ghana, Mali, and Songhai as well as of numerous small kingdoms and chiefdoms. Exactly how much migration there was from North Africa across the desert to the Sahel is much debated among historians.

In the 12th century the Almoravid Berbers arose. The word *Almoravid* was derived from *al-Murabitun*, meaning “people of the monastery,” and oral tradition holds that their leaders had spiritually prepared themselves in a monastic retreat. Their exact movements are unclear, but they may have traveled first to Senegal and from there tried to conquer the lands of the Sahel, invading Ghana in 1156, fatally weakening the empire but not conquering it. The Almoravid Berbers ended up scattered thinly across much of western Africa. By the 13th century Mali was a seat of great Muslim scholarship, and its schools attracted students from throughout the Islamic world. In general, migrants from North Africa and beyond had to live apart from the local population. Visitors and migrants from the rest of the Islamic world were primarily Arabs and Berbers as well as Jews whose skills in such crafts as metalworking were welcome.

The advance of Islam in medieval western Africa and central Africa may have been more successful by peaceful means than by invasions. As a matter of faith, Muslims were expected to be able to read the Koran; in western Africa and central Africa they were literate people among people who were mostly nonliterate. Being able to write was considered an almost supernatural power among the cultures south of the Sahel. Thus, in many communities Muslims were welcomed as spiritual guides and as healers. For the Muslims who took up residence in villages, winning conversions was as simple as telling barren women who came to them for help that they would be able to become pregnant only if they became Muslim. Those medieval African societies regarded family and especially children as vital to their sense of self-worth as well as their positions in society, so such advice carried much weight.

AL-ANDALUS

The history of Muslim Spain, known in the Islamic world as al-Andalus, has been the source of much romantic fiction as well as romantic histories. The conquest of the Iberian Peninsula, where Portugal and Spain are today, was not a simple matter of warfare. Many Christians and Jews seem to have welcomed Muslims, who brought stability and order to a land in turmoil. The initial advance of the Islamic world into the Iberian Peninsula seems to have been almost an accident. In 711 Tariq ibn Ziyad (d. ca. 720) led a small force of Berbers

and Arabs into Iberia near or through Gibraltar. Accounts differ as to why: They were pirates raiding the coast; they were on a reconnaissance mission sent by Count Julian, ruler of Sabta on the coast across from the Iberian Peninsula; they were raiders sponsored by Julian; they were sent by Julian to reclaim one of his daughters, who had been kidnapped by Visigoths, who ruled Iberia at the time. Any of these scenarios could be true because Muslims of the era did all of these activities in one place or another. What is known is that in 711 at Guadalete, the small band of Muslims defeated a Visigoth army and then plunged northward toward Seville. By 716 almost all the peninsula was under direct Islamic rule, with only a couple of exceptions, where Christian rulers acknowledged Islamic sovereignty over them.

The conquerors of Iberia were followed by settlers, not only Muslims but also Christians, Jews, and even pagans from North Africa. They were attracted by the rich opportunities al-Andalus provided. As elsewhere in the Islamic world, Muslims set about building an urban culture with a high demand for craftspeople. Muslim governments transformed much of the land with irrigation projects, bringing wild lands under cultivation, thereby making al-Andalus one of the most productive agricultural lands in the Mediterranean world. The Muslims began as a minority, but they won many converts among Christians and Jews, although some of the Christian converts readily converted back to Christianity if their homes fell under the control of Christian lords. The Muslim armies tended to be composed of outsiders. Turks, Italians, and especially Slavs were brought to al-Andalus as slaves or came to serve as mercenaries. All settled on the land and eventually married into the local population. By 1035 al-Andalus was divided into 24 different independent states. Five of these were eastern states dominated by Slavs; eight were central and southern states dominated by Berbers.

In the late 11th century King Alfonso VI of León (r. 1065–1109) and Castile (r. 1072–1109) began conquering Islamic lands. The ruler of Seville asked the Murabituns of North Africa for assistance. The Murabituns were then a rising power, mostly tribesmen who had migrated north from south of the Sahara. It seems that most people of al-Andalus saw the Murabituns as foreigners and much more alien than the Christian states with which they shared the Iberian Peninsula. This situation contributed to the confusion of armies on both sides having Christians and Muslims fighting alongside each other. By 1102 the Murabituns controlled almost all of al-Andalus, and they brought with them an influx of sub-Saharan Africans as well as North Africans.

The Muwahhiduns were highland Berbers who had migrated into North Africa's lowlands and then in the 1140s into al-Andalus. The Muwahhidun court persecuted Chris-

tians and Jews, causing Christians to migrate to the Christian kingdoms north of al-Andalus. Jews may have migrated to elsewhere in the Islamic world. Beginning in about 1216 the northern Christian kingdoms began advancing south, often expelling Muslim farmers and encouraging Christians to take over their farms. The displaced Muslims migrated either to Muslim states to the south or to North Africa, where they received a mixed welcome, with many becoming valued members of communities and others being persecuted or killed. The armies of the Christian kings were mixes of Muslims and Christians, as were the armies of the Muslim rulers, but eventually most Muslims and Jews chose to flee persecution and scattered across North Africa.

EAST AFRICA

Before the time of Muhammad there had long existed trade routes by sea connecting Indonesia, China, India, Sri Lanka, Arabia, and East Africa. It was long thought by many historians that Muslims established trading cities along East Africa's coast, organizing trade between the interior of Africa and the international sea routes; however, modern-day archaeological digs have demonstrated that the great East African seaports began as settlements by local people, often to take advantage of ocean fishing rather than trade. By the time of Muhammad these cities, which stretched from Ethiopia to just north of the southern tip of Africa, were already important ports of call. The first outsiders to take up residence in these cities were probably Indonesians, who also settled much of Madagascar. The Indonesians were followed by Indians, Arabs, Egyptians, and occasionally Chinese. Thus, when the Arabs traders began arriving in port with their new faith, they were already familiar visitors, and some had already settled in East African cities to run export-import businesses.

During medieval times many Muslims married local people, forming the Swahili culture and helping to develop the international trading language of Swahili. Most rulers of the East African city-states became Muslims, and they built mosques of coral. It is hard to say how deeply the faith of Islam penetrated the local population. In the 12th century most people in the cities and surrounding areas were still animists, with at least some believing that almost anything had spiritual qualities. By the mid-15th century this situation seems to have changed, with at least a few cities having adopted Islamic law and many of the most prosperous residents practicing the Islamic faith. There may not have been a mass migration from the Islamic world to the East African cities, but there was likely a steady but small migration of Muslims from North Africa and the Near East who sought to experience adventure, to accumulate wealth, to preach, or to solidify trading partnerships through intermarriage.

EASTWARD BY SEA

The adoption of Islam by the Arab merchants who plied the waters along the southern coast of Asia seems to have occurred quickly, and these merchants spread their faith where they traveled. They established colonies on the coast of India, took up residence as merchants in Sri Lanka, and established colonies on the Malay Peninsula, in China, and in Indonesia. Muslim merchants sailed to trading posts along the west coast of India and followed sea-lanes south of Sri Lanka, between Malaysia and Sumatra, then north to Southeast Asia, and then to ports in China. They had colonies in Beijing, near Shanghai, and at Guangzhou. They carried with them Muslim missionaries who managed to convert some Sumatrans in the late 13th century and much of southern Malaysia and part of Java in the 15th century. In China they lived in special towns that the Chinese set aside for them. In these towns lived immigrants from many lands, most of whom worked in shipping. The Muslims were allowed to enforce their own laws, except in disputes involving people outside their own faith, when Chinese judges would impose Chinese law to settle matters.

CENTRAL ASIA

During their first great expansion of territory during the 660s in central Asia, Muslims came up against tough, warlike peoples who tended to be lumped together under the term *Turks*. In 652 the Muslim army advanced into Balkh in Sughd and then to the fabled city of Samarkand, a key way station on the ancient Silk Road. In 713 they subdued some nomadic tribes and pressed against the western edge of Tang China's dominion, soon ending China's domination of the trade routes through central Asia. Two momentous events arose from the invasions of central Asia. One was the conversion to Islam of many Turkish cultures and the eventual rise of the Seljuk Turks, who would eventually dominate much of the Near East. The other was the attack of the Mongols during the 13th century, triggering a massive internal migration in the Islamic world.

Seljuk soldiers served in armies through much of the Near East, beginning the spread of their people and culture. Eventually they formed their own army, and in 1038 their leader, Tughrul Beg (ca. 990–1063), proclaimed himself the champion of both Sunni Islam and the Abbasid caliph in Baghdad. This proclamation was an important symbolic act because the champion of the faith was often the military ruler of Islam. Although the caliph was Sunni, Baghdad was under control of Shiites. The Seljuk army drove out the Shia army, and the caliph declared Tughrul Beg sultan—officially the military ruler. In 1040 the Seljuk Turks invaded Iran, eventu-

ally overthrowing the Ghaznavid Dynasty. In 1071 a Seljuk army defeated a Byzantine army and forced most of Anatolia to acknowledge Seljuk authority, although the land remained Christian.

The Seljuks formed a vigorous culture out of Turks, Arabs, and Iranians. In 1220 the Mongol armies of Genghis Khan (ca. 1162–1227) attacked central Asia. They drove deep into the Near East. Cities and towns that resisted the Mongols were put to the sword—every child and grownup. After a pause following Genghis Khan's death, an army of his grandson Hülegü (ca. 1217–65) sacked Baghdad and killed the caliph, ending the Abbasid Caliphate in 1258. Hundreds of thousands, perhaps millions, of people fled the invasions of the Mongols, either before the arrival of the Mongol armies or after the armies devastated the land. The economy of central Asia and the northern and eastern Near East was ruined. Refugees included not only Muslims but also Christians, Jews, and some of those Turks who still followed their old religions. Egypt, which in a desperate battle in 1260 managed barely to stave off the Mongol invasion, became the destination for many refugees. Others fled into Europe. They brought with them some of the finest craftspeople of the age, contributing to a flowering of arts, crafts, and economy in the empire of the Mamluks.

INDIA

By 713 the Arab armies had conquered the land of Sind, to and just beyond the Indus River, seizing the valley that may have been the birthplace of Indian civilization. Then there was a poignant pause of about 300 years, during which the kingdoms of northern India and the Islamic empires to the northwest existed mostly in peace. During that period Buddhists, who had once been numerous in Sind, almost disappeared there, not from persecution but from peaceful conversion to Islam. In what is now Afghanistan, Hindus and pagans clung longer to their faiths. In the lands ruled by Hindus, Islam made headway through the preaching of Muslim missionaries. Islam had an appeal similar to the appeal that Buddhism had had several hundred years earlier. Buddhism did not recognize caste distinctions. The Muslims offered Indians a faith in which all people were equal before God. Neither king nor general was spiritually superior to any commoner. Discrimination on the basis of caste did not exist; all were allowed to worship equally in mosques, and all were allowed to know all of the sacred texts. In the Hindu caste system access to holy books was denied to low-caste members.

Thus, when Muslim armies invaded the lands east of the Indus River, there were already communities of Muslims in northern India. The invasions changed attitudes markedly, from acceptance of Muslims to outright hatred and a deter-

mined resistance to Islam among many of India's cultures that persisted throughout Islam's domination of the land. Islam was a minority religion throughout medieval times.

The invasions began mostly as raids. Historians have characterized the raiders as adventurers, bandits, and thugs, based on the writings of Muslim chroniclers who exult over acts of cruelty and slaughter. The raiders themselves seem to have wanted to be characterized as Islamic heroes, carrying doom to the infidels of India. The raiders were composed of Turks, central Asian nomads, Iranians, and others from the Near East. Outright invasion probably began with Mahmud of Ghazna (r. 997–1030), who earned the nickname "Hammer of the Infidels." By 1018 his armies had conquered Kashmir and Punjab and as far south as the city of Kalinjar. The Ghurids came from the mountains of Afghanistan and supplanted the Ghaznavids in about 1092. They went on to conquer east into Bengal and south to the Narmada River. The major migrations during this era were not so much Muslims moving eastward as hundreds of thousands of slaves moving westward, bringing with them such Indian skills as steel making and intermixing with the populations of the Near East. Muslim chroniclers record entire cities burned to the ground and over 50,000 civilians slain at a time. Having devastated local economies, the Muslim rulers sustained themselves by attacking and looting cities and temple complexes to the south.

Many of the soldiers of the Islamic armies settled in India, often recreating cities or establishing new ones. After the

wars against the Mongols, the Mamluks ruled most of Islamic India from the 13th century to the 16th century, becoming known as India's slave kings because of their origins as military slaves. The amount of territory they ruled was fluid and depended on the abilities of each individual sultan. Nearly all of India fell under Muslim rule, either under the slave kings, who ruled from Delhi, or under the sultans of Madura, who controlled the far south of India. Most of the Islamic migrants to India were Turks, and they gradually adapted to local Indian culture, becoming more acceptable to local people by admitting Indian converts into their governments as well as by adopting some local customs of behavior.

See also AGRICULTURE; BORDERS AND FRONTIERS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; INVENTIONS; LANGUAGE; LAWS AND LEGAL CODES; LITERATURE; MILITARY; MONEY AND COINAGE; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SACRED SITES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WEAPONRY AND ARMOR; WRITING.

Europe

~ Extract from the Annals of Saint Bertin (ninth century) ~

843 A.D. Pirates of the Northmen's race came to Nantes, killed the bishop and many of the clergy and laymen, both men and women, and pillaged the city. Thence they set out to plunder the lands of lower Aquitaine. At length they arrived at a certain island [the isle of Rhé, near La Rochelle, north of the mouth of the Garonne], and carried materials thither from the mainland to build themselves houses; and they settled there for the winter, as if that were to be their permanent dwelling-place.

844. The Northmen ascended the Garonne as far as Toulouse and pillaged the lands along both banks with

impunity. Some, after leaving this region went into Galicia [in northern Spain] and perished, part of them by the attacks of the crossbowmen who had come to resist them, part by being overwhelmed by a storm at sea. But others of them went farther into Spain and engaged in long and desperate combats with the Saracens; defeated in the end, they withdrew.

845. The Northmen with a hundred ships entered the Seine on the twentieth of March and, after ravaging first one bank and then the other, came without meeting any resistance to Paris. Charles [the Bald] resolved to hold out against them; but seeing the

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impossibility of gaining a victory, he made with them a certain agreement and by a gift of 7,000 livres he bought them off from advancing farther and persuaded them to return. Euric, king of the Northmen, advanced, with six hundred vessels, along the course of the River Elbe to attack Louis of Germany. The Saxons prepared to meet him, gave battle, and with the aid of our Lord Jesus Christ won the victory. The Northmen returned down the Seine and coming to the ocean pillaged, destroyed, and burned all the regions along the coast.

846. The Danish pirates landed in Frisia. They were able to force from the people whatever contributions they wished and, being victors in battle, they remained masters of almost the entire province.

847. The Northmen made their appearance in the part of Gaul inhabited by the Britons and won three victories. Noménoé [a chief of the Britons], although defeated, at length succeeded in buying them off with presents and getting them out of his country.

853-854. The Danish pirates, making their way into the country eastward from the city of Nantes, arrived without opposition, November Eighth, before Tours. This they burned, together with the church of St. Martin and the neighboring places. But that incursion had been foreseen with certainty and the body of St. Martin had been removed to Cormery, a monastery of that church, and from there to the city of Orleans. The pirates went on to the château of Blois and burned it, proposing then to proceed to Orleans and destroy that city in the same fashion. But Agius, bishop of Orleans, and Burchard,

bishop of Chartres, had gathered soldiers and ships to meet them; so they abandoned their design and returned to the lower Loire, though the following year [855] they ascended it anew to the city of Angers.

855. They left their ships behind and undertook to go overland to the city of Poitiers; but the Aquitanians came to meet them and defeated them, so that not more than 300 escaped.

856. On the eighteenth of April, the Danish pirates came to the city of Orleans, pillaged it, and went away without meeting opposition. Other Danish pirates came into the Seine about the middle of August and, after plundering and ruining the towns on the two banks of the river, and even the monasteries and villages farther back, came to a well located place near the Seine called Jeufosse, and, there quietly passed the winter.

859. The Danish pirates having made a long sea-voyage (for they had sailed between Spain and Africa) entered the Rhone, where they pillaged many cities and monasteries and established themselves on the island called Camargue. . . . They devastated everything before them as far as the city of Valence. Then, after ravaging all these regions, they returned to the island where they had fixed their habitation. Thence they went on toward Italy, capturing and plundering Pisa and other cities.

From: Frederic Austin Ogg, ed., *A Source Book of Mediaeval History: Documents Illustrative of European Life and Institutions from the German Invasions to the Renaissance* (New York: American Book Company, 1907).

The Islamic World

≈ Ibn al-Athir: "On the Tatars" (1220-21) ≈

For some years I continued averse from mentioning this event, deeming it so horrible that I shrank from recording it and ever withdrawing one foot as I advanced the other. To whom, indeed, can it be easy to write the announcement of the death-blow of Islam and the Muslims, or who is he on whom the remembrance thereof can weigh lightly? O would that my mother had

not born me or that I had died and become a forgotten thing ere this befell! Yet, withal a number of my friends urged me to set it down in writing, and I hesitated long, but at last came to the conclusion that to omit this matter could serve no useful purpose.

I say, therefore, that this thing involves the description of the greatest catastrophe and the most dire calamity

(of the like of which days and nights are innocent) which befell all men generally, and the Muslims in particular; so that, should one say that the world, since God Almighty created Adam until now, has not been afflicted with the like thereof, he would but speak the truth. For indeed history does not contain anything which approaches or comes near unto it. For of the most grievous calamities recorded was what Nebuchadnezzar inflicted on the children of Israel by his slaughter of them and his destruction of Jerusalem; and what was Jerusalem in comparison to the countries which these accursed miscreants destroyed, each city of which was double the size of Jerusalem? Or what were the children of Israel compared to those whom these slew? For verily those whom they massacred in a single city exceeded all the children of Israel. Nay, it is unlikely that mankind will see the like of this calamity, until the world comes to an end and perishes, except the final outbreak of Gog and Magog.

For even Antichrist will spare such as follow him, though he destroy those who oppose him, but these Tatars spared none, slaying women and men and children, ripping open pregnant women and killing unborn babes. Verily to God do we belong, and unto Him do we return, and there is no strength and no power save in God, the High, the Almighty, in face of this catastrophe, whereof the sparks flew far and wide, and the hurt was universal; and which passed over the lands like clouds driven by the wind. For these were a people who emerged from the confines of China, and attacked the cities of Turkestan, like Kashghar and Balasaghun, and thence advanced on the cities of Transoxiana, such as Samargand, Bukhara and the like, taking possession of them, and treating their inhabitants in such wise as we shall mention; and of them one division then passed on into Khurasan, until they had made an end of taking possession, and destroying, and slaying, and plundering, and thence passing on to Ray, Hamadan and the Highlands, and the cities contained therein, even to the limits of Iraq, whence they marched on the towns of Adharbayjan and Arraniyya, destroying them and slaying most of their inhabitants, of whom none escaped save a small remnant; and all this in less than a year; this is a thing whereof the like has not been heard. And when they had

finished with Adharbayjan and Arraniyya, they passed on to Darband-i-Shirwan, and occupied its cities, none of which escaped save the fortress wherein was their King; wherefore they passed by it to the countries of the Lan and the Lakiz and the various nationalities which dwell in that region, and plundered, slew, and destroyed them to the full. And thence they made their way to the lands of Qipchaq, who are the most numerous of the Turks, and slew all such as withstood them, while the survivors fled to the fords and mountain-tops, and abandoned their country, which these Tatars overran. All this they did in the briefest space of time, remaining only for so long as their march required and no more.

Another division, distinct from that mentioned above, marched on Ghazna and its dependencies, and those parts of India, Sistan and Kirman which border thereon, and wrought therein deeds like unto the other, nay, yet more grievous. Now this is a thing the like of which ear has not heard; for Alexander, concerning whom historians agree that he conquered the world, did not do so with such swiftness, but only in the space of about ten years; neither did he slay, but was satisfied that men should be subject to him. But these Tatars conquered most of the habitable globe, and the best, the most flourishing and most populous part thereof, and that whereof the inhabitants were the most advanced in character and conduct, in about a year; nor did any country escape their devastations which did not fearfully expect them and dread their arrival.

Moreover they need no commissariat, nor the conveyance of supplies, for they have with them sheep, cows, horses, and the like quadrupeds, the flesh of which they eat, naught else. As for their beasts which they ride, these dig into the earth with their hoofs and eat the roots of plants, knowing naught of barley. And so, when they alight anywhere, they have need of nothing from without. As for their religion, they worship the sun when it rises, and regard nothing as unlawful, for they eat all beasts, even dogs, pigs, and the like; nor do they recognise the marriage-tie, for several men are in marital relations with one woman, and if a child is born, it knows not who is its father.

Therefore Islam and the Muslims have been afflicted during this period with calamities wherewith no people

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hath been visited. These Tatars (may God confound them!) came from the East, and wrought deeds which horrify all who hear of them, and which you shall, please God, see set forth in full detail in their proper connection. And of these was the invasion of Syria by the Franks (may God curse them!) out of the West, and their attack on Egypt, and occupation of the port of Damietta therein, so that Egypt and Syria were like to be conquered by them, but for the grace of God and the help which He vouchsafed us against them, as we have mentioned under the year 614 [1217–18]. Of these, moreover, was that the sword was drawn between those who escaped from these two foes, and strife was rampant, as we have also mentioned: and verily unto

God do we belong and unto Him do we return! We ask God to vouchsafe victory to Islam and the Muslims, for there is none other to aid, help, or defend the True Faith. But if God intends evil to any people, naught can avert it, nor have they any ruler save Him. As for these Tatars, their achievements were only rendered possible by the absence of any effective obstacle; and the cause of this absence was that Muhammad Khwarazmshah had overrun the lands, slaying and destroying their Kings, so that he remained alone ruling over all these countries; wherefore, when he was defeated by the Tatars, none was left in the lands to check those or protect these, that so God might accomplish a thing which was to be done.

From: Edward G. Browne, *A Literary History of Persia*, vol. 2 (Cambridge, U.K.: Cambridge University Press, 1902).

FURTHER READING

- Robert Bartlett, *The Making of Europe: Conquest, Colonization, and Cultural Change, 950–1350* (Princeton, N.J.: Princeton University Press, 1993).
- Carter Vaughn Findley, *The Turks in World History* (New York: Oxford University Press, 2005).
- Harry A. Gailey, *The History of Africa in Maps* (Chicago: Denoyer-Geppert, 1971).
- Geoffrey Irwin, *The Prehistoric Exploration and Colonisation of the Pacific* (Cambridge, U.K.: Cambridge University Press, 1992).
- Lucien Musset, *The Germanic Invasions: The Making of Europe, A.D. 400–600*, trans. Edward James and Columba James (University Park: Pennsylvania State University Press, 1975).
- James L. Newman, *The Peopling of Africa: A Geographic Interpretation* (New Haven, Conn.: Yale University Press, 1995).
- Raymond Scupin, ed., *Peoples and Cultures of Asia* (Upper Saddle River, N.J.: Pearson Prentice-Hall, 2006).
- Jan Vansina, *Paths in the Rainforest: Toward a History of Political Tradition in Equatorial Africa* (Madison: University of Wisconsin Press, 1990).
- J. M. Wallace-Hadrill, *The Barbarian West, 400–1000* (Oxford, U.K.: Blackwell, 1988).
- Derek A. Wilson, *A Student's Atlas of African History*, 2nd ed. (London: University of London Press, 1975).

► military

INTRODUCTION

In the wake of the professionalism of the Roman army, the Middle Ages in Europe and the Mediterranean saw the return of the heroic warrior. The Germanic and Arabic tribal

peoples that overwhelmed the empire possessed an ethos of duels and vendettas carried out by single warriors fighting against each other for honor. Close-order drill and the submersion of the warrior into the mass of mere soldiers were foreign to this mentality.

The Islamic states that succeeded Rome on the southern and eastern shores of the Mediterranean and expanded far into central and southern Asia quickly copied the professional organization, tactics, and logistics of their main opponent, the surviving Eastern Roman Empire, or Byzantine Empire. In the West, however, the heroic ideal lived on in the knight. The feudal aristocracy of western Europe saw themselves as heroic knightly warriors devoted to ideals of personal honor. In war they would rather capture an enemy than kill him, so that his armor (a very valuable commodity) could be taken and a ransom collected. They trained for single combat, and a major focus of their careers was the tournament, a sort of stylized display of single combat in which the combatants essentially gambled their armor on the outcome of their fights. While knights devoted their whole lives to warfare, they remained, as it were, professional amateurs.

Knights did make highly effective heavy cavalry, but they found themselves at a disadvantage when fighting professional Byzantine or Islamic armies. The knightly heroic form of warfare came to an end when it became evident that they could not withstand more flexible professional peasant armies, as evidenced by the difficulties knights encountered

against levies of Welsh archers in the Hundred Years' War and the popular peasant armies of the Swiss and of the Czechs in the Hussite wars.

The Aztec also engaged in heroic warfare. Although Aztec warriors began as professional mercenary soldiers, once they formed an empire in central Mexico, they developed an entirely heroic style of fighting. They faced no serious external military threat, so their warrior honor was satisfied by annually declaring war on their own subject peoples and sending warriors out to fight them. They gained honor not by killing the "enemy" but by wounding them and bringing them back as captives to the Aztec capital Tenochtitlán for ritual sacrifice.

Notable military professionalism developed in the Middle Ages among the Inca. Their method of waging war depended on putting overwhelming numbers of soldiers into the field and keeping them supplied as a force through an excellent logistical system. A similar development of military professionalism with an emphasis on force size and logistics enabled the growth of the Kongo Empire in central Africa at the end of the Middle Ages. But the triumph of medieval military professionalism came from a most unexpected source, the steppe tribe of the Mongols. Their leader Genghis Khan was a military genius on the order of Alexander the Great or Napoleon. He forged a group of talented professional command and staff officers around himself that was able to achieve strategic and logistical miracles (especially in the conquest of the Khwarezmian Empire in inner Asia and Iran) and absorb and adapt the superior military technology of China. Once the influence of Genghis Khan's personal magnetism ended, the Mongol Empire (the largest in history) fell apart, and its military arts stagnated.

The transformation of warfare in later eras depended on a new development introduced into warfare in the Middle Ages: gunpowder. The substance itself probably was invented in China about 1100 by alchemical experiment. It was only slowly adapted to warfare. It was spread to Europe and the Islamic world by the success of the Mongol conquests. At first it was used in the form of grenades (explosives thrown by catapults) and as a sort of flamethrower shooting out of brass tubes mounted on the end of sticks. The effect of these early weapons was more psychological than actual. Eventually the flamethrowing tubes began to be loaded with broken glass or pebbles, which evolved into both small arms and cannon. These arms used existing technologies: the bronze-casting technologies used to make bells and the spherical stone balls already favored as projectiles in trebuchets.

Cannon became effective in siege warfare in China in the 14th century and in Europe in the 15th century. It made all existing fortifications obsolete, since the thin, high cur-

tain walls could be breeched quickly by cannon fire. Small arms, however, proved ineffective because of their slow rate of fire. They were first used practically by the Hussite peasant army in Bohemia and finally were properly integrated into a tactical system with pikemen and cavalry by the Spanish, as demonstrated in the battle of Cerignola (1503) at the very end of the Middle Ages, resulting in a mass slaughter of knights attacking harquebusiers (soldiers manning matchlock guns) in fieldworks.

AFRICA

BY JUSTIN CORFIELD

The tribal customs that involved people serving in the armies of medieval Africa varied, with few parts of Africa able to maintain large standing armies. As a result, those places where large armies were able to be maintained quickly emerged as powerful kingdoms; many of them, however, did not last for more than a few centuries, possibly because of a failure to be able to continue to pay for the costs of running a large army as much from internal factionalism and outside pressures.

From the 430s until the 530s the Vandals emerged as a major military power in northern Africa, managing to take most of modern-day coastal Morocco, Algeria, and Tunisia from the declining Roman Empire. They raised their armies essentially by heavy expansion, rewarding their supporters by looting and pillaging cities, and their name remains synonymous with wanton destruction or desecration. Their soldiers were mainly mounted on horses without horse armor used by the late Romans and Byzantines at that time, enabling them to raid enemy settlements and evade pursuit. In battle it also gave them greater maneuverability. This method of fighting and the process of enlarging their land holdings allowed the Vandals to maintain large numbers of soldiers as long as they were successful militarily and continued to expand. This meant that when the Vandals started to suffer military reverses, such as attacks by the Byzantines in the 530s, the Vandal forces rapidly collapsed, as they had not relied on raising soldiers from the populations of areas they had occupied.

From the early seventh century there seems to have been extensive fighting in the Nile states of Maqurrah, Nabotia, and Alwah, with Maqurrah conquering Nabotia. The power vacuum that resulted led to the creation of a number of small states on the southern frontiers of Egypt; farther south it was not long before the Bantu kingdom of Zanj in modern-day Kenya had taken over the southern part of Somalia. This proliferation of states accelerated with the decline of the Axumite empire when the queen of the kingdom, Esato (or "Judith"), destroyed the countryside around Axum in 976. The fall of Axum also led Maqurrah and Alwah to grow in power. Both

became wealthy through trade with the Arabian Peninsula. It seems likely that Arab weapons were traded, which allowed both Maqurrah and Alwah to increase in power.

In western Africa the kingdom known as Wagadou and later as the Ghana Empire, located in modern-day Mali, rose in power through the use of its military strength. This seems to have been because the gold reserves that the kingdom had built up could be used to raise armies from the people within the empire to maintain a small standing army whose mobility on horseback made them impossible to challenge. The Almoravids from northwestern Africa raised large numbers of horsemen and attacked isolated settlements, and in 1076 they sacked the Ghanian capital of Kumbi. This seems to have been because the Almoravids were able to maintain a larger army for a longer time than their opponents, and they used the tactic of surprise on their rivals in Ghana.

The sacking of Kumbi led to a rapid decline in the Ghana Empire, and it broke up into a large number of smaller states; the most important three were Susu, Mali, and Songhai. The

Susu were the first to emerge as a strong military power, led by King Sumanguru, who commanded an attack on Kumbi in 1203 and the temporary conquest of Mali in 1224. However, the victory of the Susu was short-lived, and in 1235 King Sundiata of Mali managed to expand his lands to cover some of the area previously controlled by the Susu and the Songhai. The kingdom of Mali reached its height under the emperor Mansa Musa, who reigned from 1307 until 1332. Much is made of his pilgrimage to Mecca, when he took some 60,000 servants and soldiers and 12 tons of gold. While the emperor Mansa Musa was away, he left General Sagmandia in charge, and the general took the opportunity to attack the Songhai capital at Gao, thus allowing Mali to expand its lands much farther than ever before.

By the mid-ninth century the kingdom of Kanem near Lake Chad had become so wealthy through the trans-Saharan caravan trade that it also could maintain its own armies for longer periods than its neighbors. By this time the Axumite empire was declining in importance and the Zagwe Dynasty from central Ethiopia was starting to become more powerful. This was achieved largely by deploying garrisons throughout northern Ethiopia to protect isolated settlements from the depredations of the Mamluks of Egypt. With the Mamluks and their allies powerful at sea, the Zagwe Dynasty gradually withdrew from its coastal settlements, which in turn caused Ethiopia to become more isolated. Because Mamluk attacks were usually made with cavalry charges, Ethiopian military fortifications incorporated higher walls with narrower and smaller entrances to forts and monasteries that included at least two levels of defenses, thereby forcing attackers to dismount in order to pass through the first line of defense, making them more vulnerable to the defenders.

Although the civilization of Great Zimbabwe also dates from the mid-ninth century and undoubtedly had a large army to maintain its state structures, nothing is known for certain about the training and tactics used; however, it is probable that they did employ methods similar to those in other parts of southern Africa during the early modern period. Young, unmarried men served in a permanent standing army; after giving up this role to marriage, they could still be called up as reservists at any later stage. Training would be undertaken with a view to fighting other tribes as well as hunting for food or sport. In terms of tactics, the vast majority of the fighting was hand to hand; the army that was better trained and larger had the advantage. Most groups in southern Africa were unable to maintain large standing armies. The grain supplies at Great Zimbabwe thus were established, as some archaeologists have argued, to provision just such a force at times of emergency and for far longer periods than their opponents.



Archer figure; inland Niger Delta region, Mali, 13th to 15th centuries (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Museum purchase, 86-12-1)

The rise in power of Mali seems to have encouraged a number of Hausa states in western Africa to use imported weaponry and tactics in their own war of colonial expansion. This was also done by the kingdom of Kongo in modern-day Democratic Republic of the Congo and Angola. This trend toward importing weapons became noticeable during the last decades of the 15th century when Portuguese traders had started to arrive in western Africa and Kongo, bringing with them the technology for the use of musketry and cannons. Similarly, in East Africa, contact with Arab traders allowed people in and around modern-day Zanzibar to import Turkish weaponry.

As a result of this imported technology, from the 1430s until the 1490s there was a dramatic change in the power balance throughout much of Africa. The city of Timbuktu was sacked by the Tuareg in 1431, Ewuare the Great of Benin (fl. 1440–80) massively expanded his kingdom, the Songhai under Sonni 'Ali sacked Timbuktu in 1468, and the Mossi continued their lightning cavalry attacks on the Sonni, leading to the battle of Kobi in 1483 when the Mossi were finally defeated. During the 1480s contact between the Portuguese and the kingdom of Kongo allowed the latter to gain new technology, leading to the creation of one of the first "secondary empires" in Africa.

THE AMERICAS

BY J. J. GEORGE

The best information regarding military systems in the period from 500 to 1500 correlates with the largest and most organized societies of the time: the 15th- and 16th-century Aztec and Inca civilizations as well as the city of Teotihuacán, which had an institutionalized military by at least 500. Like other developed social institutions, military institutions are intended to organize values, attitudes, and interests in the service of social needs. An organized military implies a sophisticated authority structure often attributed to advanced societies and is thus linked to the origin of civilization. Regardless of whether the military is necessary for the transition to state organization and civilized life, it is very close to the core of civilizations as they have developed. The Americas was no exception.

After 500 Teotihuacán, centered 40 miles northeast of contemporary Mexico City, began to decline. Teotihuacán introduced the use of quilted-cotton body armor, which the Aztec later adopted. Other innovations used by the military of Teotihuacán was the atlatl (spear-thrower), thrusting spear, and rectangular shield, all of which were standardized and thus indicative of mass recruitment and an organizational capability usually reserved for advanced societies.

Murals at Teotihuacán also depict warriors as eagle and jaguar deities, suggesting individual ritualized battle as part of a growing war cult and of sacrificial practices meant to indulge the gods, a practice especially common among the Toltec and later the Aztec.

Teotihuacán fell by 750, and in the ensuing power vacuum, regional centers emerged in central Mexico, many in fortified hilltops, including Xochicalco, Cacaxtla, and Teotenango. Tula (800–1150), or Tollan, the center of the Toltec, emerged as a major city and regional power, of which militarism was a major feature. Military prominence is reflected in carvings of giant warriors, the prominent positions of the military orders of eagles and jaguars, and the introduction of new weaponry. The Toltec introduced a short, curved wooden sword, about 18 inches long, with inset stone blades. Armed with the atlatl, quilted-cotton armor, and a shield, the Toltec warrior was effective both as a projectilist and hand-to-hand combatant. Toltec weaponry appears to have been standardized, suggesting state control, formal units, military societies, and a chain of command. Legends told by the Aztec and recorded by the Spanish further reveal Toltec military prowess, though some of these are exaggerations by the Aztec to ennoble themselves by adopting the Toltec legacy as part of their own ancestry.

The Aztec, or more specifically the Aztec-Mexica, were originally a pugnacious, wandering people from the north. Their legends describe them leaving Tollan around 1250 and entering the Mexico basin around 1325 to settle a swampy, virtually uninhabitable island in the middle of Lake Texcoco. This island became their great capital city of Tenochtitlán and then Mexico City after the Spanish arrived in 1521.

Their reputation as soldiers served them well. Initially they hired themselves as mercenaries to local polities in need of extra punch. By the mid-15th century they had organized themselves and were a legitimate civic enterprise with a confident military institution. Aztec armies were extremely well managed and supplied. The army was typically divided into commands of 8,000 men, who could march up to 12 miles a day carrying rations for an eight-day campaign. All males, regardless of their place in the rigid social hierarchy, were born as potential warriors and had a chance to rise to high warrior status by attending the military schools (*calpulli*) in their city districts. The men were warriors, not soldiers in the traditional sense, expected to fight because of a place in society and not because of pay or obligation.

The typical warrior was a novice fresh from training and one of a group organized to learn how to take captives. A unique feature of the Aztec war machine was that its goal was not to kill enemies but to take them hostage to realize ritual sacrificial requirements. Warriors were graded according to



Warrior figure; ceramic with slip and paint, Remojadas culture, Mexico, 600–900 (Los Angeles County Museum of Art, Gift of Constance McCormick Fearing, Photograph © 2006 Museum Associates/LACMA [M.86.311.41])

the number of captives taken, and the most senior warriors, those who had taken seven or more captives, were distinguished by magnificent eagle and jaguar warrior costumes.

The matched duel was the preferred mode of combat, with warriors searching the battlefield for an enemy of equal or just-higher rank. Bringing an opponent down by a blow to the leg was ideal, wounding him enough to enable the Aztec warrior to wrestle the enemy to the ground, bind him by rope, and take him to the rear of the battlefield. The preferred Aztec weapon was the wooden club or sword studded with obsidian flakes. They also used the bow and arrow, spear, and atlatl and later adopted the thrusting spear with a longer-bladed surface (*tepoztalli*) and the bladed wooden broadsword (*macuahuitl*). Warriors carried small round shields and wore quilted-cotton body armor, similar to that of Teotihuacán and sufficient to retard arrows. The Spanish adopted cotton armor once they realized their steel breastplates were not only morbidly hot but also superfluous.

In the Mayan areas of Central America combat was largely a noble's enterprise, which translated into small forces with no chain of command, little or no standardized weaponry, and no drilled formation combat. Rather than large-scale battles, raids seem to have been the typical form of engagement. Raids legitimated kings and their right to rule. Further, preferring not to conquer and control cities or centers, which necessitated too much manpower, the Maya

conducted raids to gain tributaries and control dependent laborers. Defeat meant the loss of wealth, territory, and labor and thus a loss of power.

Warfare is a general characteristic of prestate complex societies similar to many Mayan polities. Competition over prime agricultural land, labor, and access to prestige goods may have motivated conflict in these societies. Mayan polities, however, often did not have the political strength, manpower, or organizational and logistical sophistication to conquer and control other polities and may have opted to weaken competitors or form alliances. To repel these protomilitaristic advances, many later Mayan sites developed fortifications. The Mayan lowlands are littered with fortifications and fortresses. The weaponry of the time—spears, spear-throwers, rocks, slings, and obsidian-bladed clubs—was limited in range, and height was a primary tactical advantage. Thus, securing the chief temple in most Mesoamerican centers was of prime tactical advantage. Defensive moats were known as early as the Late Formative Period (ca. 300 B.C.E.–ca. 250 C.E.) at Tikal and Becan, and defensive walls were known at El Mirador and Calakmul. Further indication of military organization among the Maya is seen in lintels at Piedras Negras (sixth to ninth centuries) showing numerous soldiers in standard uniforms kneeling in ranks before an officer. At Chichén Itzá in the Mexican Yucatán, the Toltec invasion in the late eighth or early ninth century brought with it weapons, cotton armor, and the Toltec short sword, a combination that allowed Chichén Itzá to maintain a small regional empire for more than 300 years.

The advanced, organized, state-controlled military enterprise of the Aztec or Teotihuacán was unknown in North America, and conflicts there are better categorized as chiefly warfare and raiding. Evidence of defensive fortification from many sites throughout the Southwest, Midwest, and Southeast indicate that warfare was common. Many sites in the Southwest were located and built defensively. Communities were spaced by large no-man's lands yet were located to effect line-of-sight communication between them. This community-building strategy was intended to minimize conflict or, in the event of conflict, to enable neighbors to communicate. Most Mogollon villages dated between 200 and 600 are located on hilltops. In the Anasazi region of southwestern Colorado and northern New Mexico, small hamlets with palisades were established, and some larger sites are located on mesa tops. Among the Mississippian cultures of the Southeast and Midwest some form of a military cult was thought to be extant, as seen in figural images displaying idealized warriors dressed as bird deities—not unlike the Aztec and Teotihuacán eagle and jaguar warriors—bearing clubs and holding severed heads. With warfare endemic, towns became fortified by palisades, bastions, and moats.

In South America the best evidence comes from the Inca, which flourished magnificently, though briefly, from 1434 until the Spanish arrival in 1532. For the Inca, diplomacy, reward, and enculturation were essential ingredients of empire building, though the military had its role. When military action was necessary, the Inca relied on a large, well-disciplined army with a well-organized supply system; strategy and logistics, not training, tactics, or technology, were primary reasons for Inca military success. Late in Inca times the army may have become a professionalized standing army, but initially it comprised units of peasant conscripts on rotational labor duty, using their own weapons and led by their own lords. The emperor was commander in chief and, at least in the initial stages of the empire, acted as field commander. A hierarchy of soldiers was beneath him, the highest of which were usually royal kin. The Inca were said to be able to raise an army of 100,000. Accordingly, favorite tactics included the use of overwhelming force and counterattack.

Logistical efficiency was paramount, given the nature of the physical empire—stretching over 3,400 miles from Quito, Ecuador, to Santiago, Chile, through deserts and jungles and over and around the Andean mountain range. The ability to maintain control relied on a sense of order; to maintain order the Inca had many strategies, including forced displacement of populations, construction of provincial centers from the ground up to facilitate administration, as well as subjugation through military control. Although fortified strongholds were not abundant in most of the Inca region, structures appropriate for military use were found all over. *Kallankas*, large rectangular buildings that sometimes served as barracks, were the most appropriate construction. At Vilcaswaman, one such *kallanka* was said to house 30,000 soldiers. The Inca also built storehouses across the region to feed, clothe, and maintain army units on long-distance campaigns. Finally, the far northern and southern frontiers of the Incan lands saw a heavy concentration of fortified sites, reflecting an intense concern for military security at the frontier.

ASIA AND THE PACIFIC

BY NAM C. KIM

China's medieval period starts in the fifth century during a time marked by conflict and instability. The nature of medieval warfare stemmed from developments in the Warring States Period (ca. 475 B.C.E.–221 B.C.E.), including large standing armies along with the advent of cavalry forces and crossbow weaponry. From then on, the scale of battles grew as the result of the sponsorship of state-level polities. Battles fought by competing dynasties had armies numbering in the tens of thousands as well as naval fleets. Mobilization and

transport requirements were important considerations. In addition to infantry, armies consisted of skilled horse archers, who provided the tactical advantages of speed and mobility. Wheeled vehicles drawn by animals also were deployed as mobile fortifications.

Deploying naval forces involved tactical use of inland waterways. Boats were used both for transportation and as mobile firing platforms. Powered by sails and oarsmen, vessels carried crossbowmen, and some had trebuchets (engines of war with a sling for hurling objects or projectiles). By the time of the Sui Dynasty at the close of the sixth century, mixed land and naval forces numbering in the hundreds of thousands were being sent into battles. Military power depended on farming communities from which governments could draw taxed resources, in the form of food, fabric, and *corvée* (unpaid) labor. *Corvée* labor was necessary for building and maintaining fortifications and canals, and all male commoners could be called to military service.

Armored cavalry often played a decisive role on the battlefield, particularly during the early Tang Dynasty at the start of the seventh century. Superior mobility allowed cavalry units to scout terrain, outmaneuver enemy forces, break enemy lines, and raid supply convoys. Military units consisting of hundreds of locally recruited men were based in prefectures (districts). Tang soldiers, known as the *fubing*, were expected to support themselves through farming during peacetime and served lifelong military commitments.

In the 13th century Mongol forces overthrew the Western Xia and Jin dynasties of China, establishing the Yuan Dynasty. Mongol military tactics featured steppe cavalrymen, armed with the composite bow, shock weaponry, and light armor. Mongol forces were highly mobile on open battlefields, and horses were equipped with saddles and stirrups, allowing soldiers to carry equipment and fight from the saddle. The Mongols also used siege warfare, with trebuchets, to overtake Chinese fortifications. There is evidence suggesting that the Mongols encountered and acquired gunpowder from the Chinese at this time and that the Mongols in turn may have introduced the innovation into other parts of Asia, such as India.

Although the origin of gunpowder remains the subject of debate, Chinese armies began using explosive projectiles during the Song Dynasty of the 10th through 13th centuries. Gunpowder-based weaponry remained rare early on. Over the next few centuries, gunpowder devices evolved into delivery of explosive grenades by catapult and mortar tubes, gradually culminating in the use of firearms. During the Ming Dynasty (1368–1644), Chinese military forces were increasingly using firearm and cannon technologies. In addition, naval forces were also employing cannons.

Mainland Southeast Asian warfare during the first millennium shared similarities with Chinese warfare. Northern parts of Vietnam were under Chinese rule until the 10th century, at which time the Vietnamese fought against imperial control and reestablished indigenous rule. The battle of Bach Dang River in 938 illustrates military tactics of the time. Chinese forces from the north were mobilized southward into the region by warships along the seacoast. Using the high tide as cover, the Vietnamese planted large barrier poles, sharpened and iron tipped, into the riverbed while using smaller boats to bait the Chinese ships to give chase. As the Chinese sailed upriver in pursuit, the tide fell, and they were trapped in the river by the poles. Three centuries later the Vietnamese used a similar tactic at the same location to repel Mongol invaders.

Champa is the generic name referring to small coastal kingdoms ruling over central Vietnam during the first millennium. These kingdoms became unified into a regional power during the early second millennium. Not much is known about military tactics, though historical and archaeological evidence suggests periods of warfare, which include the Vietnamese military incursions into Champa territory between the 10th and 15th centuries. During this time the Chams erected large, fortified citadels with earthen ramparts and outer moats.

Inscriptions describe the founding of the Khmer Empire in the ninth century through pacification of the Cambodian countryside in the lower Mekong River basin. Angkor Wat was built in the 12th century and served as the imperial capital of the Khmer Empire, which dominated much of Southeast Asia for six centuries. Angkor Wat's outer wall is approximately 5 yards in height and is surrounded by a large moat. During the Angkor Period (802–1431), the region was marked by internal and external warfare, including wars with the Champa Kingdom. The Khmer Empire pursued military expansion, possibly to finance state activities by capturing and incorporating labor in neighboring territories.

Japan's medieval period generally spans the 12th century to the 19th centuries. During this time powerful regional families and warlords (shoguns) ruled the country, with an emperor serving as a figurehead. Before this era much of Japan's military order was influenced by Chinese civilization. The decline of Chinese influence during the 10th century led to Japanese civil war and the emergence of various military clans.

Military recruitment became largely privatized, even for government troops. The emperor's court was left intact and without a state-run army, only to perform ceremonial functions, while the powerful *bushi* class raised and trained private armies of samurai warriors. At the beginning of the medieval period the emperor still retained the right to sanction mili-

tary mobilization. However, this power gradually lessened as power shifted into the hands of the shogun *bushi* class that often led private military campaigns against each other.

Before gunpowder Japanese military weapons were already widely used during the first millennium B.C.E. Prominent weaponry included the horse and longbow, usually made from wood or bamboo. After the fifth century C.E. lamellar armor (armor composed of small plates laced together) became common, and mounted archers emerged, as horses were imported into the islands. For the most part, horse-riding archers defined the military tactics of early medieval Japan. Swords were also widely distributed and used during the Heian Period (737–1185) at the close of the first millennium.

By the 11th century samurai combat marked most battles. Over the next few centuries, sword dimensions changed, including length, blade curvature, and use of hand guards. Premedieval and medieval soldiers also used self-standing wooden shields and lamellar body armor, usually made from iron or rawhide. As the medieval period progressed, military forces used mixtures of light and heavy cavalry with light and heavy infantry. The Portuguese introduced firearms into Japan during the 16th century, and though culturally rejected at first, firearms would eventually become incorporated into military tactics very late in the medieval period.

Medieval Japanese warfare also saw the use of fortifications in the form of ditches, palisade walls (fenced enclosures), and towers. Extensive fortifications were relatively rare until the 14th and 15th centuries. Before that time field fortifications characterized by ditches and earthen ramparts were largely basic and temporary.

On the Indian Subcontinent during the fifth century, the Gupta Empire ruled over most of modern-day India and Pakistan. Known as the golden age of India, the Gupta Period spans approximately the years 320 to 600. Military tactics featured infantry archers with longbows and metal arrow points. The long range of bows offered an efficient means of defense against horse archers. Archers were used in conjunction with infantry, who were equipped with swords, javelins, and shields. Gupta military forces also used elephants, armored cavalry, and siege engines, such as catapults.

In the Middle Ages of India armies generally consisted of feudal levies. Indian kings lacked standing armies, and village chiefs probably were responsible for raising horses and soldiers when called upon by the king, with mercenary forces being used as well. Armies combined the use of infantry and mounted soldiers. For instance, the Pala Empire, which controlled northern and eastern India from the eighth century to the 12th century, used a combination of infantry, cavalry, elephants, and chariots. Weaponry ranged from shock weapons, such as swords, clubs, axes, and hammers, to projectile

weapons, such as discuses, bows, javelins, and slings. Fortifications were relatively similar to earlier times, although there was an increased use of hilltop fortifications. Defensive works usually incorporated walls, defended gates, bastions, and moats. Many cities were fortified, and siege warfare consisted of blockades and direct assaults.

The Three Kingdoms Period (300–668) of the Korean peninsula featured the rival polities of Koguryo, Paekche, and Silla. Historical and archaeological evidence indicates warfare between the three kingdoms and with outside powers in China and Japan. Given the peninsula's geographic proximity to China, much of the available military technologies on the peninsula were relatively similar. For example, the Koguryo military featured use of cavalry mixed with infantry. Infantry soldiers wore padded armor and helmets, while higher-ranking officers were equipped with armor of lamellar iron. Shock weapons included bronze and iron swords, spearheads, and axes, while longer-range weapons included bows with metallic points.

Human colonization of many of the South Pacific islands commenced during the first millennium B.C.E. and continued during the first millennium and early second millennium C.E. According to oral histories, warfare was widespread within these Oceanic and Polynesian societies prior to 18th-century European contact, especially as populations grew. In general, warfare was a means to consolidate resources, people, agriculturally productive territory, and political power. Native histories describe battles waged by ruling classes of chiefly leaders who fought wars of conquest and succession. Complementing the historical record, warfare is indicated by archaeological evidence, which includes fortifications, weaponry, war temples, and refuges.

For example, the Maori of New Zealand first settled the island during the 11th century, and their communities eventually developed into large, hierarchical villages. Maori societies constructed heavily fortified settlements known as *pa*, typically consisting of a hilltop fortress marked by palisades, ditches, and embankments. Over 4,000 such forts have been found. Hawaiian societies did not construct fortifications, although there is evidence for the use of refuges, such as walled-up lava tubes. For Marquesan societies, warfare ranged from simple raiding to conquest of land. Some Marquesan settlements were also marked by defensibility, with ditched fortifications and strongholds.

Very broadly speaking, Polynesian warfare included both long-distance weapons, such as slings and spears, as well as shock weapons, such as lances, wooden daggers, and clubs. Maori warriors, known as *toa*, used spears and clubs with embedded shell, bone, or stone for lethal edges. These societies also used war canoe fleets, propelled by sails or paddles,

for transporting troops over longer distances. For instance, the Tongans used war canoes to invade and conquer Samoa.

EUROPE

BY BRADLEY A. SKEEN

The art of war, the understanding and application of strategy, was largely static during the Middle Ages, although there were incremental changes in some areas, such as the design of armor and the naval architecture of warships. Western European armies of knights evolved from the war bands of the ancient Germanic kings. The Byzantine Empire maintained a professional army that was based on that of the older Roman Empire. Warfare changed dramatically, however, in the 15th century as new technology such as gunpowder became prominent and popular armies began to emerge.

The Byzantine army was reformed by the emperor Maurice (r. 582–602), who transformed the Roman army of late antiquity into its medieval form. All officers were directly appointed and could be removed at will by the emperor. The army was distributed throughout the empire. Each theme (a Byzantine government administrative unit) had its own force of as many as 10,000 men. If this force was unable to deal with an invasion, forces from neighboring themes would come to its aid. This deployment dedicated the Byzantine state to a defensive posture. Beset on all sides by enemies who vastly outnumbered them, the Byzantines did not think in terms of grand offensives that would solve their military problems once and for all.

Byzantine soldiers were long-service professional volunteers. They were highly disciplined and trained; thus, they were far more effective than any other soldiers in the Middle Ages. Soldiers came especially from the mountainous regions of central Asia Minor (modern-day Turkey). Such recruits had the natural advantages of highland soldiers. Because their family farms were principally concerned with raising cattle, sheep or goats in mountain pastures rather than only the cereal crops that dominated agriculture in most areas, they were taller and more physically capable, owing to a diet more heavily based on meat and milk products rather than the wheat gruel that was the staple of most peasants. Also because of diet, the infant mortality rate was low; thus, mountain farmers tended to have more children than their land could support, creating a steady supply of young recruits. They were experienced in riding and hunting even before entering the army. These same features would characterize other outstanding groups of soldiers throughout the Middle Ages, such as the Welsh and Swiss.

The tactical model of the Byzantine army was descended from the warriors of the Germanic tribes that had made up

CROSSBOWS

One of the major weapons of war in late medieval Europe was the crossbow. It had been developed in China during the Han Dynasty (202 B.C.E.–220 C.E.), being used in war as early as 353 B.C.E.; indeed, some representations of crossbows have been found among the so-called Terracotta Army of Qin Shi Huang (r. 221–210 B.C.E.), the first emperor of China. Anna Comnena, daughter of the Byzantine emperor Alexius I Comnenus (r. 1081–1118), called the crossbow “a weapon of the barbarians absolutely unknown to the Greeks,” but soon it was being adopted by the Byzantines and first used in Europe soon after the First Crusade of 1099.

The effectiveness of the crossbow and the fact that it was first used against the Byzantines by the Turks led Pope Urban II (ca. 1035–99) to ban its use against other Christians, but within 100 years it was being used throughout Europe. Workshops in London, Genoa, Paris, and Prague mass-produced the crossbows, and, initially at any rate, it was to be used against non-Christians only. Conrad III, duke of Swabia and Holy Roman Emperor from 1138 until 1152, forbade anybody to use the crossbow in his lands, despite the fact that there were already many crossbowmen in Bohemia. The king of England, Richard I, “the Lion-hearted” (r. 1189–99), used a crossbow and was himself killed by a bolt from a crossbow. In 1238 the emperor Frederick II of the Holy Roman Empire (r. 1212–50) started using a cavalry unit of Hungarian mercenaries armed with crossbows as skirmishers.

Pope Gregory IX (before 1170–1241) used mounted crossbowmen from Provence, in southern France, to defend his lands against the Lombard League (an alliance of cities in northern Italy) in the following year, and Louis IX of France (r. 1226–70) also used the crossbowmen to great effect at the battle of Mansura, in February 1250, during the Seventh Crusade. Gradually they proved to be less effective against the English longbowmen, as seen at the battle of Crécy in 1346, though they continued to be used by the Spanish during their expeditions to the Americas from 1492.

the forces of the later Roman Empire rather than the classical Roman legions. The cavalry was the most important arm of service. The heavy cavalry, or cataphracts, could charge with the lance, but its main weapon was the bow. Troopers and their horses both wore full suits of mail armor (that is,

a leather suit with small overlapping metal plates sewn on). More lightly armed cavalry wore only a mail cuirass (armor covering the body from the neck to the waist) and carried a shield; they fought with a lance or sword. The heavy infantry wore light armor and carried a shield and battle-ax. Light infantry fought with bows.

In his military manual the *Tactica* (Tactics), the emperor Leo VI (r. 886–912) describes the specific tactics useful against each of the diverse enemies the Byzantines faced. Fighting Western forces in Italy, the massed charge of fully armored knights was something the Byzantine forces could not withstand. They nevertheless considered the Europeans to be their easiest opponents. Byzantines thought European commanders incompetent; blinded by “chivalry” to military necessity; willing to accept battle whenever it was offered, even if on unfavorable terms; and incapable of maintaining outposts or reconnaissance. After a few weeks of maneuvering, the inferior logistic system of the European armies would break down and cause them to start to break up even without battle, and many of the soldiers would desert with no prospect of finding glory in battle. The charge of the knights could be dealt with by the Byzantine army simply by retreating, pretending to have been broken; not realizing that this was a trick, the knights would scatter to begin a pursuit and then could be effectively counterattacked when the Byzantines stopped their feigned retreat.

The nomadic steppe tribes that lived north of the Black Sea specialized in raids and ambushes. If they could be forced to fight, their forces could be destroyed by the charge of Byzantine heavy cavalry. They could not sustain contact with Byzantine infantry either, since their bows had a shorter range. The Slavic tribes in the Balkans were easy to overcome in pitched battle, because they had no cavalry and could not withstand a charge of Byzantine cataphracts. They were, however, expert at laying ambushes in their native mountains.

The Arab armies were the most difficult for the Byzantines to fight. By Leo’s time the Arabs had essentially copied the Byzantine military system, though their forces were far less disciplined, especially the infantry. The problem the Arabs posed came from their frequent raids into Anatolia. A raiding Arab force was to be shadowed by local Byzantine units until an overwhelming superiority of heavy cavalry could be concentrated from nearby themes for a counterattack.

Byzantine cities were surrounded by thick curtain walls; those around the capital of Constantinople were of sufficient thickness to resist cannon fire. The Byzantines were able to deploy “Greek fire,” a sort of primitive flamethrower originally designed for naval operations. Although it was no doubt devastating in its immediate area of use, the effect of this burning-liquid weapon was mostly psychological, since no

other medieval army possessed the secret of its manufacture or composition and it seemed nearly miraculous to inexperienced enemies.

The basis of the medieval army in western Europe was the mounted knight. His equipment consisted of horse, sword, lance, and armor. Originally, knights wore mail similar to that of Byzantine cataphracts, but over time this changed to the lighter and more flexible chain mail (made of tiny interlocked rings of iron) and, finally, to plate armor that covered the entire body and that of the mount as well. Contrary to popular conceptions, plate armor was not a heavy burden that made movement awkward; because its weight was suspended from different parts of the body, it allowed more flexibility and swifter motion than older types of armor.

Knights generally owed military service to the king because of their landholding. The idea of feudalism, that land was granted by the king in return for military service, is an idealization largely reflecting the royal ideology of the later Middle Ages, after Roman law began to be revived. Every free citizen of the kingdom was liable for military service, but the burden fell especially on landholders who were wealthy enough to supply their own equipment. The king and nobles would also employ cavalry and infantry as mercenaries, though these units had far inferior equipment. The kings could and did call up militias from towns and provinces when needed, the burden of service again falling on small landowners who could provide their own equipment as infantry. Knights considered that warfare was not a mere profession but a way of life. Their training for combat was constant throughout their lives but focused on the practical needs of individual fighting: fencing, riding, and archery rather than the study of strategy, tactics, or military history.

Medieval Italian armies, responsible not to the emperor but to individual city-states, consisted of infantry raised from civic militias. These armies were supplemented by mercenaries. The employment of mercenaries in Italy—the *condottiere*—was common and continuous enough that mercenary captains became important figures with their own private armies for hire, a trend that would spread throughout Europe after the end of the Middle Ages.

The king's or great noble's army consisted of a small group of mounted knights maintained as a permanent force, supplemented by mercenary men-at-arms; it included the forces maintained by any noblemen the king could call upon for service and militias called hurriedly into service from the area near the field of battle. Such a force would rarely number as many as 20,000 soldiers. It was summoned into existence as late as possible and dismissed as early as possible because of the lack of disposable wealth to pay and support it. There was no professional military life that could educate and train

soldiers in strategy rather than in fighting, develop doctrine, or preserve institutional memory.

There was no organized drill or discipline; knights did not practice close order drill on horseback in massed formations in that way that Byzantine cavalry did. Even knights did not consider that they needed any military training beyond the skills of single combat: The massed charge of the knights as a body of heavy cavalry was not something practiced in peacetime. This lack of professionalism limited the effectiveness of medieval European armies. The French army, for instance, was so inflexible and amateurish that the English kings, during the Hundred Years' War, could on three separate occasions use small forces of Welsh longbowmen (competent with their weapon from civilian lives spent hunting in the Welsh mountains) and annihilate a larger army of French knights willing to use traditional, though defeated, tactics and charge headlong into fortified positions of archers at Crécy (1346), Poitiers (1356), and Agincourt (1415).

Another well-known feature of medieval military life was the castle. The system of having castles dispersed throughout the countryside developed during the Viking Period (espe-



Chain mail shirt of riveted iron rings; Britain, 13th century (© Museum of London)

cially 850–1000), when places of safety were needed in the face of raids by Vikings, Magyars, Arabs, and other raiders. It was perpetuated afterward because the class of nobles in charge of the castles managed to retain their hold on power against the relatively weak centralizing powers of kings and emperors. Castles were forts made of thin, high, curtain walls built of stone blocks. They were virtually impregnable because of the lack of knowledge of siege warfare techniques among the knightly nobility (although this knowledge improved after extensive contact with Islamic soldiers during the Crusades). Even in the later Middle Ages, when the effectiveness of siege engines such as the trebuchet (a kind of giant sling operated by a falling counterweight that could hurl projectiles weighing up to 300 pounds) increased, this was largely on the initiative of civilian contractors who designed and operated the machinery.

Naval warfare remained unchanged in the Mediterranean from ancient times to the 16th century; it consisted of galleys (ships propelled by several banks of rowers) either ramming each other or coming alongside to allow marines to board an enemy ship. Fighting was then essentially a land battle on the decks. The Byzantines, however, were able to gain considerable advantage with Greek fire, a burning liquid that could be forced out under pressure against target several meters away (its precise chemical composition is still not well understood). The stormy conditions of the North Atlantic made the use of galleys impossible, and throughout the Middle Ages larger and larger sailing vessels were built. Lacking practical naval cannon, the main means of ship-to-ship fighting remained grappling the enemy vessel and boarding it with marines. The advantage went to the ship with the higher deck, so ships were progressively built larger and with higher and higher “castles” (platforms) at the front and back of the ship, from which marines could leap or rappel down to the enemy vessel.

Gunpowder artillery, borrowed by Europeans from the Islamic world, was first used at the siege of Metz in 1324. Fortifications in both cities and castles consisted of curtain walls: thin, high courses of stone. Cannon could knock a breach in these walls after a few hours of bombardment. Consequently, every military fortification in Europe had to be rebuilt to withstand cannon fire, a process that carried tremendous economic and social costs and that would not be completed until the 17th century.

Gunpowder small arms did not become important during the Middle Ages because the slow rate of fire made individual gunners too vulnerable to attacks by cavalry. An exception to this was the military of the Hussites. Between 1419 and 1430 the followers of the religious leader Jan Hus (who was executed at the Council of Constance in 1415) staged a revolt

in Bohemia. The Hussites produced the first popular army in Europe, drawn from a mass movement of peasants. Freed from aristocratic tradition, the Hussites were highly innovative in their tactics. Their armies traveled in armored wagons that, when they were attacked by a force of mounted knights, would form a circle in the manner familiar from Hollywood westerns. When mounted knights charged this wagon fortress (*Wagenburg*), they were met with concentrated small-arms fire from ports in the sides of the wagons. Once this defense broke the attacking formation, the Hussites’ own cavalry would charge to attack the retreating enemy.

Another answer to the knightly cavalry charge was the Swiss pike square. This tactical system organized infantry into small formations in which each man was armed with a long pike. When the pikes were leveled, their points formed a barrier onto which charging cavalry would be impaled. In the mid 1470s the Swiss won a series of victories against Charles of Burgundy. This early conflict also had the nationalist character of a peasant army resisting a feudal overlord. The Swiss style of fighting proved so effective that they soon found themselves in demand as mercenaries throughout Europe. As the pike square became widely imitated and small firearms became easier to use, the era of the mounted knight ended with the Middle Ages around 1500.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

The Arabian world into which Islam was first introduced was still in the heroic age of fighting: that is, war was a matter of individual heroics, and battles were fought by warriors pairing off against each other, each fighting for personal glory and the honor of his clan. An example of how this worked was the battle of Badr in March 624. Muhammad led a core group of about 300 followers as well as an additional 950 allies on the raid of a Meccan caravan of about 1,000 camels carrying goods. The fighting began with each side sending three champions to fight in gap between their assembled forces. These champions paired off and fought in epic style, with two of Muhammad’s champions slaying their opponents and one of the Meccan champions almost winning his match before the two victorious champions of Muhammad’s army attacked and killed him. This preamble to the main battle was reminiscent of the heroic Bronze Age Greeks as related in Homer’s *Iliad* and the customs of Bronze Age European Celts. The battle of the champions was followed by volleys of arrows from both sides and then a charge of infantry. The principal weapon of infantry was the sword.

Also reminiscent of ancient military practices was the outfitting of warriors. Each was responsible for his own gear,

including bows and arrows, swords and other side arms, and armor. An Arab army of the 600s and 700s was composed of men sporting a motley of colors and garb, with each wearing what he could afford and what local custom demanded. Many warriors wore no more than cloth because they were too poor to buy armor, and only the richest of men could equip themselves from head to toe in armor. Armor consisted of a shield and, if the warrior could afford it, a helmet; if he could afford more, he also wore a coat of chain mail. Bows and arrows were the essential weapons of Arabian warriors, with swords also playing an important role. Knives, maces, spears, and lances often were used.

Some heroes who could afford armor or at least helmets chose to forgo both armor and helmets in order to display their bravado and daring. The grandson of Muhammad, Husayn ibn Ali, whose martyrdom is still celebrated by Shiite Muslims, was said not to have worn any armor when he was slain in battle in 680. Accounts of Islam's earliest battles often tell of such heroic men winning admiration with outsized deeds. Even those who perished won honor if they acquitted themselves with courage. In this, the early Arabian armies resembled the armies led by Alexander the Great (356–323 B.C.E.) 900 years earlier.

Cavalry was rare in Arabia. For one battle, Muhammad's army had only two horses; for others, the army had no horses at all. Camels were seldom used in battle, but they were used to transport goods and were sometimes ridden by warriors to the site of battle. The warriors would dismount and fight on foot or would mount horses if they could. Horses were seldom ridden on the way to battle; they were too valuable to risk tiring them by weighing them down during travel. Horses gave armies strategic advantages. For instance, at the battle of Uhud in March 625, a near victory for the forces of Muhammad turned into a rout of his army when Meccan cavalry charged his troops. It ended with significant troop losses, along with the wounding of Muhammad and the death of his uncle Hamza.

Despite horses' value in battle, there were not enough of them in Arabia to equip large cavalry forces. Accounts of battles indicate that about 200 cavalry was the most any one side managed to muster. Thus, infantry was the mainstay of early Islamic armies. In this, Muslims had special strength. Arabians often joined the armies of the Sassanian and Byzantine empires, serving as mercenaries in the infantry. These well-trained, battle-hardened veterans often returned to their cities. When Muslims gained control of most of Arabia, these veterans formed highly disciplined fighting units in which group cooperation was more important than individual heroics. Further, they were thoroughly versed in the tactics and predilections of the Sassanian and Byzantine armies. At the



Battle between Kay Khusraw and Afrasiyab, from a copy of the Shahnameh (Book of Kings) by Firdawsi; opaque watercolor, ink, and gold on paper; Gilan, Iran, 1493–94 (Arthur M. Sackler Gallery, Smithsonian Institution, Purchase—Smithsonian Unrestricted Trust Funds, Smithsonian Collections Acquisition Program, and Dr. Arthur M. Sackler, S1986.175a-b)

moment the Islamic world attacked the empires of the Near East, both empires were exhausted of manpower and wealth after prolonged wars against each other. Moreover, neither empire at first took the Muslim armies seriously, because Arabs had been raiding their neighbors in the Near East from the time of Sumerian kingdoms and had either gone home with their booty or had been absorbed into the societies they had raided. Still, the Muslims were different, because they intended not only to stay but to impose their way of life on their conquered lands as well.

Accounts of the Islamic armies of the medieval era often depict the Muslim soldiers as raving, terrifying fanatics, riding madly into their enemies. Actually, their fighting styles tended to be more prosaic. Their massed infantry showered arrows on their enemies. If the enemy was getting the best of the exchanges of volleys of arrows, the infantry charged,

trying to quickly close the gap between themselves and their enemies. Their cavalry seldom could overwhelm the massed infantry of their opponents, but charging with lances, they could disrupt enemy archers, buying their infantry time. Truly terrifying to their enemies were neither charges nor volleys of arrows, but instead a trait that Muslim soldiers consistently displayed—they rarely stopped fighting. A soldier minus his legs, missing an arm, his belly sliced open or featuring other plainly fatal injuries continued to try to cut down his enemies. Even when the main Muslim army was in retreat, their injured men continued to try to attack the advancing enemy in any way they could, even if only by biting.

By the 700s the Islamic world had learned how to use Greek fire, which the Arabs called *naft*. This was a liquid concoction that could be sprayed under pressure on enemies and lighted on fire. The Byzantines had long used it to terrify their enemies, and their ships often sprayed it onto enemy ships. But medieval Muslims seem rarely to have used *naft* to good effect. Indeed, the building of warships and the manning of the warships was left primarily to Christians who lived within the Islamic world.

The employment of so-called infidels (unbelievers in the Islamic faith) in Islamic armies became a necessity in the late 600s. During the 600s and 700s the Muslims may have numbered no more than 1 million, with almost every able-bodied man under arms at one time or another. They conquered a territory containing as many as 60 million people. Perhaps this is why the Islamic military built fortified cities in Egypt and Syria and why the Muslim governments in those cities often left local peoples to their old customs and religions as long as they did not rebel. Wholesale slaughter of rebellious conquered peoples was a way of terrorizing the rest into submission.

Muslim regimes were usually great builders, and among their construction projects were fortresses and fortifications for cities. Many of their best fortifications they seized from the Byzantine Empire, whose masterpiece of defensive construction may have been the city of Antioch, then in Syria and now in southern Turkey and known as Antakya. Muslim architects learned from the impressive stone fortifications of the Byzantine Empire, building walls so high that the inner space of the fortification was in darkness during the day. From numerous towers arrows and *naft* could be poured on besiegers. The purposes of fortifications were twofold: One was as defense against invaders and bandits. The other was as defense against other Muslims. By the 900s even hunting lodges for caliphs and sultans looked like castles, because Muslims had taken to warring among themselves.

The internecine warfare motivated caliphs and sultans to create elite military units that were especially loyal to them.

The most successful of these were the Mamluks and the Janissaries. By the 800s the Islamic world's military had undergone a significant change. Horses had become much more common, and the wealth of the Islamic governments enabled them to purchase as well as breed them in large numbers. During the century battlefield tactics shifted from emphasizing infantry to emphasizing cavalry based on the practices of the Sassanian Empire. Swift moving archers on horses, using the recently introduced iron stirrup, became the centerpieces of Muslim armies. The cavalymen and infantrymen were recruited from the fringes of the Islamic Near East and included Armenians, Bulgars, Turks, and Berbers.

The Abbasid caliph Abu Ishaq al-Mutasim ibn Harun (r. 833–42) created the Mamluks, and he used them in gaining the caliphate. The word *mamluk* means “one who is owned” and refers to the slave-soldiers who served the caliphs and sultans and who became an elite military caste. The Mamluks were purchased at about age 10 to 12—old enough to have survived the childhood diseases that killed many children of younger ages, yet young enough to be molded by tough, relentless training. Originally, Mamluks were slave boys from many cultures but preferably not Islamic ones, because it was against Islamic law to sell free Muslims into slavery. Eventually, boys from the “Turks” came to be preferred. (The Islamic world called any nomadic people from central Asia “Turks.”) The Turkish boys were valued because by age 10 they were already thoroughly knowledgeable in riding and caring for horses. Mamluks were used throughout the Near East and North Africa. They were trained in the skills of fighting from horseback, in working together as units, and in the Islamic faith, and they were taught to value loyalty to their *ustadh* (“master”), who they came to regard as their father, and to each other. Although they were officially slaves, Mamluks could become important government officials, and, in fact, they ruled Egypt from 1250 to 1517.

With the rise of the Ottoman Turks came the institution of the Janissaries, founded in the 1300s. The Turks divided their army into two distinct forces. One was the cavalry, led by *sipahis*, meaning “cavalry officers.” The cavalry was supplanted in importance by the other important force, the infantry. The core of the infantry consisted of the Janissary regiments. The Ottomans imposed a special tax on Christians; this tax was paid by surrendering Christian children to become slaves. Like the Mamluks, the Janissaries were trained in the skills of war and the ways of Islam and were taught to be loyal to one another. They lived in barracks, each of which had a large cauldron from which soup was served to its regiment. The cauldron and its soup represented the unity and esprit de corps of the regiment. This cauldron was carried into battle, and it was shameful to allow the cauldron

to fall into enemy hands; Janissaries fought to the death to protect their cauldron.

See also ARCHITECTURE; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; GOVERNMENT

ORGANIZATION; INVENTIONS; MIGRATION AND POPULATION MOVEMENTS; NOMADIC AND PASTORAL SOCIETIES; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TRANSPORTATION; WAR AND CONQUEST; WEAPONRY AND ARMOR.

Europe

~ Guy, a Knight: Letter from the Sixth Crusade (1249) ~

FROM DAMIETTA, 1249.

To his dear halfbrother and wellbeloved friend, master B. of Chartres, student at Paris, Guy, a knight of the household of the viscount of Melun, greeting and a ready will to do his pleasure.

Because we know that you are uneasy about the state of the Holy Land and our lord, the king of France, and that you are interested in the general welfare of the church as well as the fate of many relatives and friends who are fighting for Christ under the king's orders, therefore, we think we ought to give you exact information as to the events of which a report has doubtless already reached you.

After a council held for that purpose, we departed from Cyprus for the East. The plan was to attack Alexandria, but after a few days a sudden tempest drove us over a wide expanse of the sea. Many of our vessels were driven apart and scattered. The sultan of Cairo and other Saracen princes, informed by spies that we intended to attack Alexandria, had assembled an infinite multitude of armed men from Cairo, Babylon, Damietta and Alexandria, and awaited us in order to put us, while exhausted, to the sword. One night we were borne over the waves by a violent tempest. Toward morning the sky cleared, the storm abated, and our scattered vessels came together safely. An experienced pilot who knew all the coast in this part of the sea and many idioms, and who was a faithful guide, was sent to the masthead, in order that he might tell us if he saw land and knew where we were. After he had carefully and sorrowfully examined all the surrounding country, he cried out terrified, "God help us, God help us, who alone is able; we are before Damietta."

Indeed all of us could see the land. Other pilots on other vessels had already made the same observation, and they began to approach each other. Our lord, the king, assured of our position, with undaunted spirit, endeavored to reanimate and console his men. . . .

In the meantime our assembled vessels approached the land. The inhabitants of Damietta and of the neighboring shores could view our fleet of 1,500 vessels, without counting those still at a distance and which numbered 150. In our times no one, we believe, had ever seen such a numerous fleet of vessels. The inhabitants of Damietta, astonished and frightened beyond expression, sent four good galleys, with well-skilled sailors, to examine and ascertain who we were and what we wanted. The latter having approached near enough to distinguish our vessels, hesitated, stopped, and, as if certain of what they had to report, made ready to return to their own party; but our galleys with the fast boats got behind them and hemmed them in, so that they were compelled, in spite of their unwillingness, to approach our ships.

Our men, seeing the firmness of the king and his immovable resolution, prepared, according to his orders, for a naval combat. The king commanded to seize these mariners and all whom they met, and ordered us afterward to land and take possession of the country. We then, by means of our mangonels which hurled from a distance five or six stones at once, began to discharge at them firedarts, stones, and bottles filled with lime, made to be shot from a bow, or small sticks like arrows. The darts pierced the mariners and their vessels, the stones crushed them, the lime flying out of the broken bottles blinded them. Accordingly, three hostile galleys were soon sunk. We

(continued)

(continues)

saved, however, a few enemies. The fourth galley got away very much damaged. By exquisite tortures we extracted the truth from the sailors who fell alive into our hands, and learned that the citizens of Damietta had left the city and awaited us at Alexandria. The enemies who succeeded in escaping and whose galley was put to flight, some mortally wounded, uttering frightful cries, went to tell the multitude of Saracens who were waiting on the shore, that the sea was covered with a fleet which was drawing near, that the king of France was coming in hostile guise with an infinite number of barons, that the Christians were 10,000 to one, and that they caused fire, stones, and clouds of dust to rain down. . . .

In consequence of this speech, fear and distrust seized the enemy. All of our men, assured of the truth, conceived the greatest hopes. In emulation of one another they leaped from their vessels into the barks; the water was too shallow along the shore, the barks and the small vessels could not reach the land. Several warriors, by the express order of the king, cast themselves into the sea. The water was up to their waists. Immediately began a very cruel combat. The first crusaders were promptly followed by others and the whole force of infidels was scattered. We lost only a single man by the enemy's fire. . . . The Saracens giving way, retired into their city, fleeing shamefully and with great loss. Great numbers of them were mutilated or mortally wounded.

We would have followed them closely, but our chiefs, fearing an ambush, held us back. . . . We rested until the next day, When, with the aid and under the guidance of slaves who knew the country and the roads, we got possession of what remained to be captured of the land and shore. But during the night the Saracens, who had discovered that the captives had escaped, had killed those who remained. They thus made of them glorious martyrs in of Christ, to their own damnation.

In the darkness of the following night and on Sunday morning, as they lacked weapons and troops, the Saracens seeing the multitude of the Christians

who were landing, their courage and firmness, and the sudden desolation of their own city, lacking leaders, superiors and persons to incite them, as well as destitute of strength and weapons for fighting, departed, taking their women and children and carrying off everything movable. They fled from the other side of the city by little gates which they had made long before. . . . The king, no longer fearing an ambush, entered the city before three o'clock without hindrance and without shedding blood. . . .

I must not forget to say that the Saracens, after having determined to flee, hurled at us a great quantity of Greek fire, which was very injurious to us, because it was carried by a wind which blew from the city. But this wind, suddenly changing, carried the fire back upon Damietta, where it burned several persons and fortresses. It would have consumed more property, if the slaves who had been left had not extinguished it by a process which they knew, and by the will of God, who did not wish that we should take possession of a city which had been burnt to the ground.

The king, having then entered the city in the midst of cries of joy, went immediately into the temple of the Saracens to pray and thank God, whom he regarded as the author of what had taken place. . . .

By the divine goodness, the Christian army, like a pond which is greatly swollen by the torrents pouring in, was added to each day by some soldiers from the lands of lord Villehardouin and some Templars and Hospitalers, besides pilgrims newly arrived, so that we were, by God's grace, largely reinforced. The Templars and Hospitalers did not want to believe in such a triumph. In fact, nothing that had happened was credible. All seemed miraculous, especially the Greek fire which the wind carried back onto the heads of those who hurled it against us. A similar miracle formerly took place at Antioch. A few infidels were converted to Jesus Christ and up to the present time have remained with us.

From: Dana C. Munro, "Letters of the Crusaders." In *Translations and Reprints from the Original Sources of European History* (Philadelphia: University of Pennsylvania, 1894).

The Islamic World

~ Ahmed Mohammed al Makkari: "Tarik ibn Ziyad's
Address to His Soldiers," excerpt from *The Breath of Perfume* (711) ~

When Tarik had been informed of the approach of the enemy, he rose in the midst of his companions and, after having glorified God in the highest, he spoke to his soldiers thus:

"Oh my warriors, whither would you flee? Behind you is the sea, before you, the enemy. You have left now only the hope of your courage and your constancy. Remember that in this country you are more unfortunate than the orphan seated at the table of the avaricious master. Your enemy is before you, protected by an innumerable army; he has men in abundance, but you, as your only aid, have your own swords, and, as your only chance for life, such chance as you can snatch from the hands of your enemy. If the absolute want to which you are reduced is prolonged ever so little, if you delay to seize immediate success, your good fortune will vanish, and your enemies, whom your very presence has filled with fear, will take courage. Put far from you the disgrace from which you flee in dreams, and attack this monarch who has left his strongly fortified city to meet you. Here is a splendid opportunity to defeat him, if you will consent to expose yourselves freely to death. Do not believe that I desire to incite you to face dangers which I shall refuse to share with you. In the attack I myself will be in the fore, where the chance of life is always least.

"Remember that if you suffer a few moments in patience, you will afterward enjoy supreme delight. Do not imagine that your fate can be separated from mine, and rest assured that if you fall, I shall perish with you, or avenge you. You have heard that in this country

there are a large number of ravishingly beautiful Greek maidens, their graceful forms are draped in sumptuous gowns on which gleam pearls, coral, and purest gold, and they live in the palaces of royal kings. The Commander of True Believers, Alwalid, son of Abdalmelik, has chosen you for this attack from among all his Arab warriors; and he promises that you shall become his comrades and shall hold the rank of kings in this country. Such is his confidence in your intrepidity. The one fruit which he desires to obtain from your bravery is that the word of God shall be exalted in this country, and that the true religion shall be established here. The spoils will belong to yourselves.

"Remember that I place myself in the front of this glorious charge which I exhort you to make. At the moment when the two armies meet hand to hand, you will see me, never doubt it, seeking out this Roderick, tyrant of his people, challenging him to combat, if God is willing. If I perish after this, I will have had at least the satisfaction of delivering you, and you will easily find among you an experienced hero, to whom you can confidently give the task of directing you. But should I fall before I reach to Roderick, redouble your ardor, force yourselves to the attack and achieve the conquest of this country, in depriving him of life. With him dead, his soldiers will no longer defy you."

From: Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*. Vol. 6, *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Bernard S. Bachrach, "On Roman Ramparts 300–1300." In *The Cambridge History of Warfare*, ed. Geoffrey Parker (New York: Cambridge University Press, 2005).
- Robert Cowley and Geoffrey Parker, eds., *The Reader's Companion to Military History* (Boston: Houghton Mifflin, 1996).
- Timothy Dawson, *Byzantine Infantryman: Eastern Roman Empire c. 900–1204* (New York: Osprey, 2007).
- Hans Delbrück, *History of the Art of War within the Framework of Political History*, trans. Walter J. Renfro (Westport, Conn.: Greenwood, 1975–1985).

- Kelly DeVries, *Guns and Men in Medieval Europe, 1200–1500: Studies in Military History and Technology* (Burlington, Vt.: Ashgate/Variation, 2002).
- Dave Eggenberger, *An Encyclopedia of Battles: Accounts of over 1,560 Battles from 1479 B.C. to the Present* (New York: Dover, 1985).
- John France, *Western Warfare in the Age of the Crusades, 1000–1300* (Ithaca, N.Y.: Cornell University Press, 1999).
- Karl F. Friday, *Samurai Warfare and the State in Early Medieval Japan* (New York: Routledge, 2004).

- Jos J. L. Gommans and Dirk H. A. Kolff, eds., *Warfare and Weaponry in South Asia, 1000–1800* (New York: Oxford University Press, 2001).
- David A. Graff, *Medieval Chinese Warfare, 300–900* (New York: Routledge, 2002).
- Christopher Gravett, *English Medieval Knight 1200–1300* (Oxford, U.K.: Osprey, 2002).
- Ross Hassig, *War and Society in Ancient Mesoamerica* (Berkeley: University of California Press, 1992).
- Hutchinson Dictionary of Ancient and Medieval Warfare (Mechanicsburg, Penn.: Stackpole Books, 2001).
- John Keegan, *A History of Warfare* (New York: Random House, 1993).
- James E. Lindsay, “Warfare and Politics.” In his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- Bindu Manchanda, *Forts and Palaces of India: Sentinels of History* (New Delhi, India: Roli Books, 2006).
- David Murphy, *Condottiere 1300–1500: Infamous Medieval Mercenaries* (Oxford, U.K.: Osprey, 2007).
- Helen Nicholson, *Templars, Hospitallers and Teutonic Knights: Images of the Military Orders, 1128–1291* (New York: Leicester University Press, 1993).
- Helen Nicholson, *Medieval Warfare: Theory and Practice of War in Europe, 300–1500* (New York: Palgrave Macmillan, 2004).

► mills and milling

INTRODUCTION

The technology of mills and milling has been fundamental to civilization. Grains were first grown as crops in the ancient Near East, but even before then it is likely that people had learned to grind grain to make flour for baking. Millstones were a part of everyday life in most of the medieval world. Grain, nuts, and other foods were placed on stones, and other large stones were used to grind the food. This basic form of milling was practiced in the Americas; throughout Asia, including the Near East; Africa; and Oceania during the medieval era. It was convenient for families to be able to grind their own grain in their home, even though it was a labor-intensive process.

The term *hand mill* is not usually applied to the simple millstone and its grinder. Instead it applies to a kind of mill developed in ancient Rome that became common in much of the world. This device consisted of a heavy stationary stone set on the ground, with another stone that could be turned set on top of it. The upper stone was attached to a rotating post that had one or more horizontal rods sticking out of it. It is called a hand mill because the rods were pushed by human beings. In ancient Rome milling typically was done by slaves, but for many a bakery or family farm family members pushed the rods to turn the grinding stone. The preferred source of power was that of animals. In enclosed spaces this was gen-

erally a donkey. In large spaces, especially out of doors, the grinding stones could be very large and would be turned by oxen or mules. In many places the hand mill was preferred over other kinds of mills, because flowing water and steady winds were not always available.

The origins of watermills are obscure, perhaps because they usually were made of wood, and the wood of the earliest ones has decayed, leaving little for archaeologists to find. Watermills had three basic forms in medieval cultures. One is called the Norse mill or the Greek mill. The word *Norse* is used because the earliest of these mills so far discovered have been found in the far north of Europe, whereas the word *Greek* is used because it was through the Greeks of early Christian times that this kind of watermill was transmitted to other cultures. It consisted of a horizontal wheel with blades that were turned by water flowing against one side of the wheel, thus turning a shaft in the center of the wheel that turned a grinding stone on a floor above. Another watermill was the undershot wheel. This device had a vertical wheel with blades that was turned by water flowing under it. By far the most efficient watermill had an overshot wheel. This watermill had a vertical wheel with bucketlike blades that caught water at the top of the wheel, with gravity pulling down the blades. The biggest drawback to this kind of watermill was that it was much more expensive to make than the alternatives.

Windmills seem to have developed independently in northern Europe and in the Sassanian Empire. Both kinds of windmill were subject to variations in the wind. The one invented in the Middle East featured a horizontal wheel resembling that of the Greek mill. Horizontal rods thrust out of a horizontal wheel; attached to these rods were triangular sails that resembled those used on medieval ships in the eastern Mediterranean and the waterways south of Arabia. The wheel and rods were enclosed by a circular wall that had an opening by which the wind was directed onto sails, one at a time, causing the wheel to rotate. As with the Greek mill, on a floor above the wheel a shaft attached to the center of the rotating wheel turned a grinding stone. Shutters on the opening in the circular wall could be adjusted to control how much wind reached the sails, thus adjusting the turning speed of the wheel. This form of windmill spread through much of Asia.

Windmills with vertical sails were invented in northern Europe, becoming common only in the 1400s but spreading in use throughout Europe, North Africa, the Near East, and much of the rest of Asia. Its vertical wheel was often little more than a horizontal rod to which a circular fan of rods were attached, each having its own sail. At first these windmills had horizontal posts in their sides, and people pushed the posts to turn the building to have the sails face the wind. Before the end of the medieval era windmills were built with domes to

which the wheel was attached, and a miller could use a rod to push or pull the dome to have the sails face the wind.

AFRICA

BY MICHAEL J. O'NEAL

A mill is any type of tool used to grind or cut materials into smaller pieces. One common type of mill is the gristmill, used to grind grain into flour. Similarly, a sawmill enables the operator to cut raw wood into lumber, and milling operations are used to grind wood fragments into fiber for papermaking. Additionally, milling operations often are used to grind ores into more usable form, and they can be used to grind minerals for use in various substances.

Mills can be powered in a number of ways. One is simple human power. Using a stone or similar tool a person can, for instance, grind grain. Sometimes a mortar and pestle are used for a similar purpose; a mortar is a bowl-like container that holds grain, and a pestle is a tool with a rounded end that grinds the grain in the mortar. Another source of power is animals. Horses, mules, and oxen have commonly been used to turn large millstones. A third source of power is water. The energy from the flowing water of a river or stream is harnessed to turn a waterwheel, which is attached by gears to a millstone or other type of milling tool. Water also can be stored in a reservoir located above the mill and then released to turn the waterwheel. Similar to the waterwheel is the windmill, which operates according to the same general principle but harnesses the energy of wind to operate the tool.

In medieval Africa milling technology relied primarily on human power. Waterwheels and windmills had been employed in the Roman Empire, and by the medieval period they were in wide use in northern Africa and throughout Europe. In China water mills were used for papermaking. Similarly, animal-powered mills were used in other parts of the world. But the archaeological record of medieval Africa shows little in the way of milling technology. At various sites throughout sub-Saharan Africa, including the savannas of western Africa, the Ethiopian highlands, and the Zimbabwe culture of southern Africa, archaeologists have excavated villages and living areas where they have found a relatively large number of hand-powered grinding stones. The relatively small size of these stones and their presence in living areas strongly suggest that milling tended to be a household rather than a community activity. One exception is Zimbabwe, where such stones generally have not been found in domestic quarters. Further, archaeologists commonly have discovered grinding stones at pastoralist and other sedentary sites rather than at sites inhabited by hunter-gatherers. This would be predicted, given that pastoralists and farmers process foodstuffs for

consumption while hunter-gatherers consume foodstuffs in their natural state. Finally, the disposition of these stones in domestic settings suggests that milling was primarily a female occupation.

Archaeologists are interested first in the composition of these stones. The most effective ones were made of an igneous rock such as basalt. The advantage of this type of rock is that its grains do not detach easily, so grit from the stone does not get into the material being ground. Such rock, though, was not always available, so grinding stones made of limestone, sandstone, and other types of rock have been found.

Archaeologists next are interested in the chemical makeup of these grinding stones. Chemical analysis has shown that such stones often contain traces of elements that would not have been found in the rock itself. These elements include arsenic, antimony, and bismuth, suggesting that the grinding stones were used in the manufacture of such products as dyes, medicines, and cosmetics. They also could have been used to grind together metals to form alloys. Additionally, many grinding stones are stained with ocher, an impure iron ore that leaves behind a red or yellow color. Ocher was used as a pigment, often for ceremonial purposes, suggesting the grinding stones were put to use in ceremonial rites.

Third, archaeologists are interested in the shape of the grinding stones. They have discovered two basic designs, both of which are similar to the mortar and pestle. A term that is often used to refer to the mortar is *quern*. This refers to the stationary stone on which the material to be ground is placed. The pestle often is called simply a hand stone. Sometimes the word *quern* is used to refer to both parts of the mechanism taken together. One type of quern is the saddle quern, so called because the hand stone is rocked forward and backward in a "saddle" to create a grinding motion. The other type is called the rotary quern. This type of quern, which produces more of a crushing motion, uses a hand stone that resembles a modern rolling pin. Using both hands, the operator rolls the "rolling pin" back and forth over the material to be ground. In both cases the stationary stone is not smooth and flat. Parallel grooves cut into the stone give the fine material a place to go as the grinding process continues on the remaining larger pieces. The grooves also provide edges on which the material being ground can break.

Fourth, archaeologists are interested in the types of materials that were ground using these stones. Ores and minerals were ground to produce a variety of products. The most common use for grinding stones, though, was to mill grains into flour used in bread making or in the preparation of other foods. While the specific type of grain varied depending on the area, a common type of grain was relatively soft millet. Sorghum also was a common crop that had to be ground, and

later maize was added to the menu. Additionally, these stones were used to grind vegetables, nuts, seeds, fruits, spices, meat, bark, or any other substance that had to be broken up into smaller pieces for consumption or combination with other substances.

Grinding stones may have served as status symbols. In many places in sub-Saharan Africa stones made from igneous rocks such as basalt had to have been imported, suggesting that their owners enjoyed higher social status. Additionally, some sites contain more than one grinding stone. A site in Zimbabwe, for example, consists of a single dwelling with numerous grinding stones (along with other objects, such as pots, iron objects, and statues), suggesting that the occupant was socially prominent.

THE AMERICAS

BY MICHAEL J. O'NEAL

Mills were powered in a number of ways before the advent of electricity. The most common was simple human power. In cultures throughout the world, including the Americas, stones were used to mill grain. Generally these hand-powered mills were similar to a mortar and pestle—that is, a bowl or flat surface (the mortar) to hold the substance being milled, and a tool (the pestle) worked back and forth to grind the substance. A more technologically advanced option to mill greater quantities of material was the use of animals, including horses, mules, and oxen, to turn large millstones. Still more advanced societies powered mills with water, harnessing the energy from the flowing water of a river or stream to turn a waterwheel, which is attached by gears to a millstone or other type of milling tool. In some areas of the world mill operators stored water in reservoirs located above the mill, which they then released to turn the waterwheel. The windmill operates according to the same general principle but harnesses the energy of wind to operate the tool. Both waterwheels and windmills, though, require familiarity with the technology of the wheel, so they were not employed in the Americas until after contact with the Europeans.

The development of milling technology is inevitably an outgrowth of the needs of the people. The most common need is food, so in medieval North America hand mills for grinding grain and corn were commonly used. In general, there was no such thing as commercial production; milling was typically done by individual households. Among the Cherokee people, for instance, it was necessary to grind corn into a form that could be used for the baking of breads. A traditional way of doing this was first to boil corn in a pot and then to rinse the corn. The corn would be placed in a corn beater referred to as a *ka-no-na*. Typically, the beater

consisted of a hollowed-out stump or log into which the boiled corn was placed. The corn was beaten with a heavy pole until it attained the consistency of flour. This corn flour could then be used to make bread or combined with other ingredients, such as beans, to make soups.

Milling technologies were not highly developed in areas of the Americas where the land provided suitable food that could be consumed in its natural state. People in the far north relied primarily on products from the sea for their subsistence, in particular sea mammals; Eastern Woodlands Indians harvested the forests for game, fruits, and nuts; and Plains Indians relied on game animals. Further, extensive milling tends to be a characteristic of sedentary agricultural societies, so more nomadic cultures, such as the Plains Indians, devoted little attention to it. The milling of grains was much more important to the peoples of the southwestern United States and throughout much of Mesoamerica. These people relied on agriculture for their subsistence, so a daily task for many was grinding grains, corn, beans, and other foodstuffs.

A good example is provided by the peoples of the American Southwest, although their technologies would have been similar to those used farther south throughout Mesoamerica and South America. Here archaeologists have uncovered ample evidence of the production of milling stones. In one region of western Arizona and eastern California an area of some 300 acres was given over to the production of milling stones. Archaeologists have determined, on the basis of debris and discarded stones, that over the centuries hundreds of thousands of these stones must have been manufactured.

Typically this production took place on flat areas roughly 5 feet in diameter. The production of the *metate*, or lower milling stone—the stone on which the material to be milled was placed—consisted first of testing stones for their integrity; numerous examples of stones rejected because of fault lines have been found. Using hammerstones made of quartz, an appropriate rock was shaped so that it provided a convex (that is, slightly bowl-shaped) area. Hammerstones came in various sizes and weights; the larger ones were used to chip away the larger pieces of excess stone, and progressively smaller ones were used to chip away flakes of stone until the lower milling stone was complete. A similar process was used to produce the *mano*, or handheld pestle. While the pestles came in various sizes, a common size was that of a large loaf of bread. Once the two components were made, the process of milling grain was relatively simple. The grain was placed on the *metate*, and the *mano* was rolled back and forth over it. This action crushed the outer hulls of the grain, which was then filtered out, leaving behind the edible core.

Additionally, people in the American Southwest and farther south created gristmills out of wood. Similarly to Ameri-

can Indians farther north, they hollowed out a log or stump, but the grinding was done with a long, cylindrical pestle made of stone. Cottonwood logs usually were used for this process, largely because the cottonwood was easily hollowed out.

Among the Maya and Aztec of Mesoamerica maize was the most important food staple. The Mesoamericans developed sophisticated methods for cultivating maize, including terraced fields and slashed-and-burned fields. A primary goal of Mesoamericans was to convert the maize into flour that could be used to make light bread products similar to today's corn chips and tortillas. The process is referred to as wet milling, or *nixtimalization*. In many ways the process was like that used by native North Americans. The corn was boiled in an alkali solution, generally produced by the use of lime or wood ash. After the solution cooled, the hulls of the corn were washed away. The soft interior parts of the kernels were then ground on a three-legged stone called a *metlapil*. The householder ground the corn using a stone similar to a modern rolling pin. The result of wet milling was a dough called *masa*. What was extraordinary about this process was that it altered the nutritional value of the corn. *Nixtimalization* changes the protein makeup of corn, releasing the essential nutrient niacin. When mixed with beans and vegetables such as peppers, the result was a nutritionally balanced food. In areas that did not employ *nixtimalization*, the result was a dietary disease called pellagra. Thus, the milling process was intimately bound up with nutritional needs. Milling was by no means restricted to maize. The Aztec used similar tools to grind other grains, including amaranth, a coarse herb that was believed to have magical powers. Additionally, the cacao bean was ground to form chocolate, which became a staple in the diet.

A primitive form of animal-powered milling was used by the Mesoamericans in working ores containing precious metals. In this process gold and silver ores were mixed together on a stone floor. To purify the metals, substances such as salt and quicksilver (mercury) were added. The mixture was then "milled" by the action of horse and cattle hooves. These animals were brought into walk back and forth over the ores to crush them. Only old, poor-quality animals were used for this process, for the quicksilver was toxic to the animals, which soon died after extensive exposure to it. The process was not particularly efficient, but it was an effective form of animal-powered ore milling.

Among the Inca of South America milling technologies were not advanced. The Inca maintained a sophisticated agricultural system, but food continued to be ground by hand. Much like Americans to the north, the Inca relied on a flat milling stone on which grain and other substances were placed. The handheld stone was typically formed into a half-

moon shape, which could then be rocked back and forth over the lower stone. This type of hand milling was generally more efficient than the process employed in North America and Mesoamerica because it led to less wasted motion. However, the Inca made far less use of ground grain than did peoples farther north. Potatoes became a staple crop, and although maize was consumed, it was not as widely ground into flour. Accordingly, the Inca did not have much incentive to search for nonhuman sources of power for milling operations. Additionally, the absence of wheel technology hampered the development of more efficient milling not only in South America but throughout the Americas.

The people of the Andean region acquired more technologically sophisticated milling technologies only after the arrival of the Europeans. By the 1500s waterwheels had been introduced throughout much of western South America in such places as Peru, Bolivia, Lima, and the Andean highlands. All of these water-driven gristmills, however, were horizontal. That is, rather than erecting a vertical waterwheel attached to the millstone by a system of gears, the people in western South America laid the waterwheel horizontally so energy was transferred from flowing water directly to the millstone. This type of mill had the advantages of being cheaper to build and easier to operate than vertical waterwheel mills. The descendants of the Inca used these mills to grind wheat, barley, beans, and quinoa (a type of pigweed cultivated for its edible seeds). While the flour produced was coarse and contained many impurities, including tiny bits of the millstone itself, it was able to produce large quantities of nutritionally good food.

After the introduction of waterwheels the grinding of grain became much more efficient. However, the old ways of grinding grain using the wet milling technique persisted; in fact, they continue to be used by Andean peasants in the modern era. Wet milling by hand allows the householder to get rid of the outer husk of the grain without crushing the inside, the chief disadvantage of the horizontal waterwheel.

ASIA AND THE PACIFIC

BY ILICIA SPREY

When humans first cultivated such crops as grain and rice, they processed the seeds by crushing them between small flat stones. In Southeast Asia milling through the medieval period usually meant using a wooden trough and a wooden stick or foot-powered lever that moved through the trough, breaking up the rice and producing very coarse flour. Over time the Chinese were the first in the region to develop mills, which were powered by humans or animals turning an axle connected to a grinding stone. These methods, which were an improvement over the earlier system, were highly inefficient

means to feed people, especially in Asia, where the population was growing rapidly. By the second century water mills, which offered a more sophisticated milling process, were introduced in China. Mills became an important symbol of political power in China and elsewhere as well as a source of conflict between local landowners, Buddhist monasteries, merchants, and the imperial authority in almost all regions of Asia.

By the first century, if not earlier, mills were widely used in China to process grain into flour. However, they were not employed in weaving or fabric production in China, Japan, India, or elsewhere in Asia or Southeast Asia until the early-modern period. Instead, weaving was done by hand in small rural workshops. Most villages and smaller towns in China built mills that were powered by human or animal labor to meet their immediate food needs. Beginning with the technological revolution and advances in science that took place under the early Song Dynasty (960–1279), those communities fortunate enough to be located on a river or a powerful stream with a regular flow of water built mills. In strategically located rural villages or along major roads people erected mills by combining the resources of the population or perhaps a local lord, who expected either a payment or a percentage of processed flour and financed the initial cost of construction. The rural mills were fairly basic and minimal in size, reflecting the small population they served, and they could at times be located in an area as small as a 10-foot square. Images and descriptions of urban mills, however, have survived in great numbers, and they allow a careful examination of the mills' mechanical structures.

Using the depictions found in Chinese paintings, historians have a sense of how water-powered flour mills were laid out and organized for efficient production, particularly for the grinding of grains such as millet, wheat, and rice into flour. A typical water mill might have at the side of the main structure a large, flat covered area where farmers would deposit the raw grain from sacks and baskets. Using a series of sieves, the grain was then winnowed and the chaff removed. Next, the separated grain was washed in river water, dried again, and brought into the central mill building, where it was ground between large circular-shaped horizontal millstones. These grinding stones were powered by a wooden shaft that was moved by a series of cogs and gears, which were connected to a horizontal waterwheel driven by the passing river water.

Following the grinding, the flour that had been produced in this process would be put through a sifter (powered by a second horizontal waterwheel) to remove bits of chaff, stone, and any other materials that had been incorporated into it during the milling process. The sifted flour was set

out on a second flat, covered area on the far side of the main building to dry thoroughly in the sun and air; this procedure curtailed the growth of mold or mildew while the flour was stored. Last, the dried flour was bagged and carried by humans or loaded on carts and sold in marketplaces and to private customers, primarily in the local region. While small local mills might be operated by a single individual, the larger imperial and commercial mills, especially those servicing the imperial court, regularly employed upward of 100 men.

Control over all significant courses of revenue was important to the Song Dynasty, which needed the steady income to finance domestic and foreign policies. In the 960s the government established monopolies over both mills and over the associated wineries that were often built in the shadows of the mills. Over time the use of mills expanded, and by 1080 the Song state administration took a dominant role in the processing of raw tea leaves into powder. Certain mills were licensed to grind the dry tea leaves into a fine powder that was then pressed into regularly shaped square cakes, which were easier to transport to long-distance markets than bags of powdered tea. The processing and sale of tea were guaranteed to produce revenue for the Song administration. Tea sales brought in an average of 400,000 strings of cash per year for the Song, each string consisting of 1,000 copper coins tied together by a cord through the coins' centers. To appreciate the significance of such a sum, consider that the average annual income of a local government official at that time was approximately 90 strings a year. The efforts by the state to maintain the monopoly on mills continued until 1079, by which time it was too costly for the state to continue to run the mills, and control over them was returned to private hands, often those of the local elite. Later dynasties were unable or uninterested in attempting to reestablish an imperial monopoly over the mills.

Since mills were established on lands controlled by Buddhist monasteries in China, Korea, and Japan, they helped the economies of both the local populations and the monasteries. The efficient organization and the circular motion of the mill's wheels and stones led Buddhist monks to see the mill's wheels as representative of the Buddhist wheel of fate (dharma), or the Buddhist concept of eternal balance between moral behavior that keeps evil in check and of harmony in a state and universe that is properly ordered and run.

While commercial mills were widely known in China, they had a much smaller presence in Japan. The technology that made large mills possible was brought into Japan from two sources—Japanese Buddhist monks who had learned the technology while traveling in China in the seventh century and Korea, where the Chinese-style of large-scale milling had

previously been adopted. The *Nihon-shoki* (The Chronicles of Japan) for the year 610 states that the king of Korea presented to the Japanese emperor Suiko the first mill in Japan. Another chronicle, *Nihongi* (Early History of Japan), states in the section for the year 670 that water mills were constructed in Japan but does not say where or for what use.

The style of mill introduced into Japan appears to have been the rotary quern. A quern is a grinding apparatus in which the lower circular stone is stationary and the upper circular stone is turned by means of a spindle put through a hole in its center. This spindle is hand-turned and keeps the two stones lined up. Grain was poured through this central hole to be ground between the two stones. As it was being ground, centrifugal forces moved the ground material outward to and over the edges of the lower stone, where it was collected. The rotary quern was an improvement over the hand-turned quern, since the upper stone was turned by various power sources, including animal and water power.

Japanese Buddhist monasteries quickly built these rotary querns on their lands and found them to be a significant source of revenue, as all those who were tenants of the monastery had to abandon the use of the much smaller hand-turned querns and were forced to pay to use the monastery-owned mills. Outside Buddhist-held lands, large-scale stone mills appeared in Japan more as a technological curiosity to show visitors and were never widely constructed or used. One such large stone mill from the seventh century survives at the temple of Kanzeon-ji in Fukuoka Prefecture on the island of Kyūshū. Its grinding stones show no evidence of use. The novelty factor of rotary querns is also demonstrated by the fact that in archaeological excavations pieces of this type of quern were found only in the remnants of a few wealthy households and never in those of middle- and lower-class farmers and peasants.

There are two other reasons why large-scale grain milling was not widely adopted in premodern Japan. First, rice and barley were the dominant grains in the Japanese diet of all social classes, and wheat was little used, so this kind of mill would get little use. Second, the Japanese preferred their food to be prepared fresh, and therefore in the majority of Japanese households rice for each meal was ground as needed in small hand-turned querns. Even the poorest households ground their rice on a primitive quern formed by placing the grain kernels on a large flat rock and rolling over them either another rock or a wooden roller.

Rotary mills for grinding grain did not catch on in Japan, but by the 14th century they were adopted there as a way to grind green tea into the fine power used in the elaborate tea ceremony. This ceremony became an essential element of samurai culture by the end of the 16th cen-

tury, and this specialized quern, known as *chausu*, became highly prized and was often passed on in samurai families as an heirloom.

Prior to the introduction of the quern into India, people in that region ground grain by using a mortar and pestle. A stick or hand-size piece of stone with a rounded end was used to push the grain against the concave sides of a rounded stone vessel until unrefined flour was produced. This basic form of grinding remained the norm in the northeastern Ganges River basin until the modern era. Based on archaeological evidence from Sirkap (in modern-day Pakistan) in the northwestern portion of the subcontinent, grain-grinding querns came into the Indian Subcontinent from the Mediterranean region in the first century at the earliest. This quern was not moved by a spindle in the center of the top stone but instead by two handles on either side of the top stone, which was then turned in a counter-clockwise direction.

The first Indian improvement to this form of the quern was the transition from two handles to a single handle and from that to a vertical handle that worked like a crank. Remnants of these altered designs have been found at archaeological sites at the fifth-century Buddhist Kunala Monastery in Taxila (in modern-day Pakistan). This more efficient form of the hand-turned rotary quern provided a practical means of grinding grain for most Indian households and did not require animal power, since its grinding stones were fairly small in size (only 1–2 feet in diameter). The celebrated author of the first history of the Kashmir region and people, Kalhana (active middle of the 12th century), wrote that working these mills was the harshest and most miserable form of labor of his time.

The technology of this kind of mill was improved and adapted over time to other uses, and other sources of power were harnessed so that mills were not always dependent upon less-efficient human labor. There is evidence that between 700 and 1200 yoked oxen were first used to power larger stone mills. The animals walked in continuous circuits around the structure and could be prodded on by a single individual, who could also put in the grain to be processed as well as bag it. The greatest Indian improvement and alteration to the rotary quern borrowed from the Hellenistic world was the invention of the worm drive, a gear in the form of a screw. Used original in the Indian cotton gin, this mechanism consisted of two large screws whose turnings fit into one another, thereby threshing the material caught between them. This made it possible for sugar milling to begin perhaps as early as the tenth century. These mills also were used to extract oil from olives, which would then be used for lamps and cooking, depending on its quality.

EUROPE

BY AMY HACKNEY BLACKWELL

The best-known type of mill is a device that uses stones or other hard items to grind objects into smaller pieces. The most common use of mills is to crush grains, such as wheat or corn, into a finer powder that can more easily be used in cooking. During the first millennium grinding grain into flour was nearly the only use of mills. Medieval mills gradually became more complex, employing waterpower or wind power and complex sets of gears to turn the stones. In the last centuries of the medieval period people began using mills for industrial processes, such as manufacturing cloth, processing metal, or sawing wood.

The most basic type of mill is a flat, smooth stone on which a person can place grain and then crush it by rolling or pounding another smooth, round stone on it. There are many varieties of this type of hand mill, many of which were employed by medieval Europeans. Some mills consisted of a bowl and an oblong object used for crushing or pounding the grain. The best-known mill of this type is the mortar and pestle, which people used to crush small amounts of grains, spices, or herbs. A mortar is a small, relatively deep bowl, and a pestle is heavy stick with a rounded end. Medieval mortars and pestles could be made of stone, ceramic, wood, or any other substance strong and heavy enough to stand up to hard use. A user would place the substance that needed grinding in the mortar and use the pestle to crush it against the sides of the bowl. This type of grinding is labor intensive and useful only for grinding small amounts of a substance. Alchemists and herbalists commonly used mortars and pestles to prepare drugs, and home cooks used them to crush spices.

For large grinding jobs, such as grinding a town's wheat crop, medieval Europeans used much larger mills. Water mills were common during the early medieval period. Windmills appeared in the late 12th century. Both types of mills worked on similar principles, using natural forces to power grinding surfaces.

The most common grinding surface was stone. Millstones were specially quarried and processed to create suitable grinding surfaces. Every mechanical mill had to have two millstones, one stationary and the other mobile. The moving stone, the runner stone, was attached to moving gears powered by whatever powered the mill, and it rotated against a stationary bed stone. Millers carved grooves into their millstones to cut grain kernels and to channel them out of the mill for collection. The millstones, the runner stone, and the bed stone had similar patterns of grooves. The miller would place the stones and adjust them to achieve the correct degree

of grind. When the stones ground against one another, the grooves created a kind of scissors action that cut the grain to pieces. These grooves had to be recut from time to time to keep their edges sharp.

One of the most common and powerful types of mill was the water mill, a mill powered by natural running water. The water mill was invented during the Roman period, probably around the second century B.C.E., but it was not commonly used until the start of the medieval period. Before this time slaves had done much of the milling work by hand, but during the fourth and fifth centuries slaves became less common, and the population as a whole dropped, making hand milling impractical. Water mills were much more efficient than hand mills; historians have calculated that an early medieval water mill could produce about two horsepower of grinding energy; in other words, one mill could grind as much grain in a day as 30 to 60 humans grinding by hand. Water mills became very common during the medieval period. Although there are no exact statistics, it is known that by 1086, when William the Conqueror (r. 1066–87) created the Domesday Book (a sort of census), there were 5,624 mills in England. Many towns had more than one mill, and the number of mills in a town was a good indication of a region's prosperity.

A water mill worked by using the force of running water to turn a wheel connected to an axle that turned the mill's machinery. The wheel that caught the water to power the mill could be either horizontal or vertical. The earliest water mills used horizontal wheels. These wheels turned their millstones directly, without the use of gears. These devices were fairly simple to construct, but their speeds could not be controlled. As the medieval period progressed, vertical wheels with wooden paddles became more common. These mills were constructed with gears that took the power from the vertically spinning wheels and used it to power horizontal millstones. These gears allowed millers to control the speed of their runner stones so that the stones always ground at an even tempo. Large vertical wheels could be very powerful. Some water mills on large rivers contained multiple runner stone and bed stone combinations, allowing a miller to grind a large amount of grain at once.

A water mill had to be situated next to a river or a stream with sufficient current and volume to turn the wheel. A mill needed a fairly precise amount of water to turn its wheels at the correct speed. The mill could not turn without enough water, and too much water would make the gears move too fast, possibly damaging the mill. To avoid these problems, millers built series of sluices, or gates, to control the flow of water, keeping the power consistent regardless of river levels. They might dam the river to create a pond next to the mill to

supply a reliable power source. The local people might take advantage of this pond to raise fish for food.

Not every location had consistent supplies of running water. In areas with strong, predictable winds, people used wind to power mills. A windmill contained a large, vertical wheel covered with sails or blades that caught the wind to make the wheel spin. The spinning wheel turned a horizontal shaft that was connected to a vertical shaft with gears. This vertical shaft turned the runner stone against the bed stone, producing the force needed to grind grain. Designs of windmills varied, but most of them had some means of moving the wheels as winds changed direction. Some windmills affixed their wheels to shafts that could rotate to face the wind on a given day. Others were built as large towers with rotating tops to which the wheels were affixed. These structures could be larger and hold wheels with longer blades, allowing them to catch more breezes than smaller mills. Most windmill blades were made of cloth sails. A miller could take down the sails or adjust them to fit the winds on a given day. A windmill could grind about 1,000 bushels of grain per week when winds were steady.

Windmills appeared in western Europe in the late 12th century and quickly grew in popularity. Windmills were cheaper to build than water mills but were not as powerful or reliable because they needed steady wind speeds of 15 to 25 miles per hour. Many windmills were built on top of hills, where they could catch the strongest breezes. They were common in England, France, and the Low Countries and on the islands of the Aegean and the Mediterranean. By 1400 there were about 10,000 windmills in England. During the late medieval period the islands of the Aegean became important milling centers for the various kingdoms that ruled mainland Greece during that time. Many Cycladic islands had far more windmills than were required for local grinding needs. The wind power of the Cyclades was so strong that it was practical for landowners to ship their harvested grain to the islands for grinding and then ship it back to the mainland as flour.

Animals could also power mills. Throughout Europe people employed horses, oxen, donkeys, and dogs to turn the gears of mills. The animals were hitched to a horizontal wheel and made to walk in a circle, turning the apparatus. In some places the animals were the only source of power for the mill. In other areas mills used animal power to supplement waterpower or wind power.

Lords and nobles generally owned the mills situated on their lands. They were required to keep their mills in good repair and to build new mills as needed to meet the needs of the local populace. The peasants who farmed their lands had to use the local mills to grind their grain and would pay over

to the lord a certain percentage of their flour. The miller had to grind the lord's grain for free, without taking his usual percentage. Millers were generally quite prosperous. All farmers had to take their grain to their local mill to have it ground into flour. The miller would keep a percentage of the ground flour as his payment for the grinding. Millers had a popular reputation for dishonesty, as is illustrated by the "Reeve's Tale" in Geoffrey Chaucer's *Canterbury Tales* (late 14th century). It was commonly believed that millers stole grain and flour from their customers, who had little recourse in the matter because they had no other options for grinding their wheat.

During the late medieval period people began using mills for purposes other than grinding grain. Two of the most common uses of water mills and windmills were for producing cloth and for sawing wood. Water mills called fulling mills used waterpower to pound woolen cloth, a process that made the cloth thicker and stronger. This work had previously been done by people who stomped on the cloth with their feet. Fulling mills appeared in France during the 11th century, spread to England in the 12th century, and were common in western Europe by the 13th century. The use of mechanical power made cloth manufacture much more efficient and led to the dramatic growth of the English cloth industry during the last centuries of the medieval period.

During the 13th century sawmills appeared in France. These mills used waterwheels to power saws to cut and plane logs into boards. Mills were also used by metal processors. Some blast furnaces that processed iron ore used waterwheels to power their bellows. During the 13th century mills began to be used to power grindstones to sharpen tools. By the end of the 15th century millers had begun using mills to process iron bars into nails.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In the medieval Islamic world there may have been nothing more important to the survival of society than the milling of grain. Flour from milled grain produced bread, which was the essential food in cities and agricultural settlements. Rare was the meal anywhere in the Islamic world, from southern Asia to al-Andalus, at which bread was not served. When there was insufficient bread to feed the common folk or when bread cost more than most people could afford, civil resistance to government authority, riots, and outright armed rebellions might occur.

The principal grain to be milled was wheat, which was grown in most of the Islamic world. Millet, sorghum, and rice might also be ground in gristmills—mills that ground grain. Millet was the least nutritious of these but was an

important crop in sub-Saharan Africa and the Near East; sorghum was important in East Africa; rice was perhaps the most nutritious grain except for wheat and was essential to the diet in India, central Asia, parts of Africa, and al-Andalus, although it was more rarely ground into flour than wheat was.

When Muslim Arabs swept through the Near East and North Africa in the 600s and 700s, they absorbed into their empire several different cultures, each with its own tastes in flour and its own technologies for making it. By the 700s these cultures seem to have formed a preference for the finely ground flours typical of Byzantine cities. The technologies they absorbed included milling by hand, by water, and by wind. Milling done by hand was the most common form, using a millstone and a grinder, often a pestle. Even after Islam had established itself as primarily an urban culture, in rural areas and remote regions (such as the mountains of Afghanistan and in North Africa) the laborious process of placing grain in a hollowed, heavy stone and then crushing it with a stone pestle remained common throughout the medieval period.

Milling by hand was a family project. The grain was laid out in front of family members, who then picked through it to remove stones, hulls, and other contaminants. Even so, bits of stone might end up being ground into the flour. Women did the grinding, a process that was slow, since only a small amount of grain could be ground at one time. It was also very hard work, because a heavy stone had to be lifted and then ground into the grain against another stone. After the grain was ground into flour, it was run through a sieve, which caught remaining hulls and pieces of grain not yet ground fine enough for use.

The ancient Romans had improved on this grinding process with what is generally called the hand mill, even though it was not always powered by human hands. The hand mill that was common throughout the Islamic world consisted of a large stationary stone, usually circular, with a rotating post in its middle to which was attached another stone that revolved as the post revolved, grinding against the stationary stone. It could be turned by people pressing against poles sticking out of the rotating post, but by Islamic times, it was more often moved by animals harnessed to the poles. This was the most common kind of mill found in bakeries. It might be small enough to fit into a room of a shop or house, where it would be turned by a donkey. Or it could be much larger, requiring oxen to turn it; this kind would be found in the countryside. Even though the technologies for waterwheels and windmills were well known in the Islamic world, the hand mill was often preferred by peasants because it was

inexpensive to build and maintain and beasts of burden were usually available to turn it. Further, it did not depend on water or wind to power it and could be set up even where flowing water or consistent winds were unavailable.

Although the Islamic world's hydrological engineers were superior to those of Christian Europe, the Islamic world made far less use of the waterwheel than did Christian Europe, probably because of the shortage of fast-moving streams, except in al-Andalus. The most common type of waterwheel in the Islamic world was the horizontal wheel, the least efficient of the choices. The advantage of this wheel was that it could function well in slow-moving water. It consisted of a horizontal wheel of blades that caught the motion of moving water, either with one side walled off from the water so that it turned in only one direction or with a sluice or chute directing water against only one side of the wheel.

In the middle of the wheel was a vertical post going up through the mill's floor to the grinding room, where the post rotated, with a horizontal pole out of its side turning a stone wheel that ground against a large millstone with a hole in its middle for the post to pass through. Grain could be poured onto the millstone and would collect in troughs. The horizontal waterwheel achieved about 5 horsepower, which was a vast improvement over the horsepower available when grinding by hand or animal; it was cheap enough to build that even small communities could construct one. This horizontal waterwheel was already in use in the 600s.

The vertical waterwheel may have been independently invented in more than one place in Europe and Asia. The one used in the Islamic world was the *noria*, invented in India or the Sassanian Empire. It was originally powered by cattle, but by the 600s it had been adapted to water. This waterwheel is said to be "undershot," meaning that its blades caught the flow of water at the bottom of the wheel, where they rested in the stream. A horizontal post ran through the center of the waterwheel that was attached to two gears, one vertical and the other horizontal, which transferred its energy to the rotating post that rose up through the floor in the center of the stationary millstone to rotate another movable millstone that ground against the bottom one. The undershot waterwheel also was used to raise water from one level to another for irrigation. Although Christian Europe used the undershot wheel for several industries, such as woodcutting and pushing air into smelting furnaces, in the Islamic world it was seldom used for anything other than grinding grain and raising water.

The overshot waterwheel did not come into general use until the 1400s and remained rare in the Islamic world. This innovation was probably a European one. In the overshot wheel water flowed over the top of the wheel, usually guided

by a chute, where bucketlike blades filled with the flowing water and then were pulled down by gravity. It was the most expensive mill to build, requiring more gears and more maintenance, but it was much more efficient than the undershot wheel. When built beside a fast-moving stream, it often proved worth the expense, being twice as efficient in supplying power as the undershot wheel.

The windmill seems to have been invented in two different places in two significantly different forms. One was invented in the Sassanian Empire, probably in Sistan, in modern-day Afghanistan or Iran. It looked as though it had been inspired by the wind-driven prayer wheels of Tibet. It had a horizontal wheel like that of the horizontal waterwheel, but instead of blades, it had between six and 12 rods with three-cornered sails attached, similar to the sails on the boats of the Near East and North Africa in medieval times. Outside the circumference of the circle formed by the rods and their sails was a circular masonry wall with an opening that faced the prevailing wind. Wind would enter the opening and spin the wheel, which turned a rotating post in its center. The shaft went up through the mill's floor and through the bottom millstone, turning the upper stone to grind grain. This relatively efficient mechanism could spin too fast, scorching grain and endangering the miller. Therefore, the opening in the masonry circle had sliding shutters that could be adjusted to restrict how much air passed through, allowing millers to regulate the speed of the rotation of their millstones. After the Arab conquest of the Sassanian Empire, this form of windmill spread across the Islamic world and remained in widespread use throughout medieval times.

The vertical-wheel windmill was a latecomer to the Islamic world. Invented in northern Europe, probably in East Anglia in England, it offered much higher efficiency in adapting wind power to milling, because all its sails were catching the wind and moving with it all the time. The first of these mills had poles thrusting horizontally out of the sides of their outer walls, and people would form a team and push the poles to shift the entire building so that the wheel faced the wind. It was only in the late medieval era that this form of windmill made its way into use in the Islamic world, although when it did, it spread widely from Grenada to Turkey. In the 1400s a variation on this mill found its way from Europe into the Islamic world. This mill had its wheel attached to a dome that surmounted the building. A miller used a long pole to push or pull the dome to shift the wheel to face the wind. This innovation became very popular in the Islamic world, and some of these domed mills from late medieval times still exist in Turkey, North Africa, and Spain in the early 21st century.

The parts for all these mills were nearly always made of wood. Wood wore out faster than iron did, but iron parts were very expensive, requiring large smelting plants and blacksmiths who could fashion large fastenings for posts and gears. Two advantages of using wood rather than iron was that it was easier to fashion into parts and that wooden parts could be fabricated by the miller or by local farmers, without requiring specialized craftspeople. In cities the people who operated the mills in bakeries may have been men, but in the countryside millers seem universally to have been women.

See also ADORNMENT; AGRICULTURE; ALCHEMY AND MAGIC; ART; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FOOD AND DIET; FORESTS AND FORESTRY; GENDER STRUCTURE AND ROLES; GOVERNMENT ORGANIZATION; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; INVENTIONS; LITERATURE; METALLURGY; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; OCCUPATIONS; RELIGION AND COSMOLOGY; SCIENCE; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE.

FURTHER READING

- George F. Carter, "The Metate: An Early Grain-Grinding Implement in the New World." In *Origins of Agriculture*, ed. Charles A. Reed (The Hague: Mouton, 1977).
- Daniel W. Gade, "Grist Milling with the Horizontal Waterwheel in the Central Andes," *Technology and Culture* 12, no. 1 (1971): 43–51.
- Francis Gies and Joseph Gies, *Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages* (New York: HarperCollins, 1994).
- James E. Lindsay, "Food and Water." In his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- Adam Robert Lucas, "Industrial Milling in the Ancient and Medieval Worlds: A Survey of the Evidence for an Industrial Revolution in Medieval Europe," *Technology and Culture* 46, no. 1 (January 2005): 1–30.
- Adam Robert Lucas, *Wind, Water, Work: Ancient and Medieval Milling Technology* (Leiden, Netherlands: Brill, 2005).
- Terry S. Reynolds, *Stronger Than a Hundred Men: A History of the Vertical Water Wheel* (Baltimore, Md.: Johns Hopkins University Press, 1983).
- Joan S. Schneider, "Quarrying and Production of Milling Implements at Antelope Hill, Arizona," *Journal of Field Archeology* 23, no. 3 (1996): 299–311.
- Elizabeth Smith and Michael Wolfe, eds., *Technology and Resource Use in Medieval Europe: Cathedrals, Mills, and Mines* (Aldershot, Hampshire, U.K.: Ashgate, 1997).
- Trevor I. Williams, "The Beginning of Mechanization." In his *History of Invention: From Stone Axes to Silicon Chips* (New York: Facts On File, 1987).

► mining, quarrying, and salt making

INTRODUCTION

During the medieval era people revealed what minerals they valued by how much effort and risk they put into finding them. This may be best illustrated by salt. Salt makes food tastier, but it also is an essential nutrient, without which people cannot live. Only small amounts of salt are needed to keep people alive, but when even small amounts are unavailable, people will sacrifice much to obtain it. During most of the medieval period people in western and central Africa had to trade for their salt. The salt came to them from two places: one was by sea, and the other was from the Sahara desert. Medieval Africans who lived south of the Sahara paid an equal amount by weight in gold for salt. This was not just from having plenty of gold; by then the gold miners had exhausted most surface sources of gold and would have put themselves at risk digging into the earth to follow veins of gold. By trading gold for salt, they were trading life for life. In China and India governments monopolized salt production and taxed the sales of salt even after they had sold the salt to merchants. In both regions, people paid the taxes because they had to have the salt; in both regions people deeply resented the government for taking advantage of them in this way.

There were three basic sources of salt: the sea, rock salt left from ancient oceans, and underground brine deposits such as those in China. Most salt in medieval times came from the sea, usually from a process of drying out trapped seawater. The effectiveness of this process varied considerably, because the salt content of water varied greatly, from about 1 percent in the Baltic Sea to about 9 percent in the Dead Sea. Rock salt was gathered from surface deposits, from digging mines, and in Africa from the use of water to cause salt to rise out of the ground. The brine deposits of China were so valued that the Chinese invented a new technology to get at them: deep bore-hole drilling. In the process, they discovered natural gas.

Stone seems to have been of value everywhere, and many medieval people had a sophisticated understanding of different kinds of stone and to what uses they could be put. For instance, medieval Australians preferred granite for their tools and weapons, but they used sandstone to sharpen their granite tools. Blocks of stone were used for construction in many cultures. The value cultures placed on stone for construction can be seen in their determination to free stone blocks from quarries. In the Americas and Oceania people often worked with only stone tools to free the stone blocks, requiring long and strenuous effort on their part. In Great Zimbabwe, Europe, and elsewhere fire was used. A stone surface would be heated, and then water would be splashed on it, the sudden cooling causing the stone to crack or shatter. In India and

Ethiopia metal chisels were used to free and shape stones in quarries. In both India and Ethiopia a special form of quarrying flourished in the early medieval era: Stonemasons quarried entire temples, churches, and monasteries out of stone.

Many metals could be found in surface deposits in ancient times, but most of these deposits were gone by medieval times. In some areas, such as Japan and China, it was possible to pan for gold in streams, and many a peasant did so in order to supplement his or her income. In North America huge deposits of copper made it readily accessible to simple digging throughout medieval times, but in other areas it became something to be sought after in tunnels, dug to follow the copper deposits through the earth. In South America miners of gold, silver, and copper worked in cramped, narrow tunnels scores of yards within mountainsides, using tools of deer horn—a perilous and grinding effort eased in the Inca Empire only by liberal sick-leave policies and by mining only during warm months.

In Europe and Asia miners risked cave-ins and floods. The ancient Romans had developed an effective system for eliminating water by using waterwheels on which people treaded, turning the wheels and the buckets attached to them to raise water up from one level to the next until it could be poured outside. In Japan hand pumps were used to raise water to the surface, where it was put to use sluicing ore downhill toward smelting furnaces. The risks were great in digging into the earth, and slaves were often forced to do the work, or local populations were drafted to work government mines. Still, it seems that almost everywhere metal was known to exist, individual entrepreneurs risked their lives to find metal, because metal could improve their lives enough to make risking their lives seem worthwhile.

AFRICA

BY FLORDELIZ T. BUGARIN AND BRADLEY SKEEN

During the medieval period in Africa a wealth of different minerals shaped historical events, culture, and the everyday lives of various peoples. The mining, quarrying, and processing of these resources brought economic opportunities to various regions and affected local communities, trade routes, and political relations. Mineral abundance led to the development of market centers, the birth of new cities, and the appearance of groups of individuals with specialized skills. The production of valued commodities, such as salt, gold, iron, copper, and bronze, stimulated vast social and economic changes throughout Africa.

Salt is said to have been as priceless as gold during the medieval era. Some believe that salt was the monetary equivalent of gold and that it was exchanged measure for measure.

From oral traditions and written documents it is clear that it was a prized commodity that attracted many camel caravans of traders, stimulated the development of trade to all corners of Africa, and drew the attention of international communities. Numerous Arabic references attest to its importance as a form of currency and as a royal treasure. Because it was in high demand, salt linked traders from Timbuktu in western Africa to places as far away as Europe, Iran, and southern Africa. Lesser-known centers of production included Taghaza located north of Timbuktu, Awlil and Ijil in the western Sahara, and Kavar in Niger.

The earliest trade relations may have arisen because of the demand for salt. By the medieval period salt mining in the Sahara and the existence of a trans-Saharan salt trade route were well established. In the 12th century it was widely documented that salt was highly valued by many Africans and was collected from the sand dunes of the Sahara. The majority of these Saharan salt deposits were located at Taoudenni and Taghaza in northern Mali and at Tichitt in Mauritania.

Many techniques were used to process this mineral. Major quantities of salt came from rock deposits in places such as Ethiopia. Often it was collected from shallow mines, extracted from soil, or made by a process of evaporation. On estuaries, lagoons, and tidal flats people constructed shallow dams or directed seawater into nearby ponds. They extracted salt from these pools through solar evaporation. When solar evaporation was impossible owing to humidity, cloud cover, or rainfall, people boiled seawater. Ethnohistorical sources suggest that Africans living in the savanna regions produced salt from grasses that flourished in saline soils and stored salt in their stalks. People burned the blades, dissolved the ash, and continuously filtered and boiled the remains until they collected a sizable amount of salt. A comparable procedure involving dilution, filtration, and boiling was followed when salt was obtained from saline soils.

Methods of producing salt varied by geographical region. Since saline regions or salty conditions were unfavorable for crops, farmers usually relied on specialists to procure salt and traders to deliver supplies. Through trade and distribution, salt stimulated cultural and economic interaction. The need for salt played a major role in the development of cities. When Timbuktu was founded in Mali around 1100, it became a center for traders who wanted to trade salt from the mines in the Sahara for gold and slaves. By 1330 Timbuktu was part of the Mali Empire, and the leaders of this region were in control of the lucrative gold-salt trade routes.

Similarly to salt, gold was a major commodity in a wide-ranging network of exchanges. Gold was produced in five major areas during the medieval period and transported to many markets throughout Africa. Production centers included an-

cient Ghana, Mali, and Asante in western Africa; Axum on the northern Ethiopian plateau; and Zimbabwe in southeastern Africa. Gold traveling on northward trade routes largely came from sources within forested zones.

Researchers conducting metallurgical tests support the claim that the gold used to make Almoravid coins originated from western Africa. Many believe that western Africa after the 11th century became the primary source of gold for a global market, with most of the gold collected from the Senegal and Niger rivers or in the Lobi and Akan fields in Ghana. From there gold traveled to centers of trade such as Jenne-jeno and other posts that dotted the Sahel. The mining and quarrying of gold often involved small teams, and although production was low during these times in comparison to later periods, it had a powerful impact on trade. Just like salt and other valued goods, gold perpetuated established trade routes and solidified Africa's role in an international arena.

Gold mining was the primary factor in the rise of Great Zimbabwe and its satellite communities in modern-day Zimbabwe. The Zimbabwe plateau is rich in both alluvial gold (nuggets washed down into streambeds) and veins of gold occurring in quartz deposits within the granite substrate of the plateau; the former was collected simply by gleaning through the gravel beds of the streams and the latter by cutting shallow mine shafts into the bedrock. During the development of Great Zimbabwe into southern Africa's largest city between approximately 1250 and 1450, at least 330,600 kilograms of gold were extracted from the surrounding country, and more than 370 miles of mine shafts were excavated. The city grew up in something of a gold rush, and probably a large proportion of its population was engaged in gold mining or the mining of iron and copper ores, which also were abundant in the area. Those engaged in mining seem to have lived in camps at the extraction sites (perhaps their families remained in the city itself), while smelting and other forms of processing were done at Great Zimbabwe.

Iron, copper, and brass also were mined and traded during the medieval era. Records, oral traditions, and archaeological data indicate that these commodities traveled from one trade center to the next. Oral traditions explain the importance of copper and its alloys as luxury goods, markers of status, and highly valued commodities by populations living in forested environments. Archaeological evidence at places such as Igbo-Ukwu suggests that the metal used in many copper-based alloy items came from African sources. Large amounts of metal artifacts found at archaeological sites indicate that raw materials were reworked into a variety of tools and crafts.

Throughout most of sub-Saharan Africa metal extraction was carried out in a highly dispersed and low-intensity

manner. Individual blacksmiths would oversee the production of perhaps 20 pounds of iron per year, from mining to finished products. A smith and perhaps a dozen apprentices and assistants would begin by surveying their local area for iron deposits. These had to be near the surface, since no sophisticated mining techniques existed. If iron ores were not plainly visible, deposits could be detected from such signs as small particles of iron contained in the balls of soil and animal waste collected by dung beetles, since these insects dug their own network of shallow tunnels. The same group of smiths would then mine the iron, smelt it in a furnace, and work it into tools or weapons at the master smith's forge. Each worker received a share of the final profit based on his skills and contributions to the effort. In areas where iron was available in alluvial deposits on the surface of streambeds, the work of collection was delegated to the female family members of the smith.

Stone was not an important building material throughout most of Africa. Medieval Ethiopia, however, produced some of the world's most amazing examples of stonework. This was possible because of a tradition of craftsmanship, both in quarrying and working stone, that persisted through the many political and economic upheavals that brought constant change to Ethiopia throughout the Middle Ages. The kings of Axum in the fifth and sixth centuries erected a series of stone stelae to mark their tombs. The largest of these was one piece of granite 108 feet long, the largest single piece of stone ever quarried (including in modern times). Although it collapsed and broke during the process of erection, about 100 stelae between 50 and 80 feet long were put in place successfully.

Ethiopian skill in working stone continued after the collapse of the kingdom of Axum in the ninth century and reached another high point under the Ethiopian emperor Gebre Mesqel Lalibela (r. 1189–1229). He converted his birthplace of Roha into a highly imaginative copy of the city of Jerusalem and renamed it Lalibela after himself. His foundations included 11 churches carved out of solid rock. These were large, multistory buildings that had the appearance of ordinary monumental churches, but they were not built of joined stone blocks in the usual manner. Trenches were cut down into the rock as far as 40 feet deep to relieve the facades of the structures, and then individual rooms were carved out of the rock in situ. Elaborate architectural details were carved into the interior and exterior of the structures to depict artistically many of those elements created by joining stone blocks together.

Quarrying was nowhere more important in medieval sub-Saharan Africa than in the civilization of Great Zimbabwe. One spur to the building of the largest stone structures in southern Africa was the abundant supply of

granite. In the Zimbabwe plateau thin layers of granite continuously flaked off any exposed outcrops of bedrock. These large, flat pieces of granite could be broken up very easily into the kind of building stones used in the structures at Great Zimbabwe and other towns. When the natural supply of rock waned, a new layer of granite could be flaked off the outcroppings by building a bonfire over the desired area and then dousing it with water, producing cracking from the change in volume caused by the sudden change in temperature. This work was probably carried out by labor gangs drawn from the common population of Great Zimbabwe. The plateau also yielded excellent natural clay that was one of the many materials used in the construction of common dwellings.

The mining, quarrying, and production of mineral resources brought many changes to Africa during the medieval period. Camel caravans flourished, new communities arose, and economic relationships changed over time. To support trade, numerous techniques were used to acquire and manufacture raw sources. Once collected, these goods would mark social and economic differences and impact the lives of various communities.

THE AMERICAS

BY KEITH JORDAN

On Isle Royale and the Keweenaw Peninsula of modern-day Michigan and on the eastern shore of Lake Superior in Ontario, Native Americans continued to mine copper during the medieval period as they had for thousands of years previously. Although native North Americans did not cast or smelt copper, they produced tools and ornaments out of pure copper by cold-hammering and heating (annealing) the material. Lake Superior copper provided the source for copper objects found in the graves of Mississippian chiefs in the Midwest. Other sources of the copper used to create those burial ornaments were farther south, in the Appalachians of Georgia and the Carolinas. As yet, however, no archaeological evidence of mining comparable to the Lake Superior workings has been discovered in the southeastern United States.

By the time the Europeans arrived, indigenous peoples had dug hundreds of mines in the Lake Superior region, and between 5.6 million and 2 billion pounds of copper had been removed. Like all other mining in the pre-Columbian New World, this work was conducted using very simple tools. Large stone hammers weighing 5 to 40 pounds each were used to break up the bedrock, with kindling fires built against the bedrock helping to shatter it. Some of these hammers may have been fitted with wooden handles or swung on cords,



Gold ring with feline head in relief; Mixtec, Mexico, ca. 1200–1521
(© The Trustees of the British Museum)

while many were simply held in the digger's hand. The Native American miners dug trenches following veins of copper and excavated pits up to 50 feet deep to reach metal deposits beneath the surface. High-water tables and rain flooded the pits, and the builders were forced to dig additional trenches for drainage or simply to bail out the water with buckets made of birch bark or wood. Wooden scoops resembling canoe paddles served to remove the broken pieces of copper. Some pits were lined with logs or stones to reduce the risk of cave-ins.

The harsh climate precluded any work on the mines during the winter months. In addition to the natural obstacles, early Native Americans considered copper sacred and Lake Superior the home of powerful and dangerous spirits; thus ritual precautions probably were taken to protect the miners from supernatural injury.

In the southwestern United States, Anasazi, or Ancestral Pueblo (ca. 900–ca. 1300), peoples and their neighbors mined for turquoise, both for local use in jewelry and ritual objects and for trade with peoples to the south in Mesoamerica. Native American turquoise mines built before European contact have been discovered in New Mexico, Colorado, Utah, Arizona, Nevada, and California. One of the most important is located near Cerillos, New Mexico, and may have been controlled by the powerful Anasazi site of Chaco from 950 to 1100. Chemical analysis matching finds of turquoise to their geological source demonstrates that Cerillos turquoise was traded as far south as the Mayan site of Chichén Itzá. The mining was carried out using basically the same technology as other pre-Columbian American quarrying: using large stones, stone tools, and fire to fracture bedrock and detach pieces of stone for removal. Very similar technology produced the quarried sandstone blocks that went by the millions into the construction of buildings at Chaco and other Anasazi settlements.

MINING INCA GOLD

The Incas mined not only gold but silver, copper, and tin as well. They panned for platinum in streams in Ecuador. As the Inca Empire expanded, traders were sent into newly conquered provinces to look for sites that might be suited to the mining of gold or silver. The gold of the empire came in three fundamental forms: nuggets, small grains that had to be separated from dirt by washing, and bits of gold that were mixed with minerals and often embedded in rock. Sources for gold, silver, and copper were scattered through most of the empire, but tin tended to be found primarily in the south.

The mountains in which ores were found were worshiped, and the Inca would pray to the mountains to give up their ores. Ore itself was sacred, and ore deposits would be given offerings. Miners would gather at holy places and dance in religious ceremonies to please the mountains. The stone in which metals were found was worshiped, and the metal was treated as sacred.

Mining sites could be large or small. Near Chuquiabo (in present-day Bolivia) was a site of several mines in the walls of a river gorge. Just climbing the walls to the mine openings would have been daring, but the miners had to enter narrow tunnels, too narrow for more than one miner and not high enough for the miner to stand erect. Miners had no illumination and had to crawl from 25 to more than 100 yards in the dark to find the end of the tunnel and there carve into a vein of gold that the tunnel followed erratically. They used tools made from deer antlers.

The imperial government owned all the gold and silver that was mined in the empire. At important mines such as those near Chuquiabo (a name that means “farm of gold”), the government posted guards, who watched carefully as dirt was carried out of mines and taken down to the river to be washed to extract gold. The dirt was heaped on smooth stones, and water was splashed on it until the dirt washed away, leaving the heavy grains of gold behind.

The Maya of the Classic Period (ca. 200–ca. 900) quarried the limestone used to construct their cities from the limestone formations under their territories in Guatemala and Yucatán. Regional geology often determined building materials: at Copán in western Honduras, Mayan builders used volcanic stone, or tuff, for construction and sculptured monuments. The primary tools used to quarry any stone were other stones: small rounded stones employed as handheld hammerstones, and chisels made of flint, perhaps driven with wooden mallets. Because both limestone and the tuff used at Copán are soft when encountered in the ground but harden on exposure to air, the job of quarrying may have been easier than the work of the sculptors who later carved the blocks. Mayan quarry workers made their tasks easier by their knowledge of local geology. They directed their percussive attacks to natural cleavage planes in the limestone to easily detach blocks of the right sizes and shapes for royal monuments. Besides its use as a building stone, limestone was burned to create the powder needed for making mortar and stucco. Natural deposits of crumbled, powdery limestone, or marl, produced such material almost ready made.

The Maya manufactured salt by boiling seawater or allowing it to evaporate in ceramic vessels. Not surprisingly the major centers for salt production for the Maya during the Postclassic Period (ca. 1000–ca. 1550) were located along the Caribbean coasts of Yucatan and Belize. The city of Chichén Itzá in Yucatán may have controlled salt production and trading from the early part of that period to about 1200. Traders hauled the processed salt in canoes to coastal ports for redistribution.

Theoretically at least, all metal deposits in the Inca Empire belonged to the ruler himself. In practice they were mined by local peoples as part of their *mita*, or tax in labor to the Incan state, under the watchful eyes of Incan overseers. The richest sources of metals—gold, silver, copper, and tin—were mines located in the Andes in present-day southern Bolivia and northern Argentina and Chile. Incan mines, cut like their counterparts in North America using stone hammers, were narrow tunnels cut into mountainsides and rock faces, wide enough to admit only one worker at a time. They were comparatively shallow in depth and up to 20 feet long. Because of the cold temperatures at many of these mountain mines, digging could go on only during the summer months; to avoid problems of cold, heat, and limited lighting, the laborers worked only between noon and sundown. Many of the Incan mines were taken over by the Spanish conquistadors after 1532. The colonial authorities did not limit the work hours of the indigenous miners as the Inca had done, and many of the weakened workers succumbed to European diseases.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

Mining, quarrying, and salt making were ancient practices that were fundamental parts of the societies and economies of Asian and Pacific peoples. In medieval Australia the emphasis was on fairly simple quarrying. Australians searched river beds for stones to use in their axes and other tools, and they knew of outcrops of granite where fragments of stone would fall to the ground. In such places they would gather stones to use. Sometimes they used their stone tools to chip out pieces of stone from the granite outcrops. Many medieval Australians had no sources of stone in their own territories, which meant they had to venture into the territories of others who had such sources. This required getting permission, with the understanding that a reciprocal favor was expected for the future.

Others in the Pacific quarried stone in more spectacular ways, and Easter Island has the most famous results of what seems to have been an ancient tradition among Polynesians. For instance, Easter Islanders built *ahu*, which were ceremonial platforms on which they set giant, enigmatic statues to face the ocean. Similar platforms have been found among other island cultures such as those in the Marquesas Islands. The *ahu* were built of stone quarried from extinct volcanoes. For the *moai*, the giant statues, the Easter Islanders quarried the buff-colored bodies from Rano Raraku, a volcano near the eastern end of the island, and they quarried the ruddy stone for the topknots of the statues from Puna Pau, a volcano near the western end of the island.

The quarrying was done with stone chisels. The bodies of the statues were enormous, sometimes weighing hundreds of tons, and it probably took about a year to carve one out of the quarries of Rano Raraku. Quarriers always carved all



Jade phoenix ornament; China, Liao Dynasty, 10th or 11th century (© The Trustees of the British Museum)

around the statue until only its spine was still attached to the volcano. Although the people of Easter Island eventually wiped out almost all the forest with which it had once been covered, during the period when the statues were built, ending in about 1650, enough trees were still available for large tree trunks to be installed atop the lip of the crater of Rano Raraku. Two trunks were anchored in the ground, and thick ropes were strapped around them. It would have taken teams of people to work the ropes, slowly pulling up one side of the statue. One theory for how the statues were moved across the islands suggests that the process of moving the statues out of the quarry turned them on their bellies, which are rounded. On a sledge of wood, the statues would rock forward and back on their rounded bellies, perhaps accounting for the folklore of the islanders that says the statues walked from the quarries to their *ahu*, because the rocking would have resembled a steady gait.

The Easter Islanders were master stonemasons who quarried stones for construction. Originally, their homes had stone walls topped by thatch. The best examples have carefully dressed stones that fit neatly, like the best of Incan stonework, but the islanders apparently developed their techniques for doing this independently of outsiders. When the island was denuded of almost all its trees, the islanders dug their homes into the ground, using dressed stones to line the interiors of those caves.

Moving westward from Oceania to Southeast Asia, archaeology is of less help than on Easter Island. For instance, medieval Indonesians certainly worked with bronze and iron, but their mining practices remain obscure. Not so to the north, in Japan, where archaeologists are continuing to unlock the mysteries of Japanese stonework and mining. For most of the medieval era Japan was dependent on imports for most of its needs for metal. Japan brought in most of its iron from Korea. In fact, unlike China and Korea, Japan had its iron age before its bronze age, because Korean iron became readily available before bronze from China did.

For iron tools and copper money Japan was long dependent on its neighbors. When Japan sent tribute to the Chinese emperor, the Chinese emperor by tradition sent gifts more valuable than the tribute back to the Japanese emperor. The essential aspect of the tribute was Chinese copper coins, the only currency in Japan for centuries, only being fully supplanted by Japanese-made coins in the 1500s.

During the medieval era sources for copper, silver, and gold were found on the island of Sado and in some territories on Honshu and Kyushu. Japan was divided into fiefdoms ruled by daimyo, who were warlords. It was up to each daimyo to exploit the metal deposits on his land, and many did not invest much in mining. Thus, even though late-medieval Ja-



Bronze figure of the seated Buddha; Danesar Khera, central India; Gupta Period; fifth century. Bronze figures such as this one, made from copper mixed with tin and other alloys, indicate India's early sophistication in mining and casting. (© The Trustees of the British Museum)

pan had discovered enough copper deposits to meet its needs, it still suffered from shortages of the metal.

Copper, silver, and gold each could at first be found in surface deposits, but these deposits were quickly played out. Gold could be panned from mountain rivers, and many farmers added to their incomes by panning for the gold, an activity that remained vigorous long after the end of medieval times. Perhaps it was through such panning and the effort to separate sand from grains of gold that iron was discovered in the sand of the beds of Japan's rivers. This was a momentous discovery, because it meant that Japan at last had a source other than Korea for some of the iron used in tools and weapons. The dredging of the sandy bottoms of rivers became a small industry, and the iron smelted from the sand became the iron preferred in the making of steel for Japanese swords.

Much of Japan's mining of metal depended on digging into the ground. This was tough, dangerous work. Mines were narrow tunnels with barely enough room for one person to walk through them. Cave-ins were common, because of poorly shored-up ceilings as well as from Japan's frequent earthquakes. Further, the mines often flooded. In following

the ore into the earth, mines often went deep below the surface. Ore was placed in buckets to be hauled upward by rope or in inclined conveyors operated by pulleys. Hand-operated pumps often moved water out of the mines to the surface, where the water was used to sluice the ore downhill to a nearby furnace, where it was smelted. Mines often were run by the local daimyo, but some small ones were operated by an independent entrepreneur who paid the daimyo with a share of what he mined.

Wood was the primary building material in medieval Japan, and it never ceased to be abundant because of a tradition of replanting land where trees had been harvested. Thus, stone was rarely used for other than the lower floors of fortresses, defensive walls, and special buildings such as palaces or temples. The upper floors of fortresses were almost inevitably made of wood. Thus the quarrying of stone was probably not a big industry, and for big building projects it was usually done by commoners drafted into service for the purpose.

On the other hand, salt was an important industry. In Japan it came mostly from the sea. People would form pools that filled during high tide and then dried during low tide, leaving behind a residue that included salt. Another technique involved laying mats over holes; during high tides water would filter through the mats, leaving behind grains of salt that could be swept up after the tide receded and the sun dried the mats.

Similar techniques were used in China, where as much as 75 percent of its salt may have come from the ocean. Some salt came from pans that were filled with seawater and then allowed to dry. In various areas of China there were salt pools and salt marshes and, in the southwest, salt wells. The lives of salt makers were bad. They were poorly paid, and because China occasionally suffered a shortage of copper coinage, they were often paid in food insufficient to feed a family. Some escaped by becoming bandits. Others joined the army, the only legal way out of their misery, because otherwise the law required them to make salt all their lives.

In ancient times underground deposits of brine were discovered in western China, and the deep-borehole technique for extracting the brine was developed. The drill bit was very heavy and was suspended from a long cable. The cable was hemp wrapped in cowhide, and it was both strong and flexible. Bamboo pipes accompanied the bits, to drain away water. In this way natural gas was discovered, and bamboo pipes were used to vent the gas, which was ignited to heat cauldrons for drying the salt. Salt was heavily taxed, inflating its cost tenfold. At times the imperial government backed the value of its banknotes with salt.

Just as salt production was owned by the imperial government, so were all metals and mines during medieval times.

Miners had lives little better than those of salt makers. They were underpaid, overworked, and not allowed escape except into military service. China had a chronic problem with its gold and silver mines: Miners tended to sneak some of what they found out of the mines for their own enrichment. Their foremen, mine managers, and government officials in charge of mining operations all stole the precious metals. Perhaps one third of the gold and silver mined never made it to the imperial government. Chinese miners had many tools available to them, including picks and wheelbarrows. Coal was used for heating in China by the 1200s and was mined much as metals were mined. By the medieval era China's surface deposits of copper had been played out; although it had huge deposits of copper ore, the ore was very poor, only about 0.4 percent copper (compare with the 6 percent in ore in the Congo).

Somewhat less is known about mining in medieval India than in medieval China, despite a strong interest among archaeologists to find mines that were legendary in medieval times. India was the only source of diamonds in the medieval world. Its mines also produced sapphires, rubies, emeralds, lapis-lazuli, topazes, and crystal. Further, its mines produced perhaps the best iron in the world. Some of its mines produced iron that was made into wootz steel, valued throughout most of Asia and all the way to Europe. The iron contained about 0.003 percent vanadium, which alloyed with the iron when making steel, making the steel extra tough and flexible. Gold, silver, copper, mercury, and lead also were mined in India. Quarries produced marble, granite, and sandstone for building.

Miners used heavy iron axes to split stone out of the walls of mines or quarries. Mining was usually a monopoly of the state, with profits going to the government. Salt production was also a government monopoly. The most common process for making salt involved the use of pans in which seawater evaporated, with the resulting salt being taken inland. Other significant sources of salt were salt mines. The government sold salt to merchants and then taxed the merchants and buyers on transactions of salt, greatly inflating its price and causing resentment among many buyers.

EUROPE

BY THILO REHREN AND MARCOS MARTINÓN-TORRES

The end of the dominance of the Roman Empire over Europe north of the Alps resulted in dramatic changes in the organization of society and profoundly affected the lives of the ordinary people. The framework of long-distance trade—a globalized economy with specialized producers providing commodities for the entire empire—broke down, but so did the urban way of life, with its large building projects of tem-

ples and administrative centers, and the army, with its insatiable demand for metals and other raw materials. Instead, a plethora of smaller political units developed, with most of the population engaged in rural life and agrarian economies. The metal demand that persisted, mostly iron for tools and implements, was easily produced from the near-ubiquitous surface deposits of bog ore, while nonferrous metals such as copper, silver, and lead were relatively simple to acquire from recycled Roman relics. With the rebound of greater political organization, most notably in the Carolingian Empire (751–987) and its successors, came a renewed thirst for fresh commodities, requiring a resurgence of mining that persisted through the late medieval period and all later periods.

Mining covers the extraction of mineral resources from the ground; as such it is, together with agriculture, the original primary production on which all human material culture is based. Depending on the nature of the minerals extracted, mining comprises several activities, each with its own traditions and techniques. Most mined minerals are used to produce bricks for building purposes and are extracted by quarrying stones and clay. Mining of ore is the extraction of rocks and minerals that are smelted to produce metals. Medieval salt mining was of particular importance in the moderate climates north of the Alps, where harvesting sea salt through evaporation of seawater was not normally possible. Although mineral coal was occasionally used where it outcrops at the surface, it did not play a major role in medieval mining and metallurgy.

Quarrying provides building stones from suitable geological formations. In the Middle Ages most building stones were banked sedimentary or volcanic rocks, such as limestone and sandstone, which were relatively easily broken into near-rectangular blocks. Slate, split into thin sheets, was used for roofing and cladding. Quarrying was predominantly done in open-pit operations, using wedges and simple cutting tools to liberate the rocks from their banks. Large building programs, such as the medieval cathedrals, often maintained large quarries of their own to ensure constant and consistent supplies of stones. Regions with little or no suitable rock formations exposed at the surface, such as the low-lying parts of northeastern France, the Netherlands, northern Germany, and most of the countries south and east of the Baltic, relied on bricks fired from clay for use in stone buildings and in some timber-frame buildings. Clay quarrying leaves few traces in the landscape, and limited fuel supplies for the kilns meant that good-quality bricks were relatively expensive. Because overland transportation of bulk materials was limited, most quarries, stone or clay, usually served only their immediate regions, resulting in regionally characteristic building materials. The cost of transporting stone was so high that some-

times the location of suitable stone determined the site of the building. However, some transportation took place; for example, the famous limestone used in southeast Britain came from Normandy.

In mining for metallurgy, ownership of the ore minerals depended on the metal. The metals used for coinage, gold and silver, always belonged to the Crown. Base metals such as copper, lead, and tin were owned by the landowner under British common law or by the Crown in Germanic countries; the owner of a mine owed one-tenth of its production to the landowner or the Crown and enjoyed certain tax and legal privileges in return. Most iron ores, nonmetallic minerals, and rocks were exempt from those mining regulations.

Metal mining takes two main forms: open-pit extraction and underground mining through shafts and adits, or horizontal passages. Throughout the Middle Ages open-pit extraction was the dominant method for acquiring iron ore, typically bog iron formations and tin stone concentrated in placer deposits—that is, gravel and sand beds downstream from tin-bearing rocks. Much of surface mining for iron ore was done by individuals or small groups for their own needs, smelting the metal in small bloomery furnaces with little capital investment, legal control, or regulation. Even where iron ore was covered by mining law, bog ore was free for the landowner to exploit. Hushing—uncovering mineral veins by a heavy discharge of water from an artificial reservoir—often was used to prospect for lead veins, which were then worked through pits and simple shafts from the surface; as the depths of mines increased, underground mining became more economical.

Significant developments in underground mining began in the early Middle Ages, when much of it took the shape of disparate near-surface warrens following the ore seams and veins from the surface into the rock, with little regard for long-term sustainability, overall water drainage, and labor regulation. A major hiatus in mining occurred with the Black Death (ca. 1347–ca. 1353), which killed an estimated 25 million people, around one-third of the population of Europe. Many mines were given up and flooded, making it difficult to reopen them later. In addition, many rich ores near the surface had been exhausted. The time after the Black Death was characterized by increased mechanization to compensate for the lack of manual labor and to facilitate extraction of larger quantities of poor ores. Both required much capital investment and extended organizational structures, both of which were provided by the largest landowners: the church and the Crown, which had strong economic and political interests to stimulate production. The Cistercian order of monks was particularly active in mining and metallurgy, from Cumbria to southern Germany.

Mining in the Hapsburg Empire benefited from regal protection and support, and much of the imperial expansion was financed by profits from the mining industry. In 1347 King Magnus Eriksson of Sweden visited the mine in Falun, then the world's largest copper producer, and issued the Charter of Privileges; in 1360 he set out detailed mining regulations to improve regal control over production. Some time later the Schwaz district of Tirol (in present-day Austria) assumed a leading role in silver and copper production and eventually became the second-largest city in the empire, after Vienna. Mining towns in Schwaz and throughout central Europe were given their own relatively liberal social and economic regulations, primarily to attract people to settle the less-arable mountain lands.

Toward the end of the Middle Ages, the importance of the Schwaz district was documented by the *Schwazer Bergbuch* (The Schwaz Mining Book, 1556), the earliest book to describe mining regulations and laws and to illustrate mining practices and technical inventions. In the same year Georg Agricola published his famous *De re metallica* (On the Nature of Metals), a systematic compendium on mining and metallurgy, including geological and technical aspects; the book veered from the purely descriptive approach and thus appealed to the more inquisitive minds of Renaissance and early-modern readers. By the time those two volumes were published, capitalist companies—such as those of the Fugger and Turzo families, with their continent-wide trade networks—dominated much of the European mining industry and trade in metals, providing the finances to set up or modernize mines and to market their products.

Two methods dominated underground mining throughout the Middle Ages: fire setting and mining with iron tools. By setting an open fire against a rock face, hard rock could be weakened as a result of its expanding and contracting as it was first heated and then cooled. Fire setting produces adits and galleries with characteristic rounded cross sections, often reaching diameters in excess of 30 feet; it was used for mining massive ore bodies, such as the tin-rich stocks in Saxony and the Bohemian Erzgebirge. For more-limited ore bodies, such as veins and seams, iron tools (notably the hammer and pick) were used to produce adits and galleries with rectangular or coffin-shaped cross sections. Typically, progress in hard-rock mining was measured in inches per week. The exhaustion of superficial ore bodies and the increased depth of mines required added effort to remove water, ensure sufficient ventilation to facilitate fire setting, and maintain acceptable working conditions. Draining a large mine often required building an adit at the lowest possible level specifically to allow water to flow into the valley; all productive mines above the large mine had to pay one-tenth of their ore

to the large-mine owner, in addition to the one-tenth they paid to the Crown. Explosives such as gunpowder, although known during the Middle Ages, were not used in mining until the early 17th century.

An elaborate system of specialized labor maximized production and effective use of power. The ore was sorted underground according to grade, and each grade was hauled separately, with the rich ore kept in locked wooden boxes. Barren material and host rock were used to refill old galleries, and ore was extracted very selectively. Large mines were worked continuously in shifts all year, and experienced miners were sought after and often free to move from one region to another. For example, one of the administrators of the Spanish mine of Guadalcanal wrote to the government in 1551 to ask for 200 or more German miners.

As a result of changing geological, technological, and economic conditions, the same mine could be used in different centuries to extract different metals. The Rammelsberg near Goslar, for instance, was a copper mine during the early medieval period; became a lead and silver mine in the revival after the Black Death, when the rich copper ore was exhausted but advances in smelting technology made it possible to profitably extract silver from the lead ore initially left underground; and finally became a zinc mine in the 19th century, based on the sphalerite-rich ore left behind by all earlier miners.

Salt was vital as a component of people's diets and as a food preservative. This, combined with the scarcity of salt in particular in areas away from the shores, meant that salt commanded high prices. Underground salt mining can be traced in the Dürrenberg region of Austria to prehistoric times and again from about 1200 until 1989. Medieval salt miners built solution chambers directly into the rock underground, where salt-rich solutions formed. Salt was extracted from the brines by evaporation in large salt pans—riveted metal pans suspended above wood-fueled fires. The forming salt was scraped from the thickening solution and pressed into cone-shaped forms; after drying, the cones were ready for trade, either whole or smashed to grains and packed in barrels. The same procedure was used where natural salt springs were exploited, such as in Soest in Westphalia, where the earliest known salt production dates to the sixth century, and in Lüneburg in northern Germany, which produced much of the salt used by the fishing industry in the Baltic and North Sea.

THE ISLAMIC WORLD

BY TOM STREISSGUTH

The Arab conquest that began in the seventh century brought a new religious, social, and economic order to the Middle East, Iran, and northern Africa. From their homeland in the

Arabian Peninsula the armies of Islam conquered a vast area, overthrowing long-established realms such as the Persian Empire and the Middle Eastern territories of the Eastern Roman (Byzantine) Empire. The Arabs seized important gold mines in Nubia that had supplied ore for the bezants (coins) of the Byzantine Empire. They conquered mines in Ethiopia, home to the declining Christian realm of Axum, and began mining alluvial deposits in the Nile River valley. A new gold coin, the dinar, was minted by the Umayyad Caliphate (661–750) of Damascus. Modeled on the bezant, the dinar carried quotations of the Koran in place of imperial portraits and Byzantine emblems.

Gold and silver ore were the lifeblood of the caliphate, providing a stimulus to urban craft industries and a medium of exchange for merchants and long-distance traders. Silver coins called dirhams were exchanged with Europeans, who melted these coins down to mint their own denomination, the silver denarius. Silver was in such high demand in both Europe and the Middle East as a basic metal for coinage that a severe shortage of the metal developed in the later Middle Ages. The Islamic realms of the Middle East also were an important source of gemstones, including sapphires from the Arabian Peninsula and Iran, emeralds from Egypt, and turquoise from Iran.

Gold bullion was fashioned from the ore dug from underground or hillside mines or filtered out from river deposits. It became a key item of barter as well as a medium for paying tribute and taxes. During the medieval period hundreds of mines were worked in the Arabian Peninsula, some of which dated to antiquity and several of which are still in production. Among these mines were Bahran, Biram, and al-Nuqrah, deposits under the control of the Quryash society

to which Muhammad (ca. 570–632), the founder of Islam, belonged. Historians have estimated that the al-Hamdah and Mahd al-Dhahab mines, two of the largest in the Islamic realm, each produced more than 1 million ounces of gold in the Middle Ages.

Although gold and silver enriched the Hejaz region of the western Arabian Peninsula and the early Islamic caliphate, conditions were extremely harsh for the mine laborers, many of whom were war captives or slaves and condemned to spend their lives working in quarries or underground mine shafts. Workers were housed in large barracks located near the mine; they worked with picks, axes, and shovels to excavate and collect ore-bearing rock and sand. In most places technology was limited, preventing the construction of deep mine shafts, which require strong reinforcement as well as a method of pumping water and moving large amounts of rock and soil. Miners simply followed veins of ore with pickaxes and cleared surrounding rock with shovels.

Mine owners set up smelters near the mining sites to separate the metals from ore and convert them to a usable form. Smelters needed high temperatures to operate and had to be fueled by an abundant source of wood. Much of the Arabian Peninsula is treeless, so conditions often precluded the profitable exploitation of smaller deposits.

The mines were under the direct control of the caliph and his local governors, who would consign the operation to a private owner in exchange for a regular levy on the profits of mining, known as the *khums*. Muhammad and his successors granted the use of mines to private individuals, who had the right to the mine's production over a limited period of time in exchange for a payment. This was similar to the European feudal system of usufruct, which granted the use of loaned property for the purpose of profitable gain.

Copper mines existed in Oman, at the southern limit of the Arabian Peninsula, and a wide variety of valuable minerals were produced in Iran. Baku, on the western coast of the Caspian Sea, was the site of oil seeps that brought petroleum to the surface. Shallow pits were dug to allow the oil to collect; by the 16th century these pits were reaching 100 feet in depth. The oil was collected and used for heating, lighting, and the flammable liquid known as Greek fire that was used in warfare. On the nearby Apsheron Peninsula oil condensate and natural gas escaped through fissures in the ground and in many places ignited into a constant flame.

Morocco produced silver, and the caliphate of Spain exploited mercury mines. These were worked by separate gangs of laborers to quarry the rock, carry fuel for heating it, sift the ore, and fashion tools and utensils. The life expectancy of workers in constant contact with this highly poisonous substance must have been quite short.



Brass basin inlaid with silver and gold; Cairo, Egypt, or Damascus, Syria, ca. 1320–41 (© The Trustees of the British Museum)

Northern Africa was the site of extensive trading for the gold produced in the sub-Saharan regions of western Africa, including rich alluvial deposits located in the watersheds of the Niger and Senegal rivers. In the eighth century the Arabs of northern Africa launched a military campaign across the desert intending to seize control of these sources, but they were thrown back with heavy losses. From that time forward the Islamic states of northern Africa traded or bartered for their gold. They set up regular staging posts for the use of the long camel caravans that carried trading goods north and south across the Sahara. Gold was mined in Bambuk, just south of the upper Senegal River, and traded through the cities of Djenné and Timbuktu in what is now Mali. On the East Africa coast the trading cities of Sofala and Kilwa did a brisk business in gold brought from the African interior.

The demand for gold and other precious metals rose steadily through the medieval period as great empires rose and rival caliphates vied for power in northern Africa and the Middle East. Gold mints were established in Kairouan (in what is now Tunisia) and Al-Fustat (later called Cairo), the first Islamic capital of Egypt. Throughout Islamic Africa gold coins replaced the iron bars and cowrie shells that had provided the principal medium of exchange in the pre-Islamic period. Gold demand increased in the 11th century as the Fatimid Caliphate (909–1171) sought to finance war against the Umayyads and the Abbasids, who reigned from their capital of Baghdad.

Gold was frequently traded for slaves and for salt, which for many Africans was just as precious a commodity as gold. Salt was an essential part of the diet and a useful medium for the preservation of food. In some places it was used as a form of currency. Salt was mined or collected in Palestine, Mesopotamia, Egypt, and the Arabian Peninsula, where it existed in large quantities. Throughout northern Africa salt mines were carefully guarded and their locations kept secret.

There were many different methods of salt production. Along the coast seawater was trapped and collected in pools, and salt crystals were collected as they formed on the stagnant surface. Salt also was collected by dissolving salt-loaded soil with water and collecting the crystals in a filter or screen. Sandy soils frequently held layers of salt underneath the surface, and in some rock formations salt could be excavated from mine shafts. Salt was commonly cut into slabs and transported by camels or by slaves for merchants, who bartered the commodity for ivory, gold, slaves, and other goods from the sub-Saharan region. Salt mining formed the economic foundation for many Saharan communities, which existed in a harsh climate that had few

other resources and was ill-suited to the growing of crops or animal husbandry.

Iran was home to extensive deposits of copper, lead, iron, and cobalt. Neyshabur was the location of rich veins of turquoise that had been mined since ancient times and traded with the Middle East, central Asia, Afghanistan, and India. Turquoise had been an important trade and barter item since the time of the Persian Empire. Persian turquoise made its way north to central Asia, east to Afghanistan and India, northwest to the Caucasus region, and as far away as Siberia.

The medieval Persians mined precious gemstones, salt, lime, marble, and gypsum. Copper deposits existed at Khorasan, Kerman, and Azerbaijan along the coast of the Caspian Sea. Coal was mined in the mountains near Tehran. Orpiment, a highly toxic substance used to make poisons and artist's pigment, was mined at Afshar and Orumiyeh. Cobalt, mined at Kamsar, was used to tint glass, jewelry, and porcelain a deep blue color. There also was a large alum mine at Tarom and at other sites in the Middle East, which was the principal source of this mineral for Europeans throughout the medieval period. Alum was used in the textile industries as a medium to fix dyes in wool and other fabrics.

The conquest of the Byzantine Empire by the Ottoman Turks in the middle of the 15th century disrupted trade in gold, precious gems, and valuable minerals through the Middle East. The hazards of overland trade through western Asia's Islamic states prompted Europeans to send expeditions across the oceans in search of gold, spices, and other valuables. When knowledge of the Saharan caravan routes came to the Portuguese, a new era of exploration and exploitation opened along the western African coast, and the gold deposits of sub-Saharan Africa began moving into the treasuries of European monarchs. The result, eventually, was an important shift in the balance of economic and military power between the Islamic world and Christian Europe.

See also ADORNMENT; ARCHITECTURE; ART; BUILDING TECHNIQUES AND MATERIALS; CLIMATE AND GEOGRAPHY; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; FOOD AND DIET; FORESTS AND FORESTRY; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; INVENTIONS; METALLURGY; MONEY AND COINAGE; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TRADE AND EXCHANGE.

Asia and the Pacific

Marco Polo: Excerpt from The Glories of Kinsay
[Hangchow] (ca. 1300)

**TREATING OF THE GREAT YEARLY REVENUE
THAT THE GREAT KAAH HATH FROM KINSAY**

Now I will tell you about the great revenue which the Great Kaan draweth every year from the said city of Kinsay and its territory, forming a ninth part of the whole countrv of Manzi.

First there is the salt, which brings in a great revenue. For it produces every year, in round numbers, fourscore tomans of gold; and the toman is worth 70,000 saggi of gold, so that the total value of the fourscore tomans will be five millions and six hundred thousand saggi of gold, each saggio being worth more than a gold florin or ducat; in sooth, a vast sum of money! (This province, you see, adjoins the ocean, on the shores of which are many lagoons or salt marshes, in which the sea-water dries up during the summer time; and thence they extract such a quantity of salt as suffices for the supply of five of the kingdoms of Manzi besides this one.)

Having told you of the revenue from salt, I will now tell you of that which accrues to the Great Kaan from the duties on merchandize and other matters.

You must know that in this city and its dependencies they make great quantities of sugar, as indeed they do in the other eight divisions of this country; so that I believe the whole of the rest of the world together does not produce such a quantity, at least, if that be true which many people have told me; and the sugar alone again produces an enormous revenue. However, I will not repeat the duties on every article separately, but tell

you how they go in the lump. Well, all spicery pays three and a third per cent on the value; and all merchandize likewise pays three and a third per cent. But sea-borne goods from India and other distant countries pay ten per cent. The rice-wine also makes a great return, and coals, of which there is a great quantity; and so do the twelve guilds of craftsmen that I told you of, with their 12,000 stations apiece, for every article they make pays duty. And the silk which is produced in such abundance makes an immense return. But why should I make a long story of it? The silk, you must know, pays ten per cent, and many other articles also pay ten per cent.

And you must know that Messer Marco Polo, who relates all this, was several times sent by the Great Kaan to inspect the amount of his customs and revenue from this ninth part of Manzi, and he found it to be, exclusive of the salt revenue which we have mentioned already, 210 tomans of gold, equivalent to 14,700,000 saggi of gold; one of the most enormous revenues that ever was heard of. And if the sovereign has such a revenue from one ninth part of the country, you may judge what he must have from the whole of it! However, to speak the truth, this part is the greatest and most productive; and because of the great revenue that the Great Kaan derives from it, it is his favourite province, and he takes all the more care to watch it well, and to keep the people contented.

From: Henry Yule, trans. and ed., *The Book of Ser Marco Polo the Venetian concerning the Kingdoms and Marvels of the East* (London: John Murray, 1903).

Europe

Extract from "Accounts of Tin Mining in Cornwall"
from The Stannary Charter (1198)

THE STANNARY CHARTER, 1198

Know that the sheriff of Devon and Cornwall has received by the hand of William de Wrotham, the command of the Lord Archbishop of Canterbury in these words:

Hubert, by the grace of God, Archbishop of Canterbury, Primate of all England, Legate of the Apostolic See, to the sheriff of Devon and Cornwall, greeting. We order you, on behalf of the Lord King, that in place of Geoffrey Fitz-Peter you entrust to William de Wrotham

(continued)

(continues)

all the stannaries of the Lord King in your bailiwick and all that belongs to those stannaries. And you shall see to it that he has tin miners with that freedom which they should have, and which they have been accustomed to have, and you will see that he has all those lawful men whom the same William will name for you. You shall see that they expedite this matter, that they bring aid and counsel for the keeping of the king's stamps, and all the products of those stannaries, and see to the disposal of the profit from the same. Forbid all men free admission to your bailiwick lest, without permission of the same William, they carry away any tin either by land or sea. You will also give him much help in expediting the present business of the Lord King, that it may prosper, and that your Lord King may not suffer loss through neglect on your part.

Witness, Stephen of Turnham, at Westminster, on the twentieth day of November. . . .

And we give notice that on the nineteenth day of January in the ninth year of the reign of King Richard, at Exeter in the county of Devon, we inquired upon the oath of . . . wise and prudent men, about the true weights of the tin of Devon, and we inquired about such quantity as was the just and ancient weight of the city of Exeter, by which in ancient times, now and always, it has been customary to weigh the second smelting of tin, and what it always ought to be, and we found that the just and ancient weight of the first smelting formerly, now and always, was eight times the weight of the second smelting, and it ought to be nine times the weight according to the weight of the city of Exeter for this reason, namely, that from any thousand weight weighed by the greater weight thirty denarii are given to the Lord King, according to ancient custom for the ferm of the stannaries of Devon and for the expense of conveyance to market towns, and because the tin at the second smelting was less, and according to their oath it was measured and determined by such measure in our presence in the stannaries and towns of Devon. . . .

All miners and buyers of black tin, and first smelters of tin and merchants of tin of the first smelting have just and ancient customs and liberties established in Devon and Cornwall. Likewise just and ancient weights of the

first and second smelting of tin, determined by the oath of the above-mentioned jurors, and marked with the stamp of the Lord King, shall be kept.

Also all men have the common right of buying tin by just, ancient, and free customs, as they are accustomed to have and ought to have, by the mark from any thousand weight of the second smelting. And in the towns and market towns wherein the chief warden of the stannaries shall have appointed a time for a second smelting, from each thousand weight of which the Lord King ought to have one mark, let the second smelting be weighed by the weight of the city of Exeter, and that weight shall be marked by the stamp of the Lord King. Likewise the established weight of the city of Exeter shall always be kept in the custody of two lawful men in the market towns, and in the custody of the clerk appointed by the Lord King. . . .

And in any town where a second smelting has been decreed let there be two lawful and rich men who shall receive from the merchants the mark of the Lord King, in the presence of the wardens and the clerk of the second smelting and of the stamp for weighing and marking, and both the clerk and the wardens shall not permit the tin to be carried away until the treasurer of the Lord King shall have received the mark of the Lord King and the customary tax on the tin.

And the treasurers of the mark of the Lord King may make statements and chirographs about the money of the Lord King against the wardens and the clerk of the weight and the stamp. And in the chirographs shall be enumerated the day of receiving, and the amount of money received, and the number of thousands and hundreds of pounds of tin received, and the names of the merchants who acquired the tin. Likewise the treasurers of the Lord King by statements and chirographs of this kind shall deliver the money of the Lord King to the chief warden of the stannaries. . . .

No one may presume to have in the market towns any weights with which to weigh tin except they have been previously measured in the presence of the keepers of the weights, and judged by the weight of the Lord King, and marked by the stamp of the mark of the Lord King; The wardens and the clerk of the first smelting, as they love themselves and their own, shall diligently and mindfully make a record of the thousands and hundreds

and pounds which have been weighed and marked by the weight and stamp of the warden throughout the whole year. And let no Christian man or woman, nor any Jew, presume to buy or sell any tin of the first smelting, nor to give or carry away, outside the stannaries or outside the places appointed for weighing and marking the first smelting, until it shall have been weighed and marked in the presence of the wardens and clerks of the weights and stamp of the ferm.

Let no Christian man or woman, nor any Jew, presume to have within or outside the stannaries any of the first smelting beyond a fortnight unless it be weighed and marked by the wardens and clerk of the weight and seal of the ferm. Let no Christian man or woman, nor any Jew, carry tin in any way, by land or sea, beyond Devon or Cornwall, except he first have permission

of the chief warden of the stannaries. Let good and lawful men be appointed in the harbors of Devon and Cornwall to take the oath of all ship-hands and sailors arriving there, that they will not carry away, nor permit to be carried away in their ships, any tin except it be weighed and marked by the royal customs, and except they have the writ of the chief warden of the stannary. The stamp of the ferm shall always be guarded under the seal of the warden and of the clerk except while they are using it at the appointed places. In weighing the tin let the tongue of the scale balance justly between the weight and the tin, so that the scale is not drawn towards the tin, in accordance with the wish of the buyer, on any just scale.

From: G. R. Lewis, *The Stannaries*
(Boston: Houghton Mifflin, 1908).

FURTHER READING

- Ian Blanchard, *Mining, Metallurgy and Minting in the Middle Ages*, vols. 1 and 2 (Stuttgart, Germany: Steiner Verlag, 2001)
- C. N. Bromehead, "Mining and Quarrying to the Seventeenth Century." In *A History of Technology*, Vol. 2, *The Mediterranean Civilizations and the Middle Ages, c. 700 B.C. to c. A.D. 1500*, eds. Charles J. Singer, E. J. Holmyard, A. R. Hall, and Trevor I. Williams (Oxford, U.K.: Clarendon Press, 1957).
- V. E. Chikwendu, P. T. Craddock, R. M. Farquhar, et al., "Nigerian Sources of Copper, Lead and Tin for the Igbo-Ukwu Bronzes," *Archaeometry* 31, no. 1 (February 1989): 27–36.
- Paul T. Craddock, *Early Metal Mining and Production* (Edinburgh: Edinburgh University Press, 1995).
- Timothy F. Garrard, "Myth and Metrology: The Early Trans-Saharan Gold Trade," *Journal of African History* 23, no. 4 (1982): 443–461.
- Eugenia W. Herbert, "Aspects of the Use of Copper in Pre-colonial West Africa," *Journal of African History* 14, no. 2 (1973): 179–194.
- Charles Lebaron, "The Giants of Easter Island." In *The World's Last Mysteries* (Pleasantville, N.Y.: Reader's Digest Association, 1978).
- Paul E. Lovejoy, *Salt of the Desert Sun: A History of Salt Production and Trade in the Central Sudan* (Cambridge, U.K.: Cambridge University Press: 1986).
- Susan R. Martin, *Wonderful Power: The Story of Ancient Copper Working in the Lake Superior Basin* (Detroit: Wayne State University Press, 1999).
- Joseph Needham and Colin A. Ronan, "Salt Industry and Deep Borehole Drilling." In *The Cambridge Encyclopedia of China*, ed. Brian Hook and Denis Twitchett (New York: Cambridge University Press, 1991).

John U. Nef, "Mining and Metallurgy in Medieval Civilisation." In *The Cambridge Economic History of Europe*, Vol. 2, *Trade and Industry in the Middle Ages*, 2nd ed., eds. Michael M. Postan and Edward Miller (Cambridge, U.K.: Cambridge University Press, 1987).

Peter R. Schmidt, *Iron Technology in East Africa: Symbolism, Science, and Archaeology* (Bloomington: Indiana University Press, 1997).

Amelia M. Trevelyan, *Miskwabik, Metal of Ritual: Metallurgy in Precontact Eastern North America* (Lexington: University Press of Kentucky, 2004).

► money and coinage

INTRODUCTION

Throughout the world in early times trade was conducted by barter, so much of one commodity (animal skins, for instance) would be traded for so much of another (bread, for instance). In many places, especially for large transactions of the kind carried out by states or exceptionally wealthy merchants, precious metals (gold, silver, and copper) eventually came to be used by a medium of exchange. Goods were traded for a certain weight of one of the metals in the form of ingots or nuggets (or dust, in the case of gold), and the metals could later be traded for other goods. Once the economy of the eastern Mediterranean revived after the collapse of international trade in the Iron Age (ca. 700 B.C.E.), the kingdoms of Asia Minor began to standardize the trade in precious metals

(which were readily abundant in local streams) by stamping the royal seal into ingots to testify to the purity of the metal. This soon evolved into the practice of making small lumps of metal just large enough to bear the seal, the first coins. The practice quickly spread throughout the Mediterranean world and eventually by way of the established trading networks on the Indian Ocean and through inner Asia to other ancient civilizations (Iran, Ethiopia, India, and China).

A blank coin-shaped lump of metal is called a flan. In medieval mints workmen heated a flan in a fire and then placed it on an anvil with an embedded die bearing the image (type) of one side of the coin. The die with the type of the other side would be placed above it and stuck with a hammer, leaving impressions on both sides of the coin. Dies were steel or iron rods as big around as the coin, with negative images of the coin's types hand-carved on one end.

Coins have two sides, the front, or obverse, usually bearing the portrait of the ruler in whose name the coinage was issued or of some allegorical or mythological figure. (Jesus often appears on Byzantine coins, for example.) For this reason, the obverse is often called the "heads" side. It usually contains a list of the ruler's titles written around the outer edge of the coin. The back of the coin is called the reverse, or "tails," side. The designs on the reverse are more various but typically have a propagandistic message related to the ruler who issued the coinage. The coins of medieval Ethiopian monarchs, for instance, generally bore a Christian cross. Islamic coins were unusual in lacking a portrait, since Islam forbade figurative representations. They generally bore a quotation from the Koran instead.

Coins often are made of gold, silver, or bronze. During times of economic decline, coinage may nearly disappear and be limited to gold issues intended for state use and other large transactions. In times of economic prosperity silver becomes more common, and coinage returns to everyday use. This is illustrated in the fluctuations of economic activity in Europe after the collapse of the Western Roman Empire, where silver disappeared until the restoration of security under Charlemagne. Smaller denominations were issued in bronze or copper. In most times and places the day's wages of an unskilled laborer were one silver coin about the size of a modern American quarter.

Medieval coins are mostly known from examples recovered through archaeological research. The most important source of coins comes from hoards. Given the inadequate or nonexistent banking institutions of the medieval world, many people simply buried large numbers of coins (up to hundreds or thousands). With the constant social dislocations of the era, many of these hoards were never recovered by their owners. For instance, hundreds of thousands of Islamic

coins have been recovered from hoards in Scandinavia. They tell the story of Viking traders who sold their amber and furs to Arab merchants at markets in Kiev Rus and elsewhere on the border between Europe and Asia and then returned home with their profit.

Coinage arrived late to China (in the seventh century). Chinese coins were limited to bronze issues and always stood as equivalents to a fixed amount of gold or silver bullion, held either by the government or by private merchants. Because coins were understood in this way, paper currency, also backed by precious metal reserves, gradually replaced even bronze coins throughout the Middle Ages. This more abstract system of money is more like that developed in the West in the 19th century. Chinese coins were also unusual in being cast bronze (rather than die-struck flans). A square was cut out of the middle so that they could be suspended from a string or put on a counting stick, and they bore the name, rather than the image, of the ruler on the obverse with the date of issue on the reverse.

In the Americas and sub-Saharan Africa commerce was mostly conducted by barter, though in the later medieval period both areas began to use large pieces of cast bronze or copper as currency. In the Americas the bronze took the form of symbolic ax heads (too thin to have been of practical use).

AFRICA

BY BRADLEY A. SKEEN

As in the rest of the world, trade in Africa was originally conducted by bartering goods directly (for example, so many cattle for so much wheat). However, as trade became greater and more sophisticated, people sought media of exchange and assigned arbitrary values to markers that would facilitate trade, developing a simple kind of money or currency. Coins had been invented in Asia Minor (Turkey) during classical antiquity and were introduced into Egypt and the rest of North Africa in ancient times and slowly to other parts of Africa in the Middle Ages. Because of the unique economic position of Egypt within the Roman and Byzantine empires, coinage there took on a unique form.

Egypt was by far the richest province in the Roman Empire and, after the collapse of the Western Roman Empire in 476, also in the Byzantine Empire (as the East may thereafter be called). Egypt's wealth was due to the extraordinary agricultural productivity of the Nile Valley, which was fertilized and watered every year by the inundation of the Nile flood. Land in Egypt produced roughly 20 kernels of grain for every one seed planted, compared with a worldwide average of seven kernels returned for each seed. Coins were essentially markers for agricultural wealth.

The exceptional wealth of Egypt funded the last challenge to the unity of the Roman Empire in the civil war of Marcus Antonius (82 or 81–30 B.C.E.) against Julius Caesar's adopted son, Octavian (later the emperor Augustus, r. 27 B.C.E.–14 C.E.), in 31 B.C.E.; Cleopatra (r. 69–30 B.C.E.), the queen of Egypt, paid for the war. Therefore, once he occupied Egypt and had added it to the Roman Empire, Octavian decreed that ordinary coins would never again be minted or even circulate in Egypt. In this way he hoped to prevent any future governor of Egypt from using the wealth of the country to fund a rebellion. (The post of governor was also closed to the Roman aristocracy and was entrusted to low-level bureaucrats who could never hope to aspire to the throne.) Indeed, Egypt never became a seat of rebellion, even during later periods of intense civil wars within the empire. This decree continued in force throughout the Roman and Byzantine periods, right down to the Islamic conquest. Taxes were collected directly in kind, mostly as grain.

Trade within Egypt was conducted in a special billon coinage. Billon is a cheap metal consisting mostly of copper, alloyed with a small amount of silver and any other handy metal scraps, such as lead. Often the silver was plated onto the surface of the coin to give it an appearance more like that of the standard silver coinage of the rest of the empire. In Byzantine times—in the reign of Justinian I (r. 527–65) and later—Roman authorities dispensed with billon and even its small amount of silver in favor of a pure bronze coinage. The situation became somewhat more complicated after 296, when the emperor Diocletian (r. 284–305) introduced a small issue of gold coinage into Egypt to allow the conversion of billon coinage into a standard currency that could be used outside Egypt.

The Egyptian billon and bronze coinage was similar to ordinary Roman coinage in its types, that is, the images and designs stamped onto the coins. It usually carried the types of the ruling emperor's bust (surrounded by a legend of his name and titles) on the obverse, or "heads" side, and various nationalistic designs and slogans on the reverse, or "tails" side. The legends were written on the coins in Greek, the official administrative language of the eastern half of the Roman Empire.

Because the billon metal of which the coins were made was worthless compared with pure silver, no one outside Egypt would accept the coins as payment. (Indeed, it was illegal to spend them outside Egypt.) Billon coins were accepted for payment in trade within Egypt largely on the force of the imperial laws requiring people to accept them. In this way the Romans stumbled on a modern principle of economics in which currency has no intrinsic value but is accepted on the basis of the faith and credit of the government that issues it. Elsewhere in the Roman world merchants and government



Manilla, an open bracelet traded as currency in western Africa; 12th–18th centuries (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Gift of Tom Joyce and museum purchase with funds donated by Carl Jennings, 2002-10-35)

officials carrying out large transactions treated coins as mere bullion: The coins were weighed rather than counted. However, this practice was unnecessary in Egypt, since the billon coins were detached from the real value of precious metals and since this form of coinage was never attempted anywhere in the world outside Roman and Byzantine Egypt.

Coinage in the other provinces of the Roman and Byzantine empires in North Africa did not differ significantly from that of the European and Asiatic provinces. The short-lived Vandal Kingdom (430–533) based in Carthage (modern-day Tunisia) issued a coinage closely copying the previous Roman coinage before the kingdom was reconquered by the Byzantine emperor Justinian I.

Coins were minted in Axum from around 200 to 800. The kings of Axum seem to have issued the coinage to further the overseas trade that was the basis of their wealth and power. In the early fourth century (ca. 330) the coinage of King Ezana was the first to display the symbol of the cross after he converted to Christianity (predating the introduction of Christian motifs on Roman coinage). The obverse of his coins showed his portrait (often without legend), while the reverse showed the cross with the motto "May it please the nation," indicating, perhaps, a use of the coinage as a vehicle of propaganda in converting the Axumite population at large. King Mehadevis in the early fifth century added to his coinage the motto of the Roman emperor Constantine (r. 306–37), "In this sign [the cross], conquer!" suggesting a more militant attitude to converting the country to Christianity.

Most Axumite coins were gold; the remainder were bronze, except for a small number of silver issues. They were all similar to the type established by Ezana. Most of

the bronze coins have been found in Ethiopia and most of the silver in southern Arabia, indicating the extent of Axumite trade with this area. The coins were issued to standard weights based on those of the Byzantine Empire, suggesting that Byzantium was Axum's major trading partner, though in fact few Axumite coins have been found within its borders. Axum also followed Byzantine conventions by inscribing the legends on its coins in Greek, the language used on Byzantine coins as well.

At the turn of the fifth century King Ouazebas added a halo to his image on his bronze coins. The halo was plated in gold, using a unique mercury gilding process, unparalleled in the history of world coinage. No doubt the type referred to the sacred nature of the Ethiopian kingship, a conceit modeled on the ideology of the Byzantine emperors.

After the Islamic conquest of areas surrounding Axum in the seventh century, the state began to decline, especially because of the loss of overseas trade, and this decline was reflected in various ways in its coinage. The language used in the legends on the coins was changed from Greek to the native Ethiopic language of Ge'ez. This act was undoubtedly a response to the loss of the Byzantine Empire as an important trading partner and the end of attempts to circulate the coinage outside Ethiopia. The general level of craftsmanship in the manufacture of the coins also markedly declined: The artistry in the portraits and legends became noticeably cruder. The gold coinage became increasingly debased (devalued) through being alloyed with silver. The legends on the coins changed from the triumphal propaganda of Christianity among the early kings to pleas for peace, suggesting civic unrest at the end of the kingdom. Before the end of the seventh century Gersam, probably the last king of Axum to issue coinage, reverted to the older tradition and placed on his coins the legend "He shall conquer through Christ!"—perhaps trying to recall the state's lost glory. By the 10th century it is clear that all use of coinage had ceased in Ethiopia; trade was instead conducted through barter or by using such commodities as salt as a currency.

Most areas of Africa did not use coins but employed other markers of value in their trade. The most common were cowrie shells (from a type of marine mollusk) and glass beads. Today these often seem strange media of exchange because modern peoples do not assign any value to these objects. However, the medieval African cultures that used them did assign them a conventional value that allowed them to be used as currencies. Even gold, as far as its intrinsic worth in industry and other practical uses is concerned, would hardly be more valuable than copper or silver except for its conventional valuation. Of course, the worth of modern paper currency is based entirely on people's faith in it. However, Islamic and European traders

were, from their viewpoints, able to profit handsomely from the use of these items in trade, since they could easily obtain or manufacture them at the cost of only a fraction of their valuation in African markets.

Katanga (now Shaba) in central Africa is one of the richest copper-producing areas in the world. By the 13th century (if not earlier) traders in the area had begun to use copper as a currency. Initially, small copper nuggets were employed, then ingots, and eventually cast pieces of copper (weighing up to 11 pounds) in the form of either a cross or the letter *H*. These traded as currency throughout central Africa up until the 20th century.

In the later Middle Ages, Mogadishu, Mafia, Zanzibar, and Kilwa on the East African coast became centers for Arabic trade with the interior of Africa (although they did not entirely lose their pre-Islamic identities and conversion was mostly limited to the elite classes). As their rulers became more economically sophisticated and while the economy of the area grew, these cities began to mint their own coins, copied from Arab models. More than half of their coinages were bronze; the remainder were silver. All gold coinage in this area was imported from other parts of the Islamic world.

Many archaeological sites in Africa show that coins from the Islamic world (and even those from places farther afield, such as China) were traded alongside other local currencies. Even the excavation of the isolated city of Great Zimbabwe in southern central Africa (which grew wealthy exporting gold) has produced glass beads, cowrie shells, and a single coin, minted at Kilwa.

THE AMERICAS

BY PENNY MORRILL

Scholars are not in agreement concerning the existence of markets or currency in Mesoamerica and the Andean highlands. Some argue that among the Aztec, Maya, and Inca, markets were gatherings primarily for redistribution and reciprocity rather than for transactions that involved barter or currency. Others view these markets as opportunities for a variety of types of exchange. This scenario seems more plausible. In the latter case it is believed that market-trade gatherings took place in Mesoamerica and in the Andean highlands. After the Spaniards arrived in the early 16th century, they wrote of markets but without detailed descriptions of the places where these markets were, how the markets were organized, and how often market days took place or even whether participants were using a barter system or currency or both.

According to reports, Spaniards were awestruck by the marketplace in Tlatelolco, the market area of the Aztec capital Tenochtitlán. It was vast, well regulated, and filled

with a grand variety of products. In markets throughout the Americas fruits, animals, and textiles were probably traded as barter among farmers, merchants, and housewives. However, all evidence suggests that the exchange of goods was controlled and overseen by the elite, resulting in the development of currency.

The famed 16th-century Franciscan ethnographer Fray Bernardino de Sahagún (1499–1590) interviewed members of the Aztec elite soon after the conquest. His descriptions are among the few that survive, and they provide a view of how trade took place between the Aztec emperor and the leaders of other nations. The Aztec merchants made the transactions but as emissaries of the emperor. Sahagún's informants describe how the rulers controlled trade in luxury goods, a practice that spanned centuries among the elite of Teotihuacán and Oaxaca and in the Mayan region. The extravagant burials at Sipán, Chan Chan, and Sican in Peru indicate the vast wealth of the elite among the Moche, the Chimú, and the people of Sican. The other important piece of information provided by the Aztec's descriptions is the high value given certain items, in particular, jade, brilliantly colored feathers, and ocelot pelts. Jade was considered sacred, with associations to water and vegetation. These jade beads had measurable value and were used as currency.

One scholar uses the term *trade in metaphors* to describe 18th-century commerce between North American Indians and Europeans, meaning that the value placed on goods often related to spiritual qualities. While this term was descriptive of a barter system (wampum), it could also characterize one based on currency. During the rise of Classic Period (ca. 150–ca. 650) cities in Mexico, especially Teotihuacán, the Chalchihuites culture of Zacatecas in northern Mexico mined and traded turquoise. The people of Chaco Canyon in New Mexico traded turquoise with the central Mexican groups during the Early Postclassic Period (ca. 900–ca. 1200). Turquoise was a valued commodity for its references to water and vegetation and could have been used, like jade, as currency. However, there is no archaeological or later ethnographic evidence of the use of currency among North American Indians.

The Aztec traded fine textiles for highly desirable products from the tropics. It seems that great quantities of mantles (*tilmatli*) and cotton cloth (*cuachtli*) were exacted in tribute by the Aztec from those whom they had conquered. The acquisition of this kind of wealth provided the ruler with the quality of goods he could trade for feathers and jade. Therefore, cloth was a medium of exchange that had been given a specific value or price. A fine mantle decorated with feathers could be worth 100 canoes, and 40 of these mantles could be traded for a slave who could sing and dance.

In his 1555 *Memoriales* (Memorials) the Franciscan Fray Toribio de Benavente Motolinía describes markets in Tenochtitlán, Texcoco, Tlaxcala, and Tepeaca. He points out that in the different provinces people used various forms of currency. In some areas people used cloth as a measure of value; in others copper ax-money was used. Fray Motolinía describes these specialty axes as made quite thin and in the form of a tau. Where gold was plentiful, Fray Motolinía says that the people used gold dust as their medium of exchange. The most common currency was cacao; using cacao as money was a practice that continued long after the Spanish conquest.

Chocolate was a beverage enjoyed only by the elite. This restriction made the beans highly prized, and they acquired an extrinsic and intangible value. Cacao functioned well in small transactions because of its lesser value compared with copper axes or gold dust. Cacao beans were individually counted, even in large numbers. That cacao was used extensively as currency is corroborated by the fact that there were words in Nahuatl for the larger quantities: a *xiquipilli* was a sack of 8,000 beans, and 3 *xiquipilli* were known as a *carga*. To appreciate the wealth of the Aztec ruler, colonial observers record that at the time of the conquest Montezuma II (r. 1502–20) had 40,000 *cargas* stored in his warehouse. The Aztec ruler was able to achieve this kind of wealth by annually requiring 980 *cargas*, or 2 tons, of cacao beans in tribute from the peoples the Aztec had conquered.

The development of ax-money is perhaps the most remarkable form of exchange in the Americas because of its widespread distribution. Before 300 ax-monies were produced of arsenical bronze in southern Ecuador and northern Peru. After 950 copper-arsenic alloys were being used in these same regions. It is thought that Batán Grande on the north coast of Peru was a primary production center for arsenical bronze, which was then exported to Ecuador in the form of ingots.

The discovery of ax-money in western Mexico reveals the long-distance trade that took place along the Pacific coast between these two regions of the Americas. After 1200 ax-monies of arsenical bronze were produced in western Mexico and Oaxaca, although the copper-alloy axes were the most common in Mesoamerica and the Andes. Interestingly, the form, a rounded T-shape, occurred in Ecuador and Mexico. In both regions metalsmiths created the alloyed metals and poured the molten metal into a mold. To shape and harden the metal, the ax was alternately cold-hammered, annealed (heated), and cold-hammered again until it reached the desired thinness and strength. The Aztec nobles who informed Bernardino de Sahagún illustrated the text with depictions of the production of axes, showing the furnace and molten metal poured into the mold. Sahagún seems to have interviewed a metalsmith, for he records the words of his infor-

mant as follows: “I cast copper. I liquefy copper. I spread it. I alloy it. I solder it. I add tin to it. I harden it.”

The axes were traded as currency or as an indicator of value in South America. In Mexico the ax-monies not only were collected in tribute but also were repositories of the metal itself. It seems that the axes carried powerful symbolism. In one Mayan creation myth the copper ax was thought to hold up the sky. Axes appeared before the Spanish conquest in codices from the eastern Mixteca-Puebla region, where they were held in the hand of the rain god, Tlaloc, and of the god of the dead, Mictlantecuhltli. In one history produced soon after the Spanish conquest the *Relación de Michoacán* (1539–41), the author records that axes were carried in procession as symbols of royal power.

One of the people Sahagún interviewed indicates that gold was the most desirable, or “cherished,” among metals. He speaks of gold to Sahagún: “It excites one; one is provided solace; it provides restitution. . . . It is one’s lot, the property of the lords, the property of the ruler.” Such slender clues are all that remain for historians as they attempt to find evidence of the use of currency among the peoples of the Americas. Taking into account the archaeological record and the early colonial writings of Sahagún and others, it would seem that emblems of value, like jade, feathers, cloth, copper axes, and gold, were hoarded and traded among rulers and the elite. These transactions could be characterized as high-level bartering. Cacao may have been the only true currency, used by the powerful and subservient alike. The best evidence for this conclusion comes from the second letter Hernán Cortés (1485–1547) wrote the Spanish king: “Cacao is a fruit like the almond, which they grind and hold to be of such value that they use it as money throughout the land and with it buy all they need in the markets and other places.” Cortés later paid some of his soldiers with cacao beans.

ASIA AND THE PACIFIC

BY KENNETH HALL

Cowrie shells imported from the Pacific Ocean region were the earliest form of Chinese money. These shells were strung in units of 10 or 20 and called peng, which were used continuously in various levels of exchange throughout Asia and the Pacific in the medieval era. In the seventh century copper coinage became the marketplace exchange standard and was supplemented by locally minted gold, silver, iron, lead, and pottery coins of varying value. Under China’s Tang rulers (618–907) the cast copper qian became the monetary standard. The qian was a round copper coin with a square hole in the center, weighing one-tenth of a liang or tael (about 1.4 ounces). They were also strung together, which served as a

convenient way to carry and quickly count the coins. Song China’s (960–1279) official rate of exchange was 1 liang of silver to 1,000 copper coins and 1 liang of gold to 10,000 copper coins, although this rate of exchange was subject to a metal’s market value.

Japan’s minted currency between 708 and 958 was modeled after China’s qian, consisting of bronze coins valued at one mon each and equivalent to the qian relative to market value. From 958, when domestic mining ceased owing to internal political conflict, until 1587, when powerful samurai lords began to issue their own gold, silver, and lead coins, the Japanese economy depended on imported Chinese cash mixed with locally minted copper coinage that was the qian equivalent. Korea used minted cast-iron coins patterned after Chinese copper cash from 996, but because these coins were less accepted than Chinese qian coins, the Korean iron coinage was replaced by locally minted copper coins until the early 17th century.

Paper currency developed in 11th-century Song China as a solution to the local shortage of copper for the minting of coinage and as a marketplace convenience in an era of widespread economic prosperity. Paper money issued by the Song government had its roots in “flying cash,” which developed during the Tang Dynasty out of the need to avoid the hazards of robbery during transport and the inconvenience of carrying strings of metal coins in that era’s widespread tea trade and tax collections that required cash payments. Because of their weight, it was difficult for an individual to carry more than three or four strings on their person. The flying-cash system allowed merchants to make monetary payments at the Tang capital and receive certificates of deposit from the government in return, which they could present at any provincial treasury to draw the equivalent sum in coinage. Song Dynasty rulers implemented a “money of convenience” system, which also allowed payments at the imperial capital that could be drawn upon in the provinces.

In addition to these currency reforms enacted by the Song government, in the same period private merchant houses issued paper credits: “deposit shops” stored cash, gold, and silver for a fee and honored checks drawn against these funds by the depositor. Goldsmiths and silversmiths also issued promissory notes that were accepted in marketplace exchanges. Eventually, wealthy urban merchants commonly agreed to print monetary notes denoting equivalent values to strings of cash. This new money used a common kind of paper, designs featuring buildings, trees, men, and other objects, and the notes contained the seal of the shop of issue to create a sense of unity and trust among their users. Interlocking red and black marks denoted authenticity, as a check against counterfeiting. Merchants readily accepted these notes and converted

CHINESE COINAGE

The Chinese emperor Gaozu (r. 618–26) was the first ruler of the Tang Dynasty and the man who was responsible for introducing the Chinese system of coinage, which was followed to the end of the 19th century. Bronze coins were cast with holes in the middle, which allowed them to be strung together, with 100 of them forming a ch'ien. On occasion, strings would consist of 95 to 98 pieces. Between 700 and 2,000 ch'ien equaled a tael of silver, depending on market conditions and the quality of the silver. The coins of Gaozu and his successors featured four characters, which included the name of the emperor and the year of his reign; later Tang coins sometimes included the location of the Imperial Mint, which was at Layang in Honan Province. Initially it was difficult to ensure complete uniformity of the money in terms of its casting, but this was finally achieved during the early years of the Song Dynasty. The emperor Xiaozong (r. 1162–89) introduced the system in 1180, by which his name was on the inscribed on one side of the coin and the regnal year on the reverse.

When the Mongols captured Peking (modern-day Beijing) in 1213, they and their successors of the Yuan Dynasty, notably Kublai Khan, issued very little new bronze or copper coinage, with most people preferring to conduct transactions with paper money, described by the Venetian traveler Marco Polo. The Ming Dynasty that began in the 14th century returned to the Song custom of issuing coins, with additional characters on the reverse to indicate the place of minting and the coin's value.

them into metallic cash in return for a 3 percent fee for each 1,000 coins exchanged.

In times of perceived financial crisis there were runs on these shops, which were vulnerable to shortfalls. In such times the shops would barricade their doors, causing periodic distrust in this particular financial arrangement. The Song government intervened in 1022, replacing the preexisting systems by standardizing and regulating their realm's monetary system by the issue of government paper currency backed by the public's deposits and cash reserves in a system similar to the U.S. Federal Reserve monetary system.

Because the money quickly wore thin and to prevent counterfeiting, the first Song paper money stayed in circulation three years and then was recalled to be exchanged for

new notes or coins. Song paper currency was initially issued up to a specified value limit on the total money in circulation. At first, when there was mixed use of paper and copper cash currency in business and everyday monetary exchanges, the system worked. In the 12th century, however, when the Song faced exceptional military expenses defending China's northwestern frontiers against barbarian invasions, the Song government issued 10 million unbacked notes, which were worth about half the current strings of cash then in circulation. Owing to subsequent inflation, the Song treasury reduced the value of the paper currency so that 1,000 units of currency had the buying power of between only 940 to 960 units.

In the post-Song era the new Yuan rulers did not issue a common paper currency. Instead, from the late 13th century they instituted "commodity bills" for tea, flour, bamboo, and wine sales and purchases; teahouses, wineshops, bathhouses, and brothels in the larger cities issued handwritten paper, wooden, or bamboo tallies against prepayments of cash or as tabulations of debt. By the late 15th century the reissue of paper currency became a hopeless quagmire under the mismanagement of the Ming bureaucracy. In the end what had been the Song Dynasty's well-intended issue of paper currency in an attempt to maintain Chinese productivity in the face of a copper shortage became a bureaucratic nightmare.

By the 12th century regional Indian currency was a mixture of commodities, including gold and silver, although rice was the frequent standard of reference in marketplace transactions. For example, in 11th-century southern India, one kalanju (about 0.11–0.13 ounces) of gold was consistently quoted as equivalent to 16 kalam of rice; by the next century, as the result of inflation caused by increased availability of rice, 13 kalam of rice equaled only one kasu (roughly half the value of a kalanju of gold). The silver kalanju coin was the equivalent of the gold kalanju in 11th-century transactions, but in the following century it was worth only one-half to one-quarter the value of a gold kalanju coin because of the rulers' devaluation of the precious metal content of silver coins and an increased local preference for gold over silver. By the 13th century gold kasu coins were replaced by copper kasu coinage, valued at roughly 411 copper kasu to one gold kalanju. In addition, a new copper coin was issued, called the fanam, which would be the subsequent market standard in southern India. In contrast, from the 16th century forward the rupee was the market standard in northern India.

Modeled on the round coinage of the Gupta Empire (ca. 320–550) in northern India, which depicted images of Hindu deities and accompanying inscriptions, from the sixth century southern Indian coins included symbols and images but of an imperial rather than religious nature (fish, tiger, bow), the name of the reigning monarch, and the crests of



Gold coin; Tughluq Dynasty, India, 1325-26 (Arthur M. Sackler Gallery, Smithsonian Institution, The Catherine and Ralph Benkaim Collection, S1999.18)

conquered populations acknowledging the monarch's accomplishments, and they were widely circulated throughout his realm, not just in a specific area that had been conquered. These were conspicuous statements of political legitimacy, personalizing the role of the ruler as the source of societal prosperity. Archaeological and inscriptional evidence indicates that monetized exchange, using copper coinage for minor transactions supplemented by silver and gold coinage for more expensive purchases, had become the marketplace norm by roughly 1300 throughout India.

Some historians address the economic consequences of this shift to copper coinage, citing the importance of this lower-denomination monetization as evidence of a growing marketplace economy, the need for smaller denominations for smaller purchases by a growing number of less wealthy people who were taking part in a currency-based and not barter-based economy, and overall societal prosperity. Others assert that the use of copper coinage demonstrates a political evolution: More mature political systems needed lower denomination coinage for the regularization of their collections of taxes. Smaller coinage units made possible the collection of the increasingly minute tax assessments in annual tax payments.

Differentiated coinage also supported the state's demand that taxes be paid in cash rather than in kind, and it allowed the state to transport, bank, and redistribute collected funds rather than having to store grains and other local production, which were subject to the vagaries of rot, mold, fire, flood, and other natural disasters. These monetary revenue

assessments are thought to have been beneficial to society by forcing rural laborers to innovate and produce agricultural surpluses, cash crops (for example, tea and pepper), and handicrafts (for example, cotton) to pay the increased state assessments rather than go into debt. Consequently, there was widespread opportunity to achieve a higher standard of living, which led to increased participation by commoners as recorded donors to Hindu and Buddhist temples that had previously been sustained by wealthy landholders and state elite.

Owing to local participation in the Indian Ocean trade network, use of local- and foreign-minted metallic coinage was widespread in the coastal regions of Southeast Asia from Roman times. In the post-500 medieval era the use of coinage was associated with the development of new states based in the prosperous agricultural plains of Myanmar (Burma), Cambodia, Thailand, and Java. From the sixth to the ninth centuries locally minted high-denomination silver coinage prevailed in donations to Hindu temples and Buddhist shrines. However, from the ninth to the 15th centuries, while silver remained the monetary standard, Chinese copper coinage was widely used in marketplace exchanges in an age when China regularly ran trade deficits and paid for its imports with an outflow of copper cash that was distributed along the international trade routes as far west as Africa. In Vietnam direct Chinese cultural influence resulted in the use of the Chinese monetary system; in other locales, such as Pagan, Myanmar; centers of Thai society; and Angkor, Cambodia, there were a variety of exchange options.

Ma Huan, a Chinese scribe who traveled throughout Southeast Asia in the early 15th century, reports that copper cash was widely used among the various countries he visited, especially in Java and the Strait of Malacca region. However, he reports that copper cash was not widely used in the mainland countries. Inscriptional records support his report. In Pagan from 1100 to 1300 a klyap was the silver standard (1 klyap equaled roughly one-half an ounce of silver; 12 klyap of silver purchased 1.5 units of gold; 3 klyap purchased roughly 53 ounces of copper), although in some transactions rice and cloth were the preferred units of value. By the end of the 12th century silver ingots were weighed and given at each transaction, and silver ingots were used as the currency standard by which to measure value and as the base medium of exchange, although in smaller transactions the value was based on rice and copper khwak. The predominant use of silver depended on local preference and access to the "Great Silver Mines" (Bawdwingyi) located in the northeastern Shan hills. Local land taxes were collected in rice, copper, or cloth; when lands were not in production agriculturalists had to pay their taxes in cloth. In contrast, skilled artisans received payments in

silver when they were involved in substantial transactions, including the building of temples.

Neighboring Angkor also used silver ingots as a medium of exchange and as a measure of value and used cloth and rice as transaction standards as well. Locally silver was valued in tamlin units, and cloth was valued in longer (yau) or shorter (ulah) lengths. Cloth and silver were interchangeable as measures of value and units of account in all exchanges, including land and slave transfers. In small exchanges rice, grain, and Chinese copper coins were the norm. A Chinese visitor around 1300 reported that the value of hemp cloth was the standard used in local marketplace transactions for large transactions and silver and gold in major exchanges, including the purchase of expensive imported cotton and silk textiles. At that time a slave was worth up to 100 pieces of cloth, in contrast to previous times when 30 to 40 pieces was the normal rate of exchange.

EUROPE

BY ALAN M. STAHL

Although much of the medieval economy was based on barter or payments in agricultural produce, coinage was present in all periods and regions of Europe during the Middle Ages. In the period of transition from the late Roman Empire, coinage in Byzantium continued the Roman traditions, while that of Europe was primarily of gold and was restricted to large transactions. With the dawn of the Carolingian age, around 800, Europe's coinage shifted to the silver penny, and coins became more common. During the late medieval period and early Renaissance, from about 1200 to 1500, European coinage circulated in a variety of metals and denominations and was universal throughout the economy, while Byzantine coinage suffered from the political and economic contraction of the empire. In Renaissance Europe other forms of money, such as credit and letters of exchange, supplemented the supply of coinage.

Like most aspects of life, coinage in the early medieval period represented a partial continuation of that of the late Roman Empire. Byzantium, its successor in the east, maintained the Roman system of coinage in three metals: gold, silver, and bronze. Of these three, only the gold coinage was continued in a significant fashion by most of the European states that succeeded the Roman Empire. Silver and bronze coinages were characteristic of the Ostrogothic and Vandal kingdoms but not of the others.

The principal late Roman denomination of gold coinage was the solidus, which was of pure (24 carat) gold and weighed just under one-sixth of an ounce; the solidus was accompanied by the tremissis, a coin one-third its weight. It

was the tremissis that became the most common gold coin of early medieval Europe. The late Roman silver denomination that carried over into the Middle Ages was the siliqua, which weighed about one-twentieth of an ounce. The late Roman bronze coinage was of a very diverse nature, as was that of the few early medieval kingdoms that issued bronze coinage.

Byzantine coinage is considered as having started with the reforms of the emperor Anastasius (r. 491–518). The most prominent feature of these reforms was the creation of the bronze follis and its divisions and the establishment of a fixed ratio between it and the gold solidus. In succeeding reigns the gold solidus remained unchanged in standard but was joined by coins of similar appearance with lower weights, which may have been intended mainly for trade. Copper coins steadily declined in weight, and silver issues became erratic in standard and quantity. In the wake of the loss of much of its territory as the result of the Muslim conquests of the sixth and seventh centuries, Byzantine minting was eventually restricted to Constantinople and a few minor Italian mints.

The most direct European heirs of the Roman coinage tradition were the Ostrogothic kings of Italy of the sixth century, who issued coins of a wide variety of denominations with an appearance that maintained the traditions of the Roman mints. The Ostrogothic gold solidi and tremisses generally bore the name of the contemporary Byzantine emperor with at most a monogram to indicate the Ostrogothic king responsible for their minting. The kings did, however, put their own names on many of their silver and bronze issues. There was a similar coinage in the Vandal kingdom of North Africa in the same period. Lombard rulers replaced the Ostrogoths in Italy after a brief period of Byzantine reconquest in the sixth century and issued mainly gold coins imitating in an increasingly stylized manner those of the Byzantine emperors.

The Visigothic kings who ruled the Iberian Peninsula in the sixth and seventh centuries issued a coinage mainly of gold tremisses. Like the Ostrogoths, they put the name of the Byzantine emperors on their sixth-century coinage, but at the end of the century they began to put the names of their own kings on their coins. This coinage ended with the Muslim conquests of the early eighth century.

The Merovingian Franks, who ruled what was to become France as well as parts of the Low Countries and Germany, also mainly issued gold tremisses bearing the name of a Byzantine emperor in the sixth century. This changed in the seventh century when most of their coins bore the name of a mint city on one face and that of a minter on the other. In the course of the seventh century the Merovingian tremisses became debased and gradually became silver rather than gold. The coinage of Frisia, on the European side of the English Channel, and Anglo-Saxon England was based on that of the

Merovingian kingdom and likewise changed from gold to silver in the course of the seventh century.

The most significant changes to the Byzantine coinage in the eighth through 12th centuries were in the gold issues, which changed in content and appearance. Originally of 24-carat metal, Byzantine gold coins underwent a series of debasements until by the 11th century they contained no more than 8 carats, or one-third gold and two-thirds silver. In the same period they became broader and went from being flat to concave. Silver coinage continued to be erratic in standard and was in most periods rare. Copper coinage was plentiful, especially the *folles* denomination. Beginning in the late ninth century *folles* ceased to bear the name of the emperor, and the large series of anonymous *folles* of the 10th and 11th centuries had mainly Christian religious images and legends.

In Europe the coinage of the central Middle Ages was almost entirely in silver and of a single denomination, the penny. This coinage grew out of the debased *tremissis* of the seventh century in France and England. In the late eighth century Charlemagne on the continent and Offa in England reformed the coinage to create pennies of consistent standard and appearance. The penny denomination spread to Italy and beyond the limits of the ancient Roman Empire as coinage expanded across the continent. By the 12th century silver pennies were issued by hundreds of mints throughout Europe, and each mint used its own images and standards of weight and fineness. Although pennies were the only coins regularly minted, they were recorded by the terms *shilling* for 12 pennies and *pound* for 240 pennies.

In England the issue of pennies remained in royal control and continued the ancient Roman practice of featuring the image of the ruler on the obverse (the front of the coin).



Pottery money box; London, 1300s (© Museum of London)



Silver penny of King Alfred; Britain, ca. 886–99 (© Museum of London)

In France royal issues were only a small part of the coinage after the breakup of the Carolingian Empire in the ninth century; coins of seigneurial rulers and of bishops and abbots predominated. In Germany the coinages of lords below the imperial and royal levels were also of great importance; a special class of German pennies was the 12th-century *bracteates*, which were very broad and thin silver pennies whose artistic images were stamped on one side only. In Italy the coinages of communes (self-governing towns) were the main issues of the central Middle Ages; the most apparent development among their pennies was the frequent debasements that brought some of them to be mostly copper by the 12th century. Pennies of the new states of Scandinavia and eastern Europe were usually royal in origin, while those of the crusader states of the Levant and Greece generally followed the seigneurial model familiar to the French settlers who made up much of their ruling class.

The debasement of the Byzantine precious metal coinage was brought to an end by the reforms of Alexius I Comnenus (r. 1081–1118) at the end of the 11th century. Instead of a system of coins of pure gold, silver, and bronze, the late Byzantine coinage was based on a series of denominations of alloys of the three metals, with the highest-value coin being the *hyperpyron* of about 85 percent gold and 15 percent silver. The coins of all denominations remained concave. No coinage was minted in the names of the Latin rulers who conquered Constantinople in 1204, though some imitations of

earlier Byzantine coins are attributed to them. The rival empires in exile, especially that of Nicaea, continued the earlier Byzantine coinage systems, which they maintained after the recapture of Constantinople in 1261 and for the most part until the end of the empire in 1453.

The expansion of the denominations of European coinage beyond the silver penny began in Italy, which had the closest ties to Byzantine and Islamic traditions of multimetallc coinage and where the penny had reached the lowest level of silver content. Norman kings of Sicily in the 12th century produced large silver and gold coinages that served as the inspiration for new issues of northern Italian minters. At the end of the 12th century Venice produced its groat, a large fine silver coin worth 24 of its base pennies; the example was soon followed in Tuscany and in other Italian mints. In 1252 Florence and Genoa each introduced a gold coinage (the florin and genovino, respectively), which set the standard for the Venetian gold ducat introduced three decades later. In the Italian merchant cities the gold coinage was maintained unchanged over time, and market forces were allowed to set its value in terms of the local silver issues.

France and England also introduced large fine silver coins and gold coins in the 13th century, but the royal minters sought to keep all of the denominations in a fixed ratio of values, necessitating frequent changes in the weight of the issues of the English gold noble and the French ecu. In France kings of the 14th and 15th centuries sought added minting profits by debasing the silver issues, producing an ever-changing monetary standard. Large silver and gold coinages were widely minted in central Europe in the Late Middle Ages, especially after the discovery of rich silver deposits in Bohemia and gold in Hungary.

A negative balance of trade in the Late Middle Ages appears to have drained much of the gold and silver from Europe through Muslim lands to eastern and southern Asia, creating a European bullion shortage that was not fully alleviated until the arrival of supplies of gold and silver from the New World in the 16th century. In the meantime the development of nonmetallic money in the form of bank credit and letters of exchange compensated to some extent for the shortage of coinage.

THE ISLAMIC WORLD

BY MUHAMMED HASSAN ALI

In the early days of Islam silver Sassanian coins and gold and copper Byzantine coins were used as local currency. In 697 the caliph Abd al-Malik (r. 685–705) minted the first Muslim coins devoid of figurative representation. He then issued a decree making these coins the only allowable currency in the land. All other coins were to be handed over to the treasury

to be melted down and restruck. Those who did not comply faced the death penalty. Abd al-Malik's coins used quotations from the Koran as the main design element; hence each piece carried a message of the faith. Abd al-Malik's coinage resulted in a new, distinctively Muslim numismatic type that set the Muslim Empire apart from both its non-Muslim neighbors and its pre-Muslim past. As the most frequently seen product of the state and the official affirmation of the faith, its politics, and its economy, coinage played a vital role in asserting Islam's uniqueness and the legitimacy of its rule.

Although changes were to take place in succeeding centuries, the main elements that characterize Muslim coinage were now in place. Generally, the obverse (front) of the coin had a text stating the unity and uniqueness of God. The reverse bore a statement of Muhammad's role as the messenger of God. The mint and date were inscribed on most coins. The standard denominations for traditional Muslim coinage were the dinar in gold (based on the Byzantine gold solidus—the name derives from the old Roman silver denarius), the dirham in silver (based on the Sassanian silver drachm), and the bronze fals (based on the Byzantine bronze follies).

The mint was responsible for ensuring the purity and weight of the coins. At the mint obsolete coins (either foreign coins or coins from previous governments) and bullion were examined to determine purity. They were then heated and refined to conform to the established alloy standards. After smelting and casting, the ingots were rolled out and cut into disks. Each disk was then placed on the obverse die, and the reverse die was set on top. Finally, the top side of the die was struck with a mallet, impressing the design clearly on both sides of the coin. A bronze die set could be used several thousand times before it had to be discarded.

The metals used in Muslim coins were gold, silver, and copper. The alloys of gold and silver were generally of high purity. The principal source of gold for the Muslim world was Africa, coming to the heartlands through the trans-Saharan trade route. Apart from a small amount that was cast into ingots in Timbuktu, gold was carried as gold dust and made into dinars in the North African mints. The regions that were to benefit most from the expansion of the gold trade were the cities of North Africa and Muslim Spain.

The principal silver mines in the Middle East were in Transoxiana and the Hindu Kush. In about 1000 the Muslim world experienced a silver shortage, and silver coins virtually disappeared from circulation. The Ayyubids (1169–1260) started issuing silver coins, and by the mid-13th century silver was again plentiful. This time silver came from Europe (with the crusaders) and from the silver mines in Anatolia.

Generally, medieval Muslim coins indicated the place and date of their mint, the name of the ruler, his father's



Silver dirham coin; Anatolia, 1242–43 (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA (M.2002.1.143))

name, and the name of his heir apparent or envoy. When a new caliph came to power, he had a new coin struck in his name to make the change of rule official. When a revolt took place, the leader of the uprising would establish himself by immediately substituting his own name on newly minted coins. Sovereignty was expressed by the right of *sikka* (the ruler's name on coinage).

In an age before newspapers, radio and television, the mosque and coinage were the primary means of communi-

cation between a ruler and his people, and statements made through both media had the power of law behind them. Allah's protection was invoked for the well-being of the sovereign, whose name was proclaimed by the preacher) during his sermon. In daily life coins bearing the sovereign's name reminded his subjects of his power and responsibility for their economic needs. A change of ruler was made official when the new ruler was first mentioned publicly in the sermon and when coins were issued in his name. Thus, coinage performed the dual function of proclaiming religious affiliation and publishing the current state of political life.

From the earliest times it was clear that a certain unease existed over the power of money. There are repeated warnings in the Koran about money's transient nature: "Woe to every kind of scandal monger and backbiter who piles up wealth and lays it by thinking that his wealth can make him last forever." Added to this concern was an anxiety about the insidious tendency of money to distract the believer from the "true path." The caliph had to reconcile the competing religious demands with more temporal concerns—a tension that was reflected in Islamic attitudes toward money. The system of ethics established under Islam had to be reconciled with the needs of an earthly community and the monetary requirements of the state.

As a consequence of this unease about the power of money, religious scholars attempted to regulate money's influence and to prescribe certain conditions according to which believers could possess money and remain ethical. One of the principal conditions was to give *zakat* (alms tax). Interest was prohibited according to Islamic law, as was the use of promissory notes as a medium of exchange (hence the aversion to paper money).

While the "canonical" exchange rate was 10 silver dirhams to one gold dinar, the going rate was determined in the

VARIATIONS FROM "STANDARD" COINAGE

While the use of figural imagery was discouraged, there are a number of interesting exceptions in coins that illustrate variations from strict adherence to the letter of religious law. Many of the images were common to contemporary Muslim art and were designed for secular contexts, such as metalwork and ceramics. For instance, during the 12th and 13th centuries in the region covered by northern Syria, northern Iraq, and eastern Anatolia there appeared a fascinating and unique series of bronze coins struck by a number of dynasties of Turkoman origin. These coins contained designs coming from a complex and disparate range of sources. The earliest coins bore Byzantine Christian imagery, such as an enthroned Christ and Saint George and the dragon. From the mid-12th century coins with ancient Hellenistic and Sassanian portrait heads appeared concurrently with others showing various astrological symbols. It may be that the appearance of these coins is evidence of a politically motivated antiquarian interest in the past civilizations of the region. The Seljuks of Anatolia under Kaikhosru II (1237–46) adopted on their silver coins the image of a lion and sun (representing Leo) and used ancient Persian names, features that have been ascribed to a revival of Persian interest at this time.

marketplace by supply and demand. This rate fluctuated from as low as 7 to as high as 14 dirhams to the dinar. Despite religious regulations, Muslims developed a number of financial instruments to facilitate international trade. Concern about the ethics of financial transactions led to the development of the post of the *muhtasib*. The *muhtasib* was a functionary of the state and was appointed by virtue of his high moral integrity and knowledge of Islamic law (sharia). His role was to make sure that in all areas of commerce the sharia was upheld. Thus, he would check weights and measures, and even test for counterfeit coins. He made sure that merchants did not charge interest and dealt severely with hoarding.

Coins were not the only means of payment. Something similar to modern checks was also used. The word *check* derives from the Arabic word *saqq*, which refers to a written vow to honor the payment for merchandise when the trade destination is reached. Medieval Muslims used a “banking system” that allowed a merchant in Canton China to draw from his account in Baghdad. The use of *saqq* was born out of the need to avoid having to transport large sums of coins, owing to the dangers and difficulties of long-distance travel. Traders used *saqq* as bills of exchange, promissory notes, and letters of credit to facilitate commercial activity, making transcontinental trade possible.

On special occasions, such as the end of the Ramadan (the month of fasting), rulers might distribute coins among the people as largesse. In Fatimid Egypt the caliph specially minted gold *kharubas* (tiny gold coins) for distribution to state servants on such occasions. In Iran coinlike tokens were frequently distributed at weddings. Coins were often pierced and sewn onto women’s clothing. The range and amount would be an obvious status symbol for the woman’s family.

In the early 13th century the nature of the coinage changed substantially. The most conspicuous change was the use of pictorial types and noncircular frames and borders (such as the six-pointed star of Aleppo and the square of Damascus). By the 13th century the Muslim lands had been carved into many dynasties, each producing its own coinage. Initially, they acknowledged the nominal leadership of the caliph but later became completely independent. The Fatimids were the first to depart from classical coinage. Caliph al-Muizz (r. 953–75) introduced coinage that carried a clear Shia message. From then on Fatimid coins carried distinctly Shia proclamations. Fatimid coins had three concentric circles and the words “Ali is the Friend of Allah,” a typical Shia proclamation. During the apogee of the Fatimid Caliphate these coins became the most widely used trade coins of the Mediterranean world.

Due to a silver shortage in the East, the Seljuks issued large copper coins. They also borrowed designs from ancient

Greek and Roman, Sassanian, and Byzantine sources. The Seljuks of Asia Minor (12th–13th centuries) had silver coins showing a horseman with a mace over his shoulders or a lion and sun. Farther east the Ghaznavids (10th–12th centuries) struck coins with Sanskrit inscriptions.

The Mongol destruction of Baghdad in 1258 meant the effective end of the Abbasid Caliphate, but in 1261 Baybars (r. 1260–77) installed one of the few surviving Abbasids as caliph in Cairo. The move symbolically established the Mamluks as the leaders of Sunni Islam, though the caliph exercised no real power. On the obverse of their coins was the full name and titles of Baybars over an image of a lion; a figural image included on the coin, and the name of the caliph was not mentioned. The Almohads, who succeeded the Almoravids in the 12th century, introduced new coinage; notably, their dirham was square.

The Nasrids were the last to mint Muslim coins in al-Andalus. These coins were carefully struck and bore long legends containing passages from the Koran and genealogies of the rulers. The Nasrid coins did not show a date, but they are identifiable by the motto “None victorious save God.” Nasrid coins had a square within a circle (a common feature in coins from North Africa and Spain from the 12th through 15th centuries).

In the 13th century the Mongols swept through Asia. The khans of the Golden Horde issued an extensive series of small silver coins. The Ilkhanids of Persia struck large coins. In the 14th century Timur (1336–1405) revived the power of the Mongols and struck silver and copper coins. Timurid coins on the obverse featured the profession of faith with the names of the first four caliphs in the margin.

The Safavids were Shiites, and this adherence facilitated their distinction from the Sunni Ottomans to the west and the Sunni Uzbeks and Mughals to the east. On the obverse Safavid coins featured the profession of the faith followed by the Shia allegiance, “Ali is the Friend of God.” Around the margin were the names of the 12 imams. On the reverse was a characteristic Safavid honorific, proclaiming the king as “the servant of the King of Holiness.”

Original Ottoman coinage consisted of small silver coins. A notable Ottoman innovation was the *tughra*, an elaborate monogram formed of the sultan’s name and titles, which occupied one side of the coin. The Ottoman imperial *tughra* was also on all official documents.

See also ART; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; GOVERNMENT ORGANIZATION; LAWS AND LEGAL CODES; METALLURGY; MINING, QUARRYING, AND SALT MAKING; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WEIGHTS AND MEASURES.

Europe

~ “The Value of Foreign Coin in England” (1266) ~

Kinds of silver, namely: of Montpellier which is so good that an examined pound failed of full measure by one penny or two at most. The same for the silver of Eregha. The silver of Fugacio from which place the pound failed by four pence at most. The silver of Vrucela and of Flanders whence the pound failed by four pence. Silver of Verona; the pound usually lacked twelve pence. The silver of Valencia failed by eight pence; silver of Pampeluna, the pound lacked two pence. And all these things have been decided on the scales.

Concerning the denarii of Venice: a pound was under weight only by one penny. The same for the money of Genoa. Likewise those of Montpellier of Spain. The legal money of Cologne: a pound lacked six pence. The false money of Cologne: whence a pound failed by three shillings. The Brussels pound is commonly short three shillings. The Marseilles pound lacks six pence. But in

these things the money-changer is watchful so that he may buy a pound of whatever silver he pleases according to what returns a better profit to himself rather than to what will redound to the profit of the king, wherefore the latter receives a fixed payment of ten pounds. Wherefore, whether the money-changer is industrious or not the profit and not the loss will be the king's. But the king will not suffer from lack of diligence. Moreover, from silver vessels the money-changer receives thirteen pence for each pound; and similarly from gold vessels. And if these vessels are intact and exposed for sale, what can be sold for profit over and above the weight ought to be sold. And likewise concerning the profit on gold vessels when a gold cup is sometimes worth more than its weight by twenty shillings, or one mark, or ten shillings.

From: Hubert Hall, ed., *The Red Book of the Exchequer* (London: HMSO, 1896).

Europe

~ Charles the Bald: Excerpt from
the Edict of Pistes (864) ~

C.8. It is ordered that denarii of all kinds, of proper weight and full content, just as is contained in the capitularies of our predecessors and royal progenitors, in the fourth book, the thirty-second capitulary, should not be rejected until Martinmas . . . nor should good denarii be rejected, but they should not be accepted unless properly and well weighed. . . .

C.10. And from the time of the feast of St. Martin throughout our whole realm, no denarii, except those of our new mintage should be accepted. And from that day any one who produces another denarius for a business transaction should be deprived of it by the count or other official, just as is contained in the second book of capitularies, in the eighteenth chapter.

C.11. And on the denarius of our new money there should be on the one side our name in a circle and the monogram of our name in the center, and on the other side the name of the state and a cross in the center.

C.12. Following the custom of our predecessors, just as it is found in their capitularies, we decree that in no other place in all our kingdom shall money be made except in our palace, and in St. Josse and Rouen, which right in the past belonged to St. Josse, and in Rheims, Sens, Paris, Orleans, Chalon-sur-Saone, Melle, and Narbonne.

C.13. And those who have control of the money, with no desire for favor or gain, should select faithful coiners, as if they were seeking our favor and the grace of God. And the coiners should themselves take oaths that they will perform their office faithfully, as well as they know how. And they should not coin a denarius of mixed metal nor one of light weight, nor should they consent to such a thing. And, without any deception or evil disposition towards those whose silver they accept for purifying, they should cleanse the silver, and without practicing any deception in weighing it, they should change the purified silver into denarii. If

it be reported that any one has acted contrary to his oath, he will be tried by the judgment of God; and if it be proved that he acted contrary to his oath he will lose his hand just as was decreed for false coiners in book four of the capitularies, chapter thirty-three, and as a sacrilegious person and despoiler of the poor he will be subjected to public penance by order of the bishop;—for he committed no greater fraud if he coined a denarius of mixed metal or of light weight

than he would have done by taking the silver of the State, or of the Church, or of the poor, in purging and coining silver with evil intent. In those regions where trials are conducted according to Roman law, he will be tried in accordance with that law.

From: Roy C. Cave and Herbert H. Coulson, eds., *A Source Book for Medieval Economic History* (Milwaukee: Bruce Publishing Co., 1936).

FURTHER READING

- Michael Broome, *A Handbook of Islamic Coins* (London: BA Seaby Publications, Ltd., 1991).
- G. S. P. Freeman-Grenville, "East African Coin Finds and Their Historical Significance," *Journal of African History* 1 (1960): 31–43.
- Philip Grierson, *The Coins of Medieval Europe* (London: Seaby, 1991).
- Philip Grierson, *Byzantine Coinage*, 2nd ed. (Washington D.C.: Dumbarton Oaks, 1999).
- Kenneth W. Harl, *Coinage in the Roman Economy, 300 B.C. to A.D. 700* (Baltimore: Johns Hopkins University Press, 1996).
- Ross Hassig, *Trade, Tribute, and Transportation: The Sixteenth-Century Political Economy of the Valley of Mexico* (Norman: University of Oklahoma Press, 1985).
- Dorothy Hosler, *The Sounds and Colors of Power: The Sacred Metallurgical Technology of Ancient West Mexico*. (Cambridge, Mass.: MIT Press, 1994).
- Nicholas M. Lowick, *Islamic Coins and Trade in the Medieval World*, ed. Joe Cribb (Aldershot, Hampshire, U.K.: Variorum, 1990).
- Richard J. Plant, *Arabic Coins and How to Read Them*, 2nd ed. (London: Seaby, 1980).
- Peter Spufford, *Money and Its Use in Medieval Europe* (Cambridge, U.K.: Cambridge University Press, 1988).
- Robert S. Wicks, *Money, Markets, and Trade in Early Southeast Asia: The Development of Indigenous Monetary Systems to A.D. 1400* (Ithaca, N.Y.: Cornell University Southeast Asia Program, 1992).

► music and musical instruments

INTRODUCTION

When studying medieval music and musical instruments, it may be best to begin by understanding that the terms *music* and *musical instruments* had different meanings in different cultures; indeed, in some cultures there were no words for them. Many North American cultures, including the Inuit, had no word for music or the general concept of music. On the other hand, many western and central African cultures, such

as the Yoruba, Igbo, and Hausa, had no word for music but understood the concept of music. Some medieval languages, such as those of the Czechs and some South Americans, had no general term for music but had terms for either vocal or instrumental music. For instance, the Czechs could speak of *hudba*, meaning "instrumental music," but could only infer the idea of vocal music in its relation to *hudba*.

Music theorists have struggled for a definition of music that would apply to all cultures, even those that had no words for music or musical instruments. Two definitions stand out and are similar to each other: "sound organized in time" or "sound and silence organized through time." Both definitions function fairly well as generalizations but can give one trouble if they are applied to specific cultural practices. A key element of the second definition is the addition of "silence," which works well for musical compositions that include pauses that match the beat of the piece. A general observation that seems applicable to all cultures is that whatever the musical form, musicians distinguish between sounds that are acceptable for music and sounds that should be excluded from music. To observe how what to use and what not to use in music vary among cultures, one need only listen to Chinese classical opera and then to a medieval European madrigal. What musicians would accept as musical notes varies enough between the two that they sound almost nothing alike, but both are music. Indeed, what one culture regards as sophisticated music expressing ideas and emotions may sound as though it is only noise to members of another culture.

Music has qualities that are important to people, qualities that resist efforts to stamp them out. Among some Muslim schools of thought, music should be forbidden because of negative passages about it in the Koran and in the Hadiths, accounts of Mohammed's life and sayings. Still, music persisted in being part of popular culture in the Islamic world throughout the medieval era, and in places such as Afghanistan, Turkey, and North Africa, it was regarded as an im-

portant expression of national identity. On the other hand, in China music was often regarded as perhaps the highest of arts. Confusing the issue in China, the Islamic world, and other cultures was the ancient practice of combining stories with music for oral presentation. Stories often were written in verse, and storytellers would use music as a way to help them remember the verses with the appropriate beat. Was that literature or music? That is a question about which people could argue without reaching a conclusion, but for many medieval listeners what they heard was a combination of sounds and ideas designed to stir their emotions. Medieval musical theorists frequently ascribe certain emotions to specific kinds of sounds.

Even the notion that music has patterns that define it has its challenges. In medieval India and China musical forms were usually supposed to duplicate traditional patterns established in ancient times. A composer could rearrange the patterns for a particular tune but was not supposed to innovate. The sounds were meant to be familiar to audiences and to evoke connections to a golden past, yet in medieval Europe singers and musicians typically improvised. A musical composition was learned by listening to it, but it was possible for a musician never to play a piece exactly the same way twice, because he or she might vary the sounds to suit the interests of an individual audience. Even religious chants may have been varied by singers.

In literate societies musical theorists debated what the sounds and forms of music were supposed to mean, but it would be an error to believe that only cultures such as those of the Islamic world and India, where music was sometimes analyzed as mathematical constructs, had enough subtlety for complex combinations of sound. For instance, African drumming had a rich arrangement of sounds that held great meaning for listeners. Different pacing of drumming, different tones, and different pitches could evoke such emotions as fear, anger, or compassion and could even convey words and sentences. Among medieval Americans chants in which certain sounds are repeated, seemingly without linguistic meaning, nonetheless conveyed ideas about humanity's relationship to nature or with the supernatural world and transported audiences into states of consciousness in which they saw extra dimensions to the world or felt profound emotions connecting them to their families, tribes, and cultures.

AFRICA

BY AMY HACKNEY BLACKWELL

Music was essential to many events in African life. The people of precolonial Africa produced and listened to a wide variety of music. People traveling from North Africa, from the Mid-

dle East, and throughout sub-Saharan Africa picked up musical instruments and techniques on their travels and brought them back to their homes. Arabic musical styles were incorporated into the music of much of eastern and western Africa above the Congo. The people of East Africa picked up styles and instruments from trade with Arabia and India.

Throughout medieval Africa people sang. People sang work songs every day to wile away their time spent doing ordinary tasks. Festivals were occasions for a great deal of music and singing, often performed to accompany dancing. People sang and performed particular songs to mark marriages, births, and deaths. The courts of kings and chiefs might have their own courtly music that would be performed only there. African peoples had special music to accompany dances of love, dances to welcome visitors, war dances, rites of passage, and dances used to communicate with spirits. The music would set the pace of the dance, whether slow and stately or fast and frightening. Skillful musicians could tell dancers how to perform.

Different African groups had their own singing styles. For example, the small people who lived in the rain forests of the Congo sang morning songs known as *yelli*. Many of their songs used several voices that quickly traded off notes of the melody. People in southern Africa often sang a cappella, without instrumental accompaniment. The call-and-response method, in which a lead singer would call out single lines to a song and the rest of the group would either repeat those lines or sing their responses, was a common singing technique in much of Africa.

Improvisation was essential to African music. While people knew basic rhythmic motifs and tunes, they rarely wrote down their pieces in any sort of musical notation and thus performed entirely from memory. They would often play and sing music for hours, spinning variations of tune, rhythm, and lyrics as the mood struck them.

Griots—professional singers, poets, and bards—performed throughout the savanna belt of western Africa. Griots were also known as *jail*, *jeli*, or *guel*. Griots functioned as local historians, memorizing the lineage of the families in their area and reciting these lists when called upon. They also could tell folktales, sing folk songs, recount battles, and spin exciting stories from other historical events. Each village in the region had its own griot, who studied for years to master the historical knowledge and musical techniques. Griots traditionally played a drum called the talking drum. The griot would hold the drum under his arm and squeeze it to raise or lower the pitch while hitting the drum with a stick held in his free hand. The heads of talking drums could be made of various skins, including lizard skin and fish skin.

African people used a number of different instruments. Drums and other percussion instruments were extremely common throughout Africa. People made rattles out of locally available materials, such as gourds and seeds. The *hosho*, for example, was a Zimbabwean rattle made of a gourd with its dried seeds inside it. African musicians used metal bells, tubes that resonated when stamped on, and xylophones. Other common percussion instruments included gongs, clap sticks, and clay pots. The simplest form of percussion instrument was the human body; people clapped their hands, thighs, and chests and stamped their feet to create rhythms. People also wore percussion instruments on their ankles or wrists. For example, they might wear clappers made of shells that would bang together when they stamped their feet during a dance. In Zimbabwe people wore rattles called *magavhu* on their legs.

Africans constructed many different types of drums. Most drums had heads made of stretched membranes from animal skins. The drum frame might be made of wood or another hard material. Drummers often made drums out of hollow tree trunks carved into shape. Drums might be cylindrical, barrel shaped, semicylindrical, or hourglass shaped. Musicians could adjust the tension of their drumheads, changing the pitch and timbre of the instrument. Some drums had one head with an opening on the other end to let out the vibrations. Others had two heads. The *kebero* was a double-headed drum used in Ethiopia and Eritrea. The *ngoma* drum was common in East Africa, where it was made of wood with cow-skin heads on each end. The western African *djembe* drum was a large drum shaped like a goblet; the player sat next to it and beat it with his hands.

Drummers played their instruments by striking them with their hands and with sticks. Different hand strikes and combinations of fingers and sticks could create different sounds. Well-designed drums could produce a number of different pitches, depending on how they were struck. Drummers learned to relax their entire bodies, including their shoulders, and to use their elbows to support their hands. Good drummers moved their hands from the wrists.

Drums were the most important instruments in sub-Saharan Africa. Drum music could be extremely evocative. Many African groups used drums to communicate with the dead or to rouse people to wild dancing at festivals. The drumbeat was the heart of almost all African dances, providing the rhythm of the movements and linking participants with a common beat. Drums could be used to communicate messages from village to village and to inspire warriors to feats of valor. African drummers created extremely complex rhythms. In western Africa ensembles of musicians played a complicated form of rhythmic music that can still be heard



Drum; brass, originally inlaid with silver; Syria or Egypt, 15th century (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA [M.2002.1.574])

today in the style known as Ewe drumming. In this style, a master drummer coordinated the playing of several other musicians on drums, rattles, and bells, guiding the players in a kind of rhythmic dialogue. The Beti people of Cameroon played a type of music called *bikutsi*, which involved a great deal of stomping on the ground in 6/8 time accompanied by a harp. A *bikutsi* performance might last all night, starting with poetic recitations of myths accompanied by dancing, after which the women would dance and sing alone and air their daily problems. The *ikinimba* style of music in Rwanda used instruments to accompany songs that recounted tales from Rwandan myth and history. In Uganda groups of drummers would each play *gnoma* drums of different sizes to create a variety of pitches.

The wooden xylophone known as the marimba or *balafon* appeared in western Africa around the 12th century. *Balafons* had keys made of wood dried over a fire affixed with leather straps to a wooden frame. The maker would tune the keys by shaving off bits of wood. A *balafon* could have anywhere from six to 21 keys, tuned to whichever scale was common in the maker's region; African music uses several different scales with different numbers of notes. Under the keys hung gourds that would resonate and amplify the sound of the keys; each gourd had a hole at its bottom end covered with the silk from spiders' egg sacs to create a vibrating membrane. The player would strike the keys with mallets or sticks. The *balafon* could be played as a solo instrument or as part of an ensemble with

several musicians. Musicians from Mozambique played another kind of xylophone called a *mbila*.

The *mbira* was a type of thumb piano invented in Africa. It consisted of a wooden board with several metal or wooden keys affixed to it. It could be attached to a resonator, such as a gourd or a skin-covered frame, to make it louder. Players plucked the keys with their thumbs. Historians believe that this type of instrument was invented in Africa twice in separate locations. The earliest forms of *mbira* were made with wooden or bamboo keys and were constructed in western Africa around 1000 B.C.E. Another version of the instrument with metal keys appeared independently in the Zambezi River region around 1000 C.E. Variations on the *mbira* design spread throughout sub-Saharan Africa. Different peoples used different numbers of keys, different tunings, and different methods of playing. *Mbira* playing was obligatory at many religious ceremonies and festivals. In Zimbabwe, for instance, the *mbira* was believed to have a special capacity to communicate with ancestor spirits.

African musicians also played wind instruments and stringed instruments. People made flutes from animal horns, gourds, reeds, and bamboo. Some flutes had multiple pipes, similar to European panpipes, a style adopted from Islamic cultures. The Ethiopian flute known as the *washint* had four holes for the fingers; it was popular in the highlands. Trumpets could be made of gourds, wood, or metal. Musicians also used stringed instruments, such as lutes, harps, lyres, and zithers, playing them by plucking the strings or drawing bows over them. The Luo people of western Kenya, for example, played an eight-stringed lyre called the *nyatiti*. In Ethiopia noblemen and monks played the *begenä*, a large lyre that was used to accompany prayers. Another Ethiopian lyre, the *krar*, was tuned to a five-note scale and was played by plucking, strumming, or bowing. In Rwanda people played a stringed instrument called the *umuduri*.

THE AMERICAS

BY LAWRENCE WALDRON

At the advent of the Common Era the musical forms of the Americas had settled into distinct traditions. Music accompanied celebrations of every stage in life and every major phase of the year, and archaic and preconquest Indians punctuated their lives with rhythm and melody. As in ancient times, the human voice was the chief of their instruments, and with the accumulation of stories, songs, and myths many Native American groups codified their singing styles to match lyrical themes.

The vocal quality of most American singing before the Spanish conquest can be described as almost universally

monophonic in that second and third vocalists seldom accompanied the singer or chanter in harmony. Rather, secondary singers often joined the melody of the first singer with slight variations or with an occasional switching of octaves. These monophonic melodies could be quite complex, especially among the Indians of the eastern United States, where complex rhythms and even some call-and-response styles may have predated contacts with colonial-era African slaves. Native voices could speak, chant, or sing over music in vocal qualities that could be relaxed and natural, sustained from the diaphragm, nasal, in shrill falsetto, or in imitation of animals and other sounds in nature.

In the preconquest period the most common instruments throughout the Americas were wind and percussion instruments. They achieved standard designs and, as with the human voice, came to be used in ways dictated by tradition. Many indigenous traditions are still extant today, giving a good idea of how Native American music in the early second millennium might have sounded. Most of these extant forms, however, have been inflected in some way by European or African musical styles since the colonial period.

The first 1,500 years of the Common Era represents a time of increasingly distinct and deliberately crafted musical forms, and this period of coalescing traditions also saw some greatly diversified music. Such changes stemmed from the migration of groups into new cultural regions or the occasional invention of new instruments.

Instruments such as the flute were a common part of the ritual traditions throughout the Americas. Other instruments were used only regionally. One of these was the *bullroarer*, a blade of wood whirled on a string to create a variety of whirling noises, which was used mostly in the South American Amazon. This represented an American invention shared only by unrelated cultural groups in Australia and a few on other continents. Bone scrapers, notched bones rasped with a stick, were a standard instrument at Mesoamerican funerals and also were played at dances from the Amazon to the Cheyenne territory of the North American Plains. Aztec rattles made out of desiccated gourds or ceramic had relatives all over the American continent and were used in both religious rituals and seasonal festivals. Transverse wooden trumpets, instruments blown from the side instead of the end, could be heard in Brazilian rituals, but trumpets to the west in the Andes were made of clay and blown from the small end like the modern trumpet.

With hundreds of ethnic groups, North America exhibited perhaps the greatest diversity in the application of musical instruments. However, South America bears the distinction for the greatest variety of instruments themselves. In almost all North American rituals and celebrations the

voice was believed to carry the spirit of the orator or singer in addition to articulating clearly the content of prayers. In gatherings around sacred fires only the sound of tobacco offerings crackling in the flames could be heard accompanying the singing or chanting voice.

An early version of the Iroquois Dawn Song, a ritual that marked the commencement of the ritual calendar, is an example of a ceremony that involved only the human voice. However, most American Indian musical expression also involved a steady beat of drumming and other percussive instruments.

Drums and rattles accompanied the voice in celebration in the harvest dances of the Pueblo Indians, the chanting of creation myths in the Canadian woodlands, and the initiation ceremonies of the Pacific Northwest peoples. The drums of the North American Plains, Great Basin, and Eastern Woodlands were most commonly round elk-skin or buck-skin drums. Some could be as much as three feet across and were stood on legs and beaten in a circle at large gatherings. Others were held by hand for use either in accompaniment to other instruments or in more solitary shamanic rituals, as in Pueblo and Eastern Woodland contexts. Both varieties were beaten with sticks, creating at once a sharp percussion and a low, resounding tone. Several Iroquois groups played a small

drum partially filled with water whose tone changed as the drummer turned the water inside.

A variety of rattles accompanied Indian drumming throughout the Americas. Rattles often were made of wood in North America and were constructed with a basketry bulb in the Andes. Animal rattles were also made and could be varied in their construction, from the rawhide types of the American Northwest to eastern examples made of entire shells of turtles, gutted and then filled with seeds or pebbles. Shamans of the Northwest Coast employed wooden rattles that were elaborately carved into the shape of certain animal spirit guides or clan emblems. These rattles, carved expertly with stone tools, were fully fledged sculptures in their own right and were often painted and inlaid with abalone or other pearly shells.

The Aztec employed a great many percussive instruments. Members of the Eagle and Jaguar warrior classes marked human bones with notches, which they played with a scraper at memorial ceremonies for soldiers lost in battle. The rasped bone was often accompanied by the rhythm of a turtle shell repeatedly struck by the multiple tips of a deer antler. Aztec drums were made either by stretching animal skin over a wooden barrel or by cutting an H-shaped slit into a hollowed log. The latter, called *teponaztli*, were stood up on tripods to avoid deadening the drum's tone. As the loosened tongues between the slits were hit by sticks, they vibrated, producing a deep pulse that resonated briefly. Like Northwest Coast rattles, *teponaztli* were sometimes decoratively carved with zoomorphic symbols, in the Aztec case representing the warrior class.

In dance grounds and sacred caves the Taíno of the Caribbean performed rituals dedicated to their various *zemi*, nature spirits usually represented by wooden and stone sculptures or petroglyphs. During these celebrations Taíno musicians played slit drums, similar to those of the Aztecs, in a steady rhythm while the shamans played wooden rattles or maracas. As with slit drums and other percussion instruments, maracas had developed on the South American mainland some time in the first millennium. They were not always used as percussion instruments, however.

The maraca consisted of a small gourd containing seeds, with a handle attached on one end in the manner of a rattle. Shamans and chanters from the Caribbean Indians to those of the Amazon and Panama would twirl or rotate the instrument to create a whirring sound rather than shaking it like a rattle. After it was encountered in the Caribbean islands by Europeans, the maraca eventually became a popular instrument in Latin American music. However, those later musicians did not play it like an Amerindian idiophone, choosing to shake it back and forth like a percussive rattle instead.



Rattle; slip-painted ceramic, Maya culture, Mexico, 700–1000 (Los Angeles County Museum of Art, Gift of Constance McCormick Fearing, Photograph © 2006 Museum Associates/LACMA [AC1996.146.45])

Carib Indians, some of whom seem not to have used drums, developed virtuosic techniques of playing the maracas whereby the seeds inside the gourd were made to produce unique and individual noises. The instrument could thereby imitate the sound of rain, hurricanes, and other natural phenomena. Carib singing accompanied by the maracas could involve many unusual sounds, including the creation of sympathetic vibrations between vocal chords to produce a style of polyphony similar to that of Mongolian throat singing.

The Aztec employed several idiophones in their religious rituals. Many of these unique devices produced, like the Amazonian maraca, sounds analogous to those found in nature. Mexican “rain sticks” were called *ayon chicuaztli* by the Aztec and were used to imitate the sound of trickling water, falling rain, rivers, and splashing. They were used in the worship of mountain and water deities.

Indian dancers wore a variety of implements to accompany ceremonial music with their own peculiar sounds. Attached to clothing or to the body of a dancer, shells, seeds, and bells could create bursts and waves of sound as the performer moved. Throughout North America Indians danced with these idiophones either in hand or affixed to their wrists, ankles, torso, or head. Northwest Coast peoples wore clam-shell clappers, whereas the Anasazi wore ceramic bells. These little bells may have been baked-clay imitations of earlier metal ones acquired from the Maya through trade. In both the Anasazi and Maya cases the bells were made in different sizes and thicknesses to create different musical tones.

By the Common Era most of the wind instruments of the Americas seemed to have been highly developed. Ancient instruments inherited by preconquest Indians included various flutes and whistles made of either wood or bone; trumpets made of conch shells, clay, wood, and cane; and wooden panpipes. Many of these instruments seem to have issued from some original stock of Pacific instrument types that evolved into unique forms adapted to individual ethnic groups and performances. Some ancient instruments fell out of use for a time, only to be reintroduced later.

The ocarina is a ceramic flute that produces a range of haunting, airy tones. While ceramic instruments of this type may have been developed by many different archaic Indians before the Common Era, the later examples all seem to have spread from the South American Andes. By the second millennium of the Common Era variations on the Andean ocarina could be found in territories as far north as Nicaragua and central Mexico.

Several kinds of clay trumpets also seem to have originated in the Andes. These were played by Moche and Inca musicians but may have evolved from smaller Nazca prototypes invented earlier. The Maya and Aztec are known to have

played trumpets of this type as well as wooden ones. One variety of Andean trumpet was tubular, with its bell carved in the shape of an animal or human head. This imagery may have referred either to religious ceremonies involving zoomorphic deities or to warrior-cult imagery of trophy heads taken in battle. Another trumpet featured a spiral tube that added to the resonance of the instrument and strengthened the ceramic shaft. Peruvians also were known to have played long trumpets of silver and copper more in the manner of those found in Europe.

The *quena*, a type of wooden clarinet, was played at Inca weddings, harvests, and various dry-season festivals to the accompaniment of drums and flutes. Panpipes were played at any performances involving festive drumming and were ubiquitous throughout the Inca realm. This instrument had remained virtually unchanged from before the Common Era. Panpipes came in different lengths and sizes to attain different tonal ranges. Musicians often held a set of panpipes in each hand, skillfully switching between them to play different parts of a melody. Many of the Andean wind instruments were adapted to Christian worship and festivals in the colonial period.

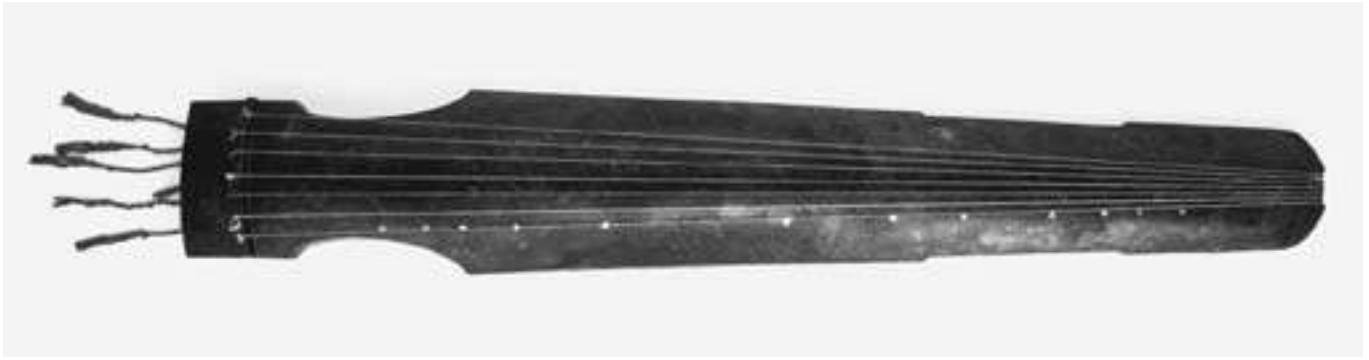
The Moche whistling vessels were decidedly an Andean novelty that did not appear elsewhere in the pre-Columbian world. These unique creations produced musical whistles when the water inside them was agitated. Different levels of water produced different musical notes when the pot was shaken.

ASIA AND THE PACIFIC

BY ILICIA SPREY

In medieval Asia and Southeast Asia music was an integral part of culture in all areas of life. In religion music was used to communicate with and honor the gods. For rulers, the presence of music at their courts brought power and heightened status. For the growing urban-based middle class, patronage of musical theater was a sign of their growing sophistication. In rural villages singing made work go faster and was an essential element of festivals and communal rituals. Music was also a powerful medium of cross-cultural influences that moved throughout the region with traders and holy men.

While musical compositions were taught by a master to his pupil by repetition, lyrics were collected without accompanying notation. Indian musical compositions were based on ragas, or melodies, which were themselves based on centuries-old works of earlier composers, all of which combined with improvisation in an effort to achieve the perceived ideal of musical, cultural, and spiritual harmony. A raga consisted of five or more notes upon which the musician built a melody. In *Bharata Natya Shastra*, a third-century Indian



Bronze zither; China, Ming Dynasty, 1368–1644 (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1915-101)

work on musicology, more than 30 instrumental ragas are identified, but ragas also could have vocal accompaniment. In southern India ragas were composed for specific rituals, and in northern India ragas were created to be played at specific times of day (such as dawn, morning, afternoon, or night) to evoke certain desirable feelings or responses (such as awe, fear, joy, or laughter). During the Gupta Empire (ca. 320–ca. 550) Faxian (fl. 399–414), a Chinese monk traveling throughout India, remarked that music played an important role in the daily life of even the lowest social classes while at work and for entertainment.

In China cultivation of musical skills and preservation of lyrics were encouraged by Confucianism, which taught that with their works, composers could produce in their audience the desired balance between the human world and heaven. Confucius (551–479 B.C.E.) is credited with the first collection of written Chinese music, known as *Youlan* (Solitary Orchid). These classical works use the five-tone Chinese scale common thereafter in East Asia, in contrast to the seven-note scale developed in India and adapted in Southeast Asia. The earliest recorded Chinese lyrics are in a collection known as *Shi jing* (Book of Songs), consisting of some 305 poems that were set to music for a variety of purposes, including as ritual hymns, traditional festival songs, and folk songs, some of which are thought to date to the 11th century B.C.E. In the early Imperial Period (553–794) Japanese musicians wrote and signed their compositions, which included original works that were consistent with earlier Japanese musical traditions and adaptations of Chinese music.

The earliest depictions of musicians appear in Gupta-era temple carvings and sculptures. During the Gupta era and thereafter Indian Vedic hymns and mantras—repetitious chanting—were the centerpiece of temple worship. *Dhrupad*, based on Vedic tradition, served as a form of worship by making offerings of pleasing sounds to the Hindu gods. If *dhrupad* were meant to please the gods, then the melodies of the ragas played in a temple setting were meant to create a trancelike

state in worshippers and help them first move toward union with the Hindu deities and later, in the Buddhist faith, reach enlightenment.

Gupta-era India is noted as a cultural golden age in which the emperors made their court the center of artistic life with poetry, drama, and musical performances. The emperor Samudra Gupta (r. ca. 330–ca. 80), noted as both a brilliant general and a politician, took pride in his ability to play the lyre, as seen in the gold coins he ordered struck showing him playing that instrument. Respect for and development of Indian cultural forms continued into the following centuries under other rulers, with the most notable development in religious music being the widespread adoption of the bhakti form of Hinduism in 13th- through 18th-century India. Its intent was to express through poetry, composition, music, dance, and song the believer's passionate devotion to God.

At the end of the first century Hinduism and Buddhism, along with their respective musical traditions, spread into Southeast Asia, and Buddhism spread into China. In Indonesia carvings at the ninth-century central Javanese Buddhist temple of Borobudur and at the Hindu temple complex of Prambanan show musicians accompanying dancers. While China and its neighbors embraced Buddhism, ancestor worship remained prevalent, and in sixth-century China *ya-yüeh*, a form of music meant to please ancestral spirits, was commonplace, as were its Korean and Vietnamese counterparts, *ah-ah* and *hát chá vãn*.

Buddhist monks throughout Asia used the rhythm of the music to learn and recite sacred texts, and during religious festivals singing was accompanied by drums. In Nara (710–94) and Heian (794–1185) Japan the social and political elite patronized Buddhist monasteries. Their complex rituals and chanting, called *shomyo*, consisted of music and recitations of sutras, the teachings of the Buddha, in one of three languages (two of which only the court elite would have known): Sanskrit from ancient India, Chinese, and Japanese. In the Kamakura Period (1185–1333) the idea of salvation was made more ac-

cessible to the masses, and Buddhist chanting was performed exclusively in Japanese. The formalization of traditional Japanese Shintoism in the Nara and Heian eras led to the development of a unique form of sacred ritual music, *kagura*, which combined music and dance as a way of making religion more accessible to the general public. In Japan religious music also played a social role. In the 13th century Zen Buddhist priests of the Fuke sect played music to earn alms for the poor and to gain personal enlightenment. In the Kyūshū region of Japan itinerant blind musicians known as *moso* sometimes dressed as priests and performed music accompanying religious and semireligious texts to purify households.

By the end of the Han Dynasty (202 B.C.E. –220 C.E.) musical performances had become an integral part of Chinese court life, as demonstrated in the establishment of the Imperial Music Bureau (Yueh Fu), which was maintained by subsequent dynasties. It oversaw the collection and supervision of court songs, chants, and military music. Its agents went into the countryside to gather popular ballads and folk music. After examination these songs were either allowed to be performed or rejected if their topic was disruptive to social and political harmony. Over the centuries the music of other peoples entered China along the overland and maritime trade routes, and during the reign of the Tang emperor Xuanzong (r. 712–56) the Pear Garden Academy was established to preserve the nature of Chinese music and to train musicians.

In Indonesia gong orchestras originally played formal music for special community ceremonies and celebrations and at important events at the palace, or *kraton*, of the local rulers. It became a sign of wealth, power, and cultural patronage for the royal court to have a gamelan (percussion orchestra) in residence. Gamelans were composed primarily of a variety of wood, iron, and bronze drums and gongs but also could include flutes. Gamelans always accompanied dramatic and dance presentations, many of which were inspired by or adapted Indian literary and ritual traditions. By the 14th century in Burma, Thailand, Cambodia, and Vietnam gongs of various sizes arranged in circles were played by men at court and as part of royal processions, to announce the approach of the king.

The Japanese royal court developed a unique form of music, called gagaku, meaning “elegant music,” which consisted of formal compositions played by wind, string, and percussion instruments. Gagaku began in India and was later adopted in China as *ya-yüeh*. Japanese monks studying in China learned its techniques and brought it back with them to Japan in 612. Korean and Vietnamese musicians also had some influence on its ultimate form in Japan. Gagaku changed from its initial musical form in the temples, becoming an exclusive part of the Japanese imperial court culture beginning with the Heian

Period. For over a millennium gagaku was played by generations of the same families and by musical guilds. Traditional gagaku pieces became so valued that no new compositions have been created since the 10th century.

In 14th-century Japan, Noh, a form of musical drama, first appeared, combining elements from folk and court entertainments, including gagaku. It had its roots in Chinese musical drama, which was brought from China to Japan by the actor Kanami (1334–85), who enjoyed the patronage of the Ashikaga shogun Yoshimitsu (1358–1408). In Noh the male musicians, or *hayashi*, play the four traditional instruments: the flute (*fue*), the drum (*okawa*), the shoulder drum (*kotsuzumi*), and the stick drum (*taiko*); the *jiutai*, or chorus of six to eight men, sings. Musicians and actors work together to achieve a state of *sen no rikyu*, or transcendence, a concept much valued in Japanese society.

The musical spirit lived in rural villages, where formal and informal music was played year-round. Instruments played by local musicians and the poor were made from readily available and inexpensive natural products, such as bamboo for pipes and flutes. Itinerant and local musicians were vital to festivals and weddings, marked by music, singing, and dancing, which were an important part of popular life and enhanced the local sense of community. In the *minyo*, or Japanese folk music tradition, women played wind instruments that accompanied singing by both males and females at communal gatherings; people sang without instrumental accompaniment while at work. In rural China, and in particular in the southeastern province of Yunnan and in the adjacent hill regions of Southeast Asia, workers also surrounded themselves with music, using it while working to establish a rhythm in the transplanting of rice or while engaged in elaborate courting rituals.

Tibetan folk music included a number of a cappella *lu* songs, noted for their high-pitched notes. The topic of many of these songs dates back more than 1,000 years to the deeds of Gesar, the legendary king of the Ling state. In Korea *pansori* was folk music created by a singer and drummer. While topics were limited to concerns of local interest, each singer personalized the lyrics, often including humor in order to inspire audience participation.

Medieval musical instruments fall into one of four categories: woodwind, percussion, stringed instruments plucked by the musician, and stringed instruments played with a bow. Bowed instruments, such as the Chinese *huqin*, *erhu*, and *jin-gu*, are similar to modern-day fiddles, with either two or four strings that produce various pitches according to their size. The Burmese harp, or *saungi*, which dates back to at least 800, is an example of a stringed plucked instrument. The body, or resonator, of the harp, which is 32 inches long and 6 inches

deep and wide, sits on the lap of the musician. Its neck, which is attached on the player's left-hand side, arches inward and upward approximately 2 feet. It has 13 to 16 strings, which are connected at an angle between the body and the neck of the instrument. The musician's left hand dampens the strings, and the fingers of the right hand pluck them.

A similar instrument is the Japanese *biwa*, a short-necked instrument influenced by the Indian sitar and by the Arabic *ud*, which had crossed into Asia along the Silk Road during the Han era. These instruments came into Japan during the Nara period. The *biwa* has a pear-shaped body, four frets on the neck, and four strings, which are plucked with a plectrum. The sitar is more than 700 years old and is the primary instrument used in ragas, occasionally accompanied by flutes and other reed instruments.

Japanese music was influenced by the introduction of foreign instruments. The *shakuhachi*, a long, thin, wooden flute with six holes, is played by blowing into an opening on its end. It was first used in Buddhist gagaku music. The koto is a little over 6 feet in length and looks like a zither. Aristocratic Japanese found the koto vulgar when it was first introduced in the sixth century, but by the 16th century it was slowly being adopted by the growing middle class. The *Tale of Genji* (ca. 1010) mentions it, and by late medieval times it was associated with geisha culture. The three-stringed *shamisen*, with a long, wooden neck, no frets, and a resonance box, reached Japan by 1500 from the Ryukyu Islands (Okinawa). It is played by plucking and depressing the strings. As with the koto, the upper classes rejected it, but the merchant class adopted it, and it eventually won a place in shogunate court music. The popularity of the *shamisen* led to the decline of the *biwa*.

In early medieval Japan, Indonesia, and India these formal music traditions were studied by the upper classes and embraced by the reigning courts. However, by the early 15th century the middle class had taken up music as a status symbol, coinciding with the decline of the old imperial courts and the rise of the new military regimes; wandering minstrels maintained the earlier folk musical traditions and began to create new popular music that was a blend of the court and folk musical traditions.

Music was central to the culture and life of the Aboriginal peoples of Australia, as its focus was on the physical and supernatural worlds and their connection to both. Singing and music were (and still are) part of their larger oral tradition of transmitting knowledge, and the melodies were unique to each group or band. In their youth they sang of nature in karma songs, in adolescence they learned songs to entertain, and in later life they demonstrated their maturity and wisdom by singing their group's most sacred melodies. The instruments that accompanied much of their singing

generally either used wind to make sound or were percussive, often consisting of two pieces struck together to create sound. They had no stringed instruments.

Perhaps the best-known aboriginal musical instrument is the didgeridoo, which is made from a hollowed-out tree branch and is approximately 5 feet long. Its exterior is polished with bee's wax and decorated with symbols relevant to the particular band or group. The player blows into one end, vibrating his lips over the narrower end and generating a deep resonating tone that flow out through the wider end. Another wind "instrument" is the gum leaf, the leaves from the eucalyptus tree. They place a single thin leaf between their hands and blow against it, producing a whistling sound. There is also the "bull-roarer," a flat piece of wood between 12 and 16 inches in length and about 2 to 3 inches wide, which is swung on a rope in circles, thus creating a whirring sound. Percussion sounds are made by hand clapping, hitting sticks against one another, striking a hollow log with a stick, or using an hourglass-shaped drum whose striking surface is made from either lizard or animal skin stretched and secured to the drum's sides.

The Maori of New Zealand, like the Australian aboriginal peoples, make music a central part of all rites, ceremonies, and rituals and have many similar musical instruments, including the bull-roarer and a drum covered with stretched shark skin, which is struck with the fingers or open hand. The Maori have unique instruments made from the resources of both land and sea, including two kinds of flutes. The *koauau* is a 6-inch-long flute made either of wood or from the larger bones of a bird. Along its length is a hole into which the player blows and three to six finger holes that are left open or covered by the player's fingers to make various tones. Traditionally, the *koauau* was associated with romantic seduction. The other kind of flute, the much shorter *nguru* at only 2 to 6 inches long, has two or three finger holes, is shaped like a whale's tooth, and is blown into at one end. The air travels through the wider middle section of the instrument and then through the other, narrower end.

EUROPE

BY ALICE CLARK

Music held an important role in medieval culture but in ways sometimes different from those of modern culture. During the Middle Ages much music was transmitted anonymously, if it was written down at all. Most instrumental music was in fact improvised, and little of it made its way to parchment. Those doing the writing tended to view instrumental music as less important than vocal music, especially sacred music, and most instrumentalists were of relatively low social status

and probably could not read or write words, much less music. This instrumental music was for the most part functional: dance music, fanfares, and such. The instruments involved often appear to have Middle Eastern roots, and many eventually developed into the instruments familiar to modern-day audiences: For instance, the *vielle* is a distant ancestor of the violin.

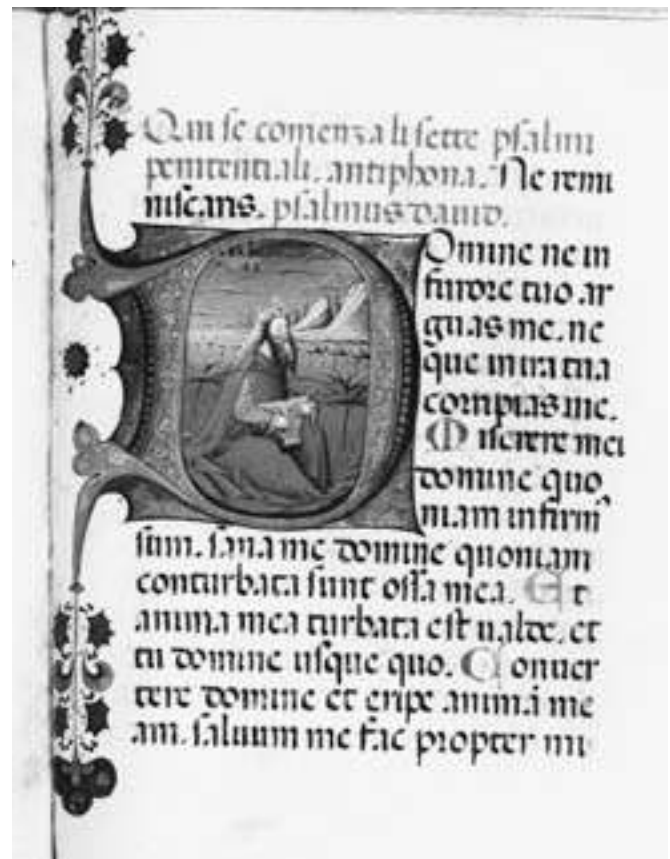
A second major difference from our own time is that most music ordinary people experienced was monophonic, having one melodic line with little or no accompaniment. Such was true of most instrumental music and of the other main musical repertory, chant or plainsong. There were many local forms of worship in early medieval Europe, but they were replaced in the Carolingian Period (751–987) by what is called Gregorian chant. Charlemagne (r. 800–14), as part of his efforts to unify his empire and to reform worship and education, sought chant books and singers from Rome, and this mixture of Roman music with the local Frankish rite was written down and transmitted across Europe, creating a repertory that was actively used until the 1960s (and is still used to some extent).

The need to teach and to learn this new chant apparently led to the development of Western musical notation and practical theory. The earliest form of notation gives only melodic gestures because writing was meant to supplement memory; later developments include staff lines and clefs that allow pitch to be fixed. The modal system and other theoretical tools were used to classify chants and to make it easier to teach them to boys who did not already know the repertory. Chant notation does not give precise information about rhythm, and the free style heard on modern recordings seems to have been the norm for most of the Middle Ages. While all chant is monophonic, it contains a wide variety of musical styles, ranging from the simplest formulas used to recite prayers and readings to elaborate graduals and alleluias, full of melismas (many notes set to a single syllable of text). Chant was performed mostly by choirs of canons, monks, and nuns. These groups were not trained musicians in the modern sense because the goal of singing chant was not to entertain an audience or to display vocal skill but rather to transmit the text and to worship God.

Another important area of monophonic music is that of secular song. The troubadours, poet-composers from what is now the south of France, wrote in the language of Occitan (also known as Provençal). Eleanor of Aquitaine (ca. 1122–1204), granddaughter of a troubadour, probably played a major role in taking the idea of secular song to France when she married Louis VII (r. 1137–80) and then to England when she married Henry II (r. 1154–89); one of her grandsons, Thibaut de Navarre (r. 1234–53), was himself a trou-

vere, a poet-composer in French, as was her son Richard I, “the Lionheart,” king of England (r. 1189–99). Secular song exists in medieval forms of German, Italian, and Spanish; there are even a few songs in English, though French was the court language of England for most of the Middle Ages.

Many medieval songs are concerned with a kind of sacralized love often referred to today as courtly love; its language is very similar to that of the devotion to the Virgin Mary that developed around the same time. These songs are usually strophic, with one melody used for multiple stanzas of text, and mostly syllabic, with one note for each syllable. When melodies are written down at all, they are presented without accompaniment, in a notation like that of chant, so there is normally little or no information about rhythm. This lack of information has led to some controversy, but many scholars and performers today believe that these songs were performed mostly in a free rhythm, shaped by the text. There is less agreement on the question of the use of instruments: Some argue for the use of improvised instrumental accompaniment; others say that at least some types of songs likely were unaccompanied.



King David playing the psaltery; detail of a manuscript page, Italy, 1473 (The Pierpont Morgan Library)

The focus on monophony, characteristic of much medieval music, is in keeping with what is found in most of the rest of the world. Medieval Europe, however, also developed polyphony, or music with more than one melodic line. This addition of a vertical aspect to music led to new developments, but monophonic music continued to be important throughout the Middle Ages.

The first documented examples of medieval polyphony come from the Carolingian Period, starting with simple movement in parallel fourths or fifths. More elaborate styles developed, culminating in the music of the Notre Dame school. Notre Dame polyphony, like the styles that preceded it, is based almost exclusively on chant, and much of it functioned within the liturgy. This music came into being at the same time the cathedral of Notre Dame in Paris was being built, in the late 12th and 13th centuries, and the music was copied into manuscripts that circulated as far away as northern Scotland, Rome, and Poland. According to an anonymous writer who apparently was an English monk who had studied in Paris, the *Magnus liber organi* (Big Book of Organum, ca. 1170) was a collection of polyphony for church services throughout the year; it was collected initially by Léonin (a canon of Notre Dame active in the second half of the 12th century) and then improved by Pérotin (d. ca. 1238), a slightly later composer, though it is less certain precisely who he was.

These and other mostly anonymous composers wrote mostly in two styles: *organum purum*, a florid style in which a top line moves in free rhythm over a sustained-note tenor (the lower voice, which bears the preexisting chant), and *discant*, in which both voices move at approximately the same rate with a steady beat. The development of the *discant* style forced Notre Dame musicians to create, for the first time in medieval European music, a way of notating rhythm. Notre Dame polyphony, like all polyphony before the 15th century, was performed by soloists; parts of the liturgy normally sung by the choir continued to be performed in monophonic chant.

Discant style led to the development of perhaps the quintessential genre of medieval polyphony: the motet. In a motet a fragment of chant, given a repeated rhythmic pattern, underlies one to three other voices, each with its own text. The result may sound chaotic to modern ears because the texts often cannot be understood at first hearing, but in the motet composers can show great skill, ranging from links to other motets to number symbolism to palindromic rhythms to dense intertextual connections to the Bible, the liturgy, or secular works, such as the *Roman de la rose* (Romance of the Rose, ca. 1230). Many of the subtleties of this genre cannot be heard (though some can), but this very fact emphasizes that

for medieval people, as for the Greeks before them, music not only was about sound but also was also a link to higher, inaudible harmonies. (We still use such words as *harmony*, *consonant*, and *dissonance* in general, nonmusical senses.) These motets often link sacred and secular ideas in ways that may surprise us but that are entirely characteristic of medieval thought, where the separation of those spheres that we find normal did not exist.

In the late Middle Ages, however, polyphonic genres developed that are more accessible to the general listener. Guillaume de Machaut (ca. 1300–77) was instrumental in the 14th-century flowering of polyphonic secular songs in French, based on fixed forms. These songs, unlike the motet, a genre to which Machaut and his contemporaries also made important contributions, are dominated by the top voice, which was composed first and which was usually the only one given a text. (There is some disagreement over whether the untexted lower voices were sung or played on instruments.)

France tends to get the bulk of attention from both scholars and performers of medieval music, in part because more information and musical sources survive from France than from elsewhere in Europe. Nevertheless, other important repertoires exist, including the Italian songs of Francesco Landini (ca. 1325–97) and his contemporaries as well as the English motets of the 14th century. Indeed, the end of the Middle Ages is marked by a kind of synthesis of French, English, and Italian styles, which can be heard in the works of such composers as Guillaume Dufay (ca. 1400–74).

While music was an important part of medieval culture, it did not focus on the kind of personal expression typical of the 19th century onward, nor was most medieval music created or performed by professional musicians as such. Much music served a purpose, especially within worship. With a few exceptions, notably in the troubadour repertory, most music is not assigned to a composer in the surviving sources. There was less sense of ownership of creative works than is generally true today; moreover, it was common to rework music initially created by others. Even where a composer's name is known, little or no information may exist about that person's life or career, or precisely which pieces he (or sometimes she) wrote. Professional instrumentalists and minstrels did exist, but they were often illiterate and of a lower social class, and some had nonmusical responsibilities at court. Most other composers and performers were not full-time musicians: They served the church (like Léonin), or they were government officials (like Machaut). They cared about music but viewed their musical activities as only one part of their lives and not necessarily as something that either defined them or belonged to them in a way that is often true of music and composers today.

THE ISLAMIC WORLD

BY MUHAMMED HASSAN ALI

Music crosses continents, cultures, and people. Like language, it enables people to communicate. Today, as in the medieval era, one can hear the melodious call to prayer (*adhan*), and Muslims are taught Koranic recitation (*qirat*) with vocal undulation. In the Sufi tradition, chanting (*sama*, literally “listening”) is an important part of *zikr* (remembering). These are all a cappella forms of music, meaning that they are performed without instrumental accompaniment. Regional forms of devotional expression included *qasida* in Iran and *ginan* in northern India.

With the advent of Islam in the seventh century a new form of music emerged. It elaborated on the pre-Islamic conventions of the Persians, Byzantines, Turks, Berbers, and Moors. The Arabic language was a catalyst, and within a century the new art form was established from central Asia to the Atlantic. While this form dominated what is called art music, folk music retained its indigenous character. The music of the pre-Islamic Arabian Peninsula was principally vocal. Allegedly, singing originated with the caravan song, from which developed a more sophisticated secular song. These traditions entertained desert travelers and pilgrims. Instruments accompanied the singer, and the most popular were the short lute (*ud*), long lute (*tunbur*), flute (*qussaba*), tambourine (*duff*), and drum (*tabl*).

Even at its most complicated, Muslim music was traditional and transmitted orally. A notational system existed but was used only for pedagogical purposes. A large body of medieval writing about music survives in which musical theory was related to various areas of intellectual activity; hence the extreme importance of understanding music as an element of the culture involved. Medieval documents show that Muslim music was mainly an individual, soloist art. Small ensembles were actually groups of soloists in which the principal member, usually the singer, predominated. Musical performance therefore displayed many singing and vocal techniques, such as special vocal color, guttural nasality, vibrato, and other stylistic ornaments. Although the music was based upon strict rules, preexisting melodies, and stylistic requirements, the performer enjoyed great creative freedom. The artist was expected to bring his contribution to a given traditional piece through improvisation, original ornamentation, and his own approach to tempo, rhythmic pattern, and the distribution of the text over the melody. Thus the artist functioned as both performer and composer.

The repertoire in common use comprised a wide variety of forms. One category included unmeasured improvised pieces, such as the *layali*. An equivalent instrumental impro-



King Khusraw Parviz Listens to Barbad the Concealed Musician, illustration from a manuscript of the *Shahnameh* (*Book of Kings*); Iraq, ca. 1300 (Los Angeles County Museum of Art, The Nasli M. Heeramanek Collection, gift of Joan Palevsky, Photograph © 2006 Museum Associates/LACMA [M.73.5.406])

visation is the *taqsim*, and this in some cases was accompanied by a uniform pulsation (*taqsim ala al-wuhdah*). The metric songs embraced various poetic forms and metric structures, such as *qasida*, *dor*, and *muwashshah*. Artistic recitals were almost always accompanied by one or more instruments to enrich the performance. Traditional forms combined categories to create large compositions similar to a suite, using vocal and instrumental features. The whole was linked by the unity of the mode and a defined rhythmic development.

The music itself was characterized by a subtle organization of melody and rhythm in which the vocal component predominated over the instrumental. This gave the performer a relatively high degree of artistic freedom. The artist generally concentrated on the details forming a work, being less concerned with following a preconceived plan than with allowing the music's structure to emerge empirically from its details. Melodies were organized in terms of modes (*maqam*), which were characteristic melodic patterns with prescribed scales, preferential notes, typical melodic and rhythmic formulas, variety of intonations, and other conventional devices. The performer improvised within the framework of the *maqam*, which is also imbued with ethos

(*tathir*), a specific emotional or philosophical meaning attached to a musical mode. Rhythms were organized into rhythmic modes (*iqaat*), cyclical patterns of strong and weak beats. Classical music was the aristocratic music of the court and the upper class and underwent development and modification in the hands of gifted musicians throughout several centuries. Rhythmic and melodic modes grew in number and complexity, and new vocal and instrumental genres arose. In addition, a body of theoretical works emerged, influencing the music.

The Arab philosopher Al-Kindi (d. ca. 870), in his 13 treatises on music theory, discussed the ethical and cosmological aspects of music as well as its mathematical and acoustic qualities. The Brethren of Purity wrote about the spiritual aspects of music. Scientific studies of music (those that are strictly mathematical in nature and independent of the human ear) were discussed by the philosophers Al-Farabi (ca. 872–ca. 950), Ibn Sina (known in the West as Avicenna, ca. 980–1037), Ibn Zayla (ca. 983–1048), and Safi ad-Din al-Urmawi (d. 1291). These writers dealt with the theory of sound, intervals and their ratios, harmonies and dissonances, genres, systems, modes, rhythms and rhythmic modes, and the theory of composition of musical instruments.

Discourses on music were also part of a broader discussion on topics as diverse as literature, medicine, history, geography, and religion. Al-Isfahani (897–967), in his *Kitab al-aghani* (Book of Songs), collected songs that were popular during his day and added details about their authors, their backgrounds, and technical information that he found interesting. Al-Katib's (d. 765) encyclopedic work on music (which translates as "Perfection of Musical Knowledge") covers a wide range of music theory and practice, including observations and advice, phonetics, breathing, pronunciation, arrangements of musical concerts, audience reactions, plagiarism, classification of voices, treatment of voice, and problems relating to modality.

Music had several roles within Muslim society. In addition to its role in religion, art, and folklore, it played a part in medicine. Muslim physicians believed that music had therapeutic qualities and harnessed these qualities for their patients. In the pre-Islamic Arabian Peninsula the Bedouins used music on the battlefield to rouse the spirit of their soldiers and terrify the enemy. In 1299 the Ottoman Empire instated a permanent military band for the same reasons. The military band also graced ambassadorial receptions during times of peace. In the nomadic cultures of the Arabian Peninsula and North Africa poetry and music had social and historical functions in addition to literary and religious ones.

All music was transmitted orally and gave learning it a particular character of its own. Expertise was difficult to ac-

quire as it needed both inborn talent and long training. Training was always individual, based on a master-pupil relationship that began as purely pedagogical but ended as almost parental. The finished ideal was a student with an extraordinary aptitude for music: creative as a composer, practiced as an instrumentalist and singer, gifted with a phenomenal memory, able

RUBAB AND REBAB

The rubab was a stringed instrument invented in Afghanistan probably in the 600s and played in India, Iran, and south-central Asia. It was made from mulberry wood and had strings of kid gut. Although its shape varied from region to region, in general the sound box was shaped like a boat with a thick, horseshoe-shaped aft. The neck was about one-third the length of the box, with a pronounced downward hook at its end. Goatskin covered the main body. It had three strings for melody and 12 resonant, or sympathetic, strings. Resonant strings would seldom be touched by the musician; instead, they resonated with three melody strings, giving the instrument a rich tone. There were frets across the neck, and the strings were stretched over these frets and down the hooked end. The musician would pluck the strings.

The rebab developed during the 700s or possibly earlier in Afghanistan and became popular in the Near East, southern Europe, North Africa, and even Southeast Asia. It seems to have traveled wherever Muslims traveled. It may be confused with the rubab, but it was a different instrument. Like the rubab, the rebab was a stringed instrument, and its body was also covered by goat skin. But it was mostly played with a bow drawn across its strings and just occasionally plucked. It had a bowl-like box with the strings stretched over the bottom of the bowl. The neck was three to four times as long as the diameter of the box. It could be played with the base of the rebab set on the ground and the neck pointed upward. A spike at the bottom of the base was common and was set into the ground. Also common were stands, instead of spikes, of two legs that rested on the ground. Among regional variations were the size of the box and the number of strings (ranging from one to three). The strings were stretched over a bridge to pegs that were used for tuning them. Both the rubab and the rebab are still played in folk music and Arab classical music.

to improvise effortlessly, able to write good prose and verse, and having a wide general cultural knowledge.

During the Abbasid Dynasty (749–1258) Muslim music reached its zenith. At that time music in al-Andalus began to attain a character that was distinct from Arabian music. Politically, Abbasid hegemony began its decline in the 11th century, ending in the Mongol invasion in 1258. In al-Andalus the Spanish captured Granada in 1492, effectively ending the golden age. This split the Muslim world into smaller, independent states. Musical life, however, continued. Although it was less fertile and less original than before, it benefited in some ways from decentralization. At the various smaller courts music was encouraged by rulers anxious for prestige and was able to assimilate new local contributions, leading to greater diversity. The Sufi orders, primarily in Turkey and Iran, contributed the most to developing art music at that time. They did this by promoting music for their own religious needs and by creating conditions for a wider musical culture in general.

Many varied musical instruments were in use during the medieval period. One issue with the written sources is that they may use several different names to refer to one instrument, or conversely one name may be used to refer to several different instruments. For example, the term *mizmar* could refer to wind instruments in general, double- or single-reed instruments, or even the psalm.

Idiophones included metal castanets, cymbals attached to a dancer's thumb and middle finger; wooden spoons; copper plates; and oil containers. The Bedouins used a wooden coffee grinder (*mihbaj*), which consisted of a 1-foot-tall base and a 2-foot-long pestle. The *mihbaj* served a dual purpose of being a household item and, in the hands of an artist, a percussion instrument.

Membranophones were circular or rectangular frame drums (*duff*). Some had jingling disks, while others had strings stretched under the skin. One type of vase-shaped drum (*darbukkah* or *tablah*) was made out of earthenware. The *zarb* was placed under the left arm or between the legs and beaten in the middle and near the edge with both hands. Cylindrical drums (*tabl*) with two skins hung from the player's neck and were beaten with two flexible sticks. These were typically used at processions and open-air ceremonies. Kettledrums (*naqqarat*), hemispherical with skin stretched on top, came in pairs (a large one and small one). These were played during pilgrimages. During the late Abbasid and Fatimid (909–1171) dynasties kettledrums were beaten before the daily prayers.

Aerophones included reed instruments, flutes, and horns. Oblique reed flutes (*nay*) did not have a mouthpiece and came in different lengths. They usually had five or six holes on the

upper side and one hole on the bottom side. Notes could be modified by blowing more or less forcefully. Double-reed instruments (*zurna* or *ghayta*) were similar to the oboe. These were made out of wood and widened at the bottom into a bell shape. The reed, enclosed in a small brass mouthpiece, was held entirely inside the player's mouth as the lips pressed on a small metal ring. These instruments had seven or eight finger holes. A great variety of single-reed instruments had two pipes, some with pipes of equal length and others with one pipe longer than the other. Other aerophones were the horn (*buq*) and the long trumpet (*nafir*).

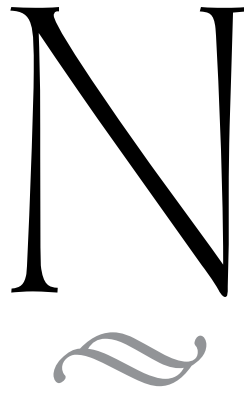
Chordophones were string instruments, most of which were plucked, not bowed. The most prominent string instrument was the short-necked lute with a pear-shaped body, called the *'ud* or the *amir al-tarab* ("the prince of enchantment"). Initially it had four strings and frets, but later versions had five double strings and were fretless. Long-necked lutes were widespread. The *sitar* had four strings and 25 movable frets. It was plucked with the nail of the index finger. The *tar* had a figure-eight body and was covered with skin. It had three double strings and was plucked with a plectrum, or a pick. Others—such as *tambur*, *komuz*, and *dombra*—had two, three, or four strings. The two main types of instruments were essentially trapezoidal boxes (*cithar*). The *qanun* had 24 triple strings, under the end of which were little movable bridges to allow the player to modify the tuning. It was held on the player's knees and was plucked with a plectrum attached to each index finger. The *santur* had 72 strings grouped in fours and supported by 18 movable bridges in two rows of nine, which divided the whole into three registers. It was struck with two sticks. The only bowed instrument was the *rabab*. A simple one was either rectangular or round, covered in skin, and strung with a single string. Another kind was oval or spherical and had two strings. A more complex type (*kamanja*) had three or four strings and a wooden body ending in a peg. All these were played by holding the bow steady and moving the instrument.

See also ADORNMENT; ART; CALENDARS AND CLOCKS; CRAFTS; DEATH AND BURIAL PRACTICES; DRAMA AND THEATER; EDUCATION; EMPIRES AND DYNASTIES; FESTIVALS; HEALTH AND DISEASE; HOUSEHOLD GOODS; INVENTIONS; LITERATURE; OCCUPATIONS; RELIGION AND COSMOLOGY; SPORTS AND RECREATION; TRADE AND EXCHANGE; WRITING.

FURTHER READING

Arthur Llewellyn Basham, *The Wonder That Was India: A Survey of the History and Culture of the Indian Sub-Continent before the Coming of the Muslims*, 3rd ed. (Columbia, Mo.: South Asia Books, 2000).

- J. Peter Burkholder, Donald Jay Grout, and Claude V. Palisca, *A History of Western Music*, 7th ed. (New York: Norton, 2006).
- Henry George Farmer, *A History of Arabian Music to the XIIIth Century* (London: Luzac, 1929).
- Henry George Farmer, *Historical Facts for the Arabian Musical Influence* (London: W. Reeves, 1930).
- Henry George Farmer, *The Sources of Arabian Music* (Leiden, Netherlands: E. J. Brill, 1965).
- Richard H. Hoppin, *Medieval Music* (New York: Norton, 1978).
- Lois Ibsen al-Faruqi, *An Annotated Glossary of Arabic Musical Terms* (Westport, Conn.: Greenwood Press, 1981).
- William P. Malm, *Traditional Japanese Music and Musical Instruments* (Tokyo: Kodansha International, 2001).
- Solveig McIntosh, *Hidden Faces of Ancient Indian Song* (Aldershot, U.K.: Ashgate, 2005).
- Gerald McMaster and Clifford E. Trafzer, eds., *Native Universe: Voices of Indian America* (Washington, D.C.: National Museum of the American Indian, Smithsonian Institution, 2004).
- J. H. Kwabena Nketia, *The Music of Africa* (New York: Norton, 1974).
- Dale A. Olsen, *Music of El Dorado: The Ethnomusicology of Ancient South American Cultures* (Gainesville: University Press of Florida, 2002).
- Francesco Salvador-Daniel, *The Music and Musical Instruments of the Arab* (Portland, Maine: Longwood Press, 1976).
- Douglas Spotted Eagle, *Voices of Native America: Native American Music* (Liberty, Utah: Eagle's View Publishing, 1997).
- Jeremy Yudkin, *Music in Medieval Europe* (Englewood Cliffs, N.J.: Prentice Hall, 1989).



► natural disasters

INTRODUCTION

Natural disasters can occur when human behavior conflicts with events within their natural environment. Planting crops in drought-prone areas, building on the sides of volcanoes, and settling on floodplains are examples of human beings acting in ways that might bring them into risk of natural catastrophe. Disasters can be made worse by the behavior of people. In the case of droughts, a famine can begin because a war destroys whatever crops manage to resist the drought, because farmers are so heavily taxed that they cannot profit from their farms and therefore do not plant crops, or because a government mismanages resources that could help people, such as through failure to save reserves of good harvests against future bad times, failure to distribute food to those who need it most, or failure to protect the trader and trade routes that could bring food into a drought-stricken area.

Still, people throughout the medieval world also could take action to change their environment so as to control natural events or at least manage natural disasters to minimize destruction and suffering. Among the most basic of these measures was the building of levees such as those built and maintained in China and the Near East. Both regions had rivers that could jump their banks, flooding the countryside and sometimes changing their courses. Levees were designed to hold rivers in place, and in China a government was thought to be negligent if it did not properly maintain its levees. A

way to lessen the intensity of floods was to construct irrigation canals. In China, India, and the Near East people built new channels to send river water to previously unwatered areas, bringing new land under cultivation and simultaneously draining water from the main flow, lessening its intensity.

The ingenuity that medieval people used to manage water is impressive. In the Netherlands people erected huge levees to manage the flows of the ocean. Dams were put up in arid regions such as North Africa and the Near East, and in al-Andalus dams were used to help foster its agricultural revolution of the 800s. The solution of terraced farming on mountainsides to control flooding and retain water during dry periods seems to have been reached in several cultures, such as in Japan, China, Sri Lanka, and Yemen.

Water was a visible quantity, its availability or unavailability known to longtime residents of the land. Other aspects of the natural world were not so easily seen but could reveal themselves with terrifying suddenness, such as volcanic eruptions and earthquakes. The effects of these events in medieval times are hard to gauge, usually because of an absence of documentary evidence from people who lived at the times of the events. Even so, archaeologists and historians as well as scientists from fields such as geology and climatology have tried to identify such events and understand what they meant for people.

For instance, in the early 500s the volcano Krakatau erupted with such violence that it darkened the skies of the world for about three years. The tsunami from the explosion

may have destroyed a Sumatran civilization: The darkened skies brought about crop failures around the world, causing untold deaths. Earthquakes seemed to leap out of the ground at people, wrenching open the earth and causing buildings to fall, yet people could plan to a degree for such events. For example, people in the areas of modern-day Afghanistan and Pakistan developed a building technology that incorporated wood into walls of stone, giving the walls the ability to flex and remain standing during the frequent shocks in the area. In Japan construction techniques with wood allowed entire structures to bend during shocks. Indeed, in both the Near East and Japan deaths caused by collapsing structures most often occurred when the building contractors cut corners and broke building codes, constructing substandard structures.

Violent weather was something else people anticipated when building. The mobile huts of the nomadic peoples of central and northern Asia were admirably suited to parting violent windstorms around themselves, like boats gliding through water. The Inuit of North America similarly made use of building shape to deflect the effects of snowstorms. In Southeast Asia many cultures built longhouses high on stilts to avoid floodwaters yet with sleek roofs of reeds that sent water from storms out and away from the houses.

With storms and all other forms of natural disaster, sometimes there was nothing to be done but stay away. For instance, during medieval times, Indians tended to avoid settling in the coastal plains that flooded frequently because of monsoons. Even the most careful water management could not save the great cities of the Silk Road from a change in climate that dried the land, forcing residents to leave. Further, whether the threat was from forest fires or volcanic explosions, people sometimes had to move into harm's way to find food for foraging or to find fertile land on which to grow food. Sometimes there was no escape, whether because of war or geography, and living with drought or avalanche was just something to be endured.

AFRICA

BY LEAH A. J. COHEN

The record of natural disasters in medieval Africa is fragmented, and many of the links between climate change, drought, flood, and famine have yet to be uncovered and documented. The sources of information regarding these and other natural disasters are pieced together from a variety of sources, including mythology and tradition, archaeological records, the travel documents of Arabian and European explorers, ice and sediment cores, data about sea temperature, and extensive records of Nile River flows. This information illustrates that disease epidemics and cycles of drought and

flooding were the most commonly documented natural disasters for humans in Africa during this period.

The occurrence of droughts in East Africa near the start of the medieval period has been linked to a massive volcanic event in Java in 535. The gases that billowed into the atmosphere and spread around the globe reduced sunlight all over the world, which resulted in a sudden drop in temperatures and a reduction in rainfall in many regions. The northeastern monsoon that flowed between India and the African coast and traditionally brought seasonal rains to East Africa was much drier than normal. It is estimated that these dry conditions lasted two to three years.

Some historians and scientists have made a link between the extreme dryness that followed the Java eruption and the East African origins of the bubonic plague outbreak that traveled with traders up the Nile and possibly the Red Sea, reaching Egypt by 542. This outbreak then traveled across the Mediterranean and spread throughout Europe. It is thought that a dramatic transition from dry to wet conditions, which happened during the recovery from the dry period, created conditions that allowed the resident East African rodent population, on which plague-carrying fleas lived, to explode faster than their natural predators' populations. This meant that the rodents' habitat expanded quickly and put them in contact with other animals and humans that did not have a natural resistance to the plague. The plague outbreak has been blamed for the comparatively sudden switch from agricultural to pastoral livelihoods in eastern Africa. Historians theorize that the rapidly expanding population of infected rodents congregated in areas where crops were stored, which resulted in the transfer of disease to farmers more quickly than to herders, who had less contact with the rodents. It is also thought that many of the port cities on the eastern coast of Africa were abandoned as a result of this outbreak of plague.

Aside from the two- to three-year dry spell in the sixth century, many other periods of drought occurred from region to region throughout the African continent. Stories of drought are scattered throughout the mythologies of many African cultures from medieval times. For example, the fall of the empire of Ghana in the 12th and 13th centuries has been attributed to several factors, one of which was a severe drought that devastated the land and natural-resource base of the empire. Furthermore, tradition tells of a severe drought in the empire of Mali prior to its peak in the 13th century that ended because the first king of Mali converted to Islam. The exact dates of his rule and the drought are unknown. A number of travel, church, and government records suggest a drought in Ethiopia sometime between 1252 and 1274 that caused widespread famine. An Arabian travel document re-

CYCLONES OF AFRICA

In the summer in southern Africa there is a threat of violent tropical storms. These are cyclones, also often called hurricanes or typhoons. They develop winds of more than 80 miles per hour and can generate tall ocean swells that become storm surges when they break across a coastline. These surges can be very destructive, overwhelming houses, people, and animals. In addition, the cyclones can sometimes drop enormous amounts of water inland, causing rivers to swell into lakes. Sometimes the cyclones sweep from east to west across the continent to Angola. A challenge to the medieval peoples of southern Africa was to anticipate the worst storms and to prepare for them.

An insidious aspect of the storms was that the worst ones did not occur every year. Often, storms formed in the east, hit Madagascar, and then weakened and often turned toward the sea. Perhaps unaware of the danger, farmers would move into lowlands and could prosper during years when the worst storms did not come. In the lower reaches of the Zambezi River, this seems to have been common, but it took only one severe cyclone to swell Lake Malawi, sending torrents down the Zambezi to cause the lower reaches of the Zambezi to swell outward, its channels unable to carry the load of water, flooding the land.

There were people who began their settlements with a few mud houses covered with thatch, and the settlements developed into cities and towns on the east coast. Although many of their buildings were made of stone, most people still lived in traditional houses even at the height of the cities' prosperity in the 1300s and 1400s. Most of these cities were in low-lying areas, thus making them very vulnerable to storm surges. How did the peoples of the cities avoid being swept away? An answer may come from the work of archaeologists who have uncovered walls made of massive stones. These were likely to have been storm walls, intended to fend off surging water.

corded in the mid-19th century tells the story of the king of France who waged a war of revenge on Tunis in northern Africa during a period of severe drought in Africa sometime between 1250 and 1270.

The frequency with which drought mythologies occupy the African folklore and tradition is not the only evidence supporting the natural occurrence of drought on the continent. Nile flow records and the analysis of sediments in African lakes also indicate dry and wet periods. However, the picture is no less fragmented from these data sources, which often suggest a great variability in drought and flood conditions. The major climatic event of this period was the Medieval Warm Period (approximately 800 through 1300). Climatic conditions in general were dry during this period in Africa, but many factors created variations in local conditions of drought and flood throughout Africa. Records from the Nile and elsewhere for the period from 970 through 1500 indicate fluctuations in the seasonal flood levels. Some scientists have concluded that the Nile flow data indicate lower general flood levels during the Little Ice Age, approximately 1300 through 1850, compared with the Medieval Warm Period.

Some of the most extreme conditions occurred during the Medieval Warm Period, which caused severe famines. There is evidence of a series of great floods in the Nile River valley in the early ninth century. Nile flow records also indicate low average flood levels between the seventh and 15th centuries, with particularly low flood levels in 967, which would certainly have lowered agricultural productivity, creating famine. The variation in local drought conditions is so great that droughts that were detected around Lake Naivasha in Kenya in the late 14th and early 15th centuries (which occurred within the 1270–1850 period of generally increased moisture) were not detected around Lake Hayk in northern Ethiopia, although both regions are in East Africa. Other climatic data suggest a pattern of increased moisture for eastern Africa near the equator and a pattern of drought in central equatorial Africa during the Little Ice Age. Although reasons for the demise of the civilization of Great Zimbabwe (11th through 15th centuries) in southern Africa is unknown, many researchers theorize that it was at least partially due to severe drought.

These climatic changes did not necessarily result in disaster for the human populations living in these areas. Throughout Africa's history humans have adapted to the ever-changing environmental conditions by altering livelihood strategies and migrating. One notable example of adaptation to environmental conditions comes from the Nile Valley. The seasonal flooding of the Nile River, which brought water and fertile soil deposits to the valley, was the lifeline of the population rather than the curse. Disaster followed if the Nile flood levels were lower than anticipated. Low flood levels meant less water for irrigated agriculture and a higher sediment load in the floodwaters, which hindered the flow of water through the irrigation canal systems. Therefore, if the

Nile did not flood, it caused agricultural production to decline and those who depended on it to experience famine.

Throughout the medieval period the natural fluctuation in wet and dry conditions in western Africa dictated human movement. While it meant disaster for some groups, it meant success for others. For example, during a period of increased dryness between 1000 and 1500 the Mali Empire was able to explore farther south, since this change in climate moved the northern boundary of the deadly tsetse fly southward. However, this dry period also forced human groups living in the northern areas bordering the Sahara desert to move south as the desert expanded, creating situations of increased conflict over territories.

At the end of the medieval period areas of northern Africa experienced another massive plague epidemic. This time it was the pneumonic plague, which traveled easily and was especially infectious and deadly. This epidemic was responsible for killing a substantial percentage of the Egyptian population and remained present in the population, periodically causing outbreaks for centuries.

Although earthquake disasters were not a common cause of devastation in Africa in medieval times, earthquakes in 1302 and in 1323 severely damaged the Pharos of Alexandria, an ancient tower on the island of Pharos in Alexandria, Egypt. The tower, which was built sometime in the third century B.C.E., was first a landmark of the Egyptian coast and later a lighthouse.

THE AMERICAS

BY KEITH JORDAN

Contemporary knowledge of natural disasters in pre-Columbian North America is limited to scientific data drawn from geology and biology. The impact of disasters on indigenous peoples can be inferred by attempting to relate these environmental changes to changes in behavior reflected in archaeological finds. Whether and how much an adverse environmental effect influenced cultural developments such as social collapse or the abandonment of settlements is often difficult to determine.

Humans respond to disasters in many and complex ways, and the dating methods for archaeological materials are often insufficiently precise to allow for clear correlations between natural and cultural change. For example, in the Southwest a drought that occurred around 1090, identified from the study of tree rings, corresponds to the beginnings of the decline of the Anasazi (Ancestral Pueblo) sites of Chaco Canyon, New Mexico. Some construction at Chaco Canyon nonetheless continued into the following century, indicating that the drought was not sufficient to cause the site's loss of

prestige and subsequent abandonment. If the ruling elite at Chaco based its power in part on controlling rituals designed to maintain agricultural abundance, as some archaeologists think, then the drought might have undermined their power by calling into question the effectiveness of their rituals.

Similarly, a massive drought struck the Southwest between 1276 and 1299, according to the tree-ring evidence. This corresponds roughly to the period when the Anasazi abandoned the northern Southwest, migrating south to become the modern-day Pueblo peoples. In fact, the drought itself seems to have spread from north to south. The correlation, however, is not precise. Some areas that were little affected by the drought, like river valleys, were still abandoned by the Anasazi, and the archaeological evidence shows that people started leaving the northern Southwest before the drought. It seems that other, more social factors also influenced the Anasazi migrations.

In the Eastern Woodlands two quarter-century periods of drought around 1200 may have contributed to the decline of the Mississippian city of Cahokia in Illinois. Geological evidence for a late-13th-century earthquake in the Midwest that may have damaged the main platform mound at the site suggests that more than one kind of disaster afflicted the city at this time. The final collapse of Mississippian culture in the Southeast, however, seems to have been the result of a disaster combining natural and human aspects. The expeditions of the Spanish explorer Hernando de Soto (ca. 1500–42) and others into the southern United States during the 16th century introduced smallpox and other European diseases to native peoples with no resistance to these organisms. The resultant plagues decimated the Native North American population and destroyed cultures as complex systems of religious and political beliefs perished along with the chiefs and elders.

Around 590 the volcano known today as Loma Caldera in El Salvador erupted, burying a nearby Mayan village, Cerén, under 16 feet of ash. What was a disaster for the inhabitants of Cerén turned out to be good fortune for archaeologists. The ash preserved the remains of the town, providing a window into the everyday life of Mayan commoners just as the similar burial of Pompeii in 79 C.E. did for the ancient Romans. Unlike the Pompeians, however, the Maya of Cerén seem to have recognized the threat of eruption and evacuated the village before the ash started to fall, leaving no bodies behind.

Core samples taken from lakes in Yucatán provide evidence of a massive drought in the 10th century. Some scholars blame this and other disasters for the collapse of Classic Mayan civilization, but there are problems with any simplistic version of this idea. Classic Mayan cities began to be abandoned a century before the drought. The fall of Mayan kingdoms also occurred in areas south of Yucatán unaffected



Jade figurine of Tlaloc, the rain god, who could also provoke storms and floods; Mixtec culture, Mexico, ca. 1200–1521 (© The Trustees of the British Museum)

by the drought, and some Yucatán cities survived most of the other Mayan city-states by 100 years or more, gaining in political power and influence.

One major Mesoamerican series of disasters is known through the oral histories of its overpowering impact, as preserved by the Spanish invaders of the 16th century and their Native American informants. In 1449 a flood struck the Aztec capital of Tenochtitlán, located at the site of modern Mexico City. The city was situated on an island surrounded by freshwater and saltwater lakes. The flood caused brackish water to contaminate the city's freshwater drinking sources and irrigation works, but that was just the beginning of a long period of troubles for the Aztec. The following four years were unusually cold and even included uncharacteristic snowfalls, causing severe crop failures. This in turn led to extreme fam-

ine conditions by 1452. Allegedly, even members of the Aztec nobility were forced to sell their children as slaves to the inhabitants of agriculturally prosperous areas like Mexico's Gulf Coast, and some resorted to cannibalism to survive.

The worst part of the famine corresponded to 1454, the year One Rabbit in the Aztec calendar. After this experience, the name of the year became a sort of shorthand in Aztec speech for starvation. The Aztecs recovered within the 1450s and went on to conquer many of their neighbors. Significantly, one of the first areas they turned to in their expansion was the Gulf Coast. They sought to dominate the region for its grain reserves to prevent such catastrophic food shortages from ever befalling Tenochtitlán again.

A repeated source of natural calamities for centuries on the Peruvian coast is the meteorological phenomenon christened El Niño. This is a warm-water current from the western Pacific that reaches the Peruvian coast every year in December, hence its name in Spanish after the infant Jesus. Usually it lasts for only a few weeks, but every three to seven years it becomes a major event, lasting up to months and creating floods, droughts, and the mass death of the cool-water sea life relied upon as a food source by many coastal peoples.

Some of these El Niño events are truly catastrophic in magnitude. According to geological and archaeological evidence, the Moche civilization of the northern Peruvian coast was beset by multiple disasters in the late sixth century. A drought during the period between 562 and 594 was accompanied by a powerful El Niño event—possibly lasting as long as 18 months—that caused widespread flooding. A Moche capital at the present-day site of Cerro Blanco was inundated. Its buildings, constructed of unbaked mud bricks, were severely damaged. Irrigation systems were swamped and destroyed, and famine and disease epidemics almost certainly followed. Furthermore, there is some evidence that an earthquake struck the Moche area during this calamitous time.

The Moche sought to control these disastrous phenomena in the only way they saw as effective: through religious ritual and human sacrifice. Excavations near the structure known as Huaca de la Luna at Cerro Blanco show that during El Niño events the Moche killed and dismembered human sacrificial victims and threw their bodies from a natural elevation into the flood-borne mud. Cerro Blanco survived the sixth-century disasters and was rebuilt, but it lost much of its influence as another Moche city, Pampa Grande, rose to dominate the region. At the same time, another kingdom in the Peruvian highlands, Huari, seems to have profited from the disasters. Not only did the natural events weaken the Huari state's potential rivals on the coast, but Huari's sophisticated irrigation systems allowed it to survive the drought and probably attracted less-fortunate neighbors.

The final natural disaster to strike medieval Peru was of the same nature as that which destroyed the Mississippian chiefdoms. Smallpox introduced from Spanish colonies in Central America reached Peru in the 1520s. As in North America, the disease ravaged a population that had no prior exposure. Compounded by a civil war between rival claimants to the throne, this plague served as an unintended spearhead of the Spanish Conquest, destabilizing and weakening the Inca Empire just prior to the Spanish invasion of 1532.

ASIA AND THE PACIFIC

BY AMY HACKNEY BLACKWELL

The Asia and the Pacific region is prone to a variety of types of natural disasters. During the Middle Ages seismic activity caused numerous natural disasters in the region. Volcanoes, earthquakes, and tsunamis were all tremendously destructive. The climate patterns of the Indian Ocean and the Asian continent created unpredictable and sometimes violent weather that could swing rapidly between devastating storms and deadly droughts. All natural disasters could create effects that lasted long after the disasters themselves were over. Famine and disease were the natural consequences of these events and often killed far more people than the original victims of the disasters themselves.

The Pacific Rim is very geologically active. The entire Pacific Ocean is surrounded by tectonic plate edges, undersea volcanoes, and deep oceanic trenches. Three-fourths of the world's active volcanoes are located here, and 90 percent of the world's earthquakes occur in this area, which modern scientists sometimes call the Ring of Fire. Another 5 percent of the world's earthquakes occur along a belt running between Sumatra and Java up through the Himalayas.

This large amount of seismic activity meant that earthquakes and volcanic eruptions occurred with some frequency during the medieval period. The islands of Japan and Indonesia were home to some of the world's most active volcanoes, which erupted periodically and caused widespread destruction. Earthquakes and volcanic eruptions that happened out in the ocean could cause tsunamis, massive ocean waves that could reach far inland, destroying everything they washed over and sweeping thousands of humans out to sea. Japan in particular suffered numerous tsunamis in medieval times. On average, a tsunami large enough to be recorded struck Japan every seven years or so.

Many earthquakes and tsunamis struck the Nankai district, southwestern Honshū and Shikoku, threatening the important medieval cities Kyoto and Nara. The first earthquake recorded by Japanese chroniclers resulted from the Hakuko earthquake in the Kii Channel in 684, causing a tsunami to

strike the Kii peninsula. This earthquake marked the start of slightly more frequent earthquakes in the Nankai trough, southeast of the island Honshū near Wakayama Prefecture. Japanese geologists have taken soil samples that show that up until 684 earthquakes generated tsunamis approximately every 200 years, but between 684 and 1946 the frequency increased to every 160 years or so. Many Japanese earthquakes in this region occurred in pairs, with one earthquake happening in the area of the modern city of Ōsaka and another happening in the Wakayama area. Geologists believe that both the Hakuko earthquake of 684 and the Ninna earthquake of 887 followed this pattern. In 1096 the Eicho earthquake seems to have hit the Ōsaka region. The 1099 Kowa earthquake may have been one giant earthquake that covered the whole region.

A major earthquake struck the city of Kamakura on August 23, 1257. In his writings the Buddhist scholar Nichiren Shonin (1222–82) describes the destruction caused by this earthquake. This earthquake apparently was preceded by several months of smaller tremors and was followed by aftershocks that extended into November. Many of Kamakura's buildings and temples were destroyed. In 1258 several violent windstorms and rainstorms battered Kamakura and Kyoto, creating floods that killed thousands. In 1273 a massive earthquake caused a tsunami that killed an estimated 30,000 people. Another massive earthquake struck Kamakura in 1293. Historians estimate that at least 23,000 people died, though the number could have been much higher.

Earthquakes occurred in other locations in Asia and the Pacific. A 13th-century historian from Syria recounts the tale of an earthquake that occurred in 893 in a region he calls "Outer India," killing 180,000 people and destroying an unnamed capital city. Subsequent historians suggest that this earthquake actually occurred in Armenia instead. In 1036 a large earthquake destroyed Shanxi, China, killing about 23,000 people. Approximately 100,000 people died in 1290 when a massive earthquake struck Bo Hai in Hebei, China. The deadliest recorded earthquake in history struck Shaanxi, China, in January 1556, destroying houses built on cliff faces and killing an estimated 830,000.

Mount Fuji, a volcano in central Honshū, Japan, erupted at least 13 times between 781 and 1083. A large eruption in 864 sent lava down the northeastern slope of the mountain. This lava divided a large lake into two lakes, now known as Saiko and Shoujiko. Between 1083 and 1511 Fuji was quiet, with no eruptions recorded. Mount Haruna in Gumma Prefecture in eastern Honshū erupted around 550. Volcanoes in the Daisetsuzan volcanic group of Hokkaido erupted around 1400. Narugo, a volcano in Miyagi Prefecture, erupted in 837. It trembled first for a few days and then erupted, creating a

new hot spring. Nii-shima and Kozushima, both Izu islands, erupted in the ninth century. On-take in Kyūshū erupted in 708 and again for the period 1471–76.

The volcano Krakatau, in the Sunda Strait between Java and Sumatra, erupted violently in 535. The explosion created large waves on the shores of the neighboring islands, sweeping people and their property out to sea. This eruption may have played a role in the formation of the islands Krakatau, Verlaten, and Lang. Some scientists have suggested that this eruption may have caused the world's climate to change. Geologists believe that Gunung Tambora in Indonesia erupted in about 740.

Mauna Loa, a volcano in Hawaii, erupted regularly during the medieval period, though there are no written records of these eruptions. Another Hawaiian volcano, Kilauea, probably erupted regularly and emitted lava during the late medieval period. Scientists believe that Mount Pinatubo in the Philippines had a large eruption during the 15th century. Rangitoto, a volcano in the Auckland volcanic field of New Zealand's North Island, erupted around 1350, destroying some Maori villages.

Areas that were not prone to earthquakes and volcanoes suffered their share of natural disasters as well. Tropical cyclones, often called typhoons in the Pacific and hurricanes in the Atlantic, affected the southeastern coast of Asia, the Bay of Bengal, the northern coast of Australia, and the islands of Indonesia and New Guinea. These storms could bring with them winds of up to 190 miles per hour, often destroying houses, trees, and crops. Typhoons caused large floods, especially in the Bay of Bengal and at the mouths of rivers in Southeast Asia and China.

India's climate and geography presented the risk of numerous types of natural disasters, all of which caused death and could also precipitate famines and disease. Unpredictable rainfall caused many problems in medieval times. Heavy monsoons overfilled rivers, causing massive floods that regularly drowned and displaced thousands of people and washed away crops. Tropical cyclones could produce storm surges and heavy winds that destroyed towns and crops. Cyclones also brought with them hailstorms that could destroy crops. Landslides were common in the foothills of the Himalayas, and avalanches were common in the higher elevations.

India was plagued by periodic droughts that led to large famines. India's farmers depended on regular yearly rains to water their crops. If the rains failed, then the farmers could not grow enough food to feed themselves. The effects of a famine could last for years after the rains returned because people would have consumed their seeds and working animals as food, preventing the people from replanting. In 650 drought caused famine throughout India. Famines in 1022 and 1033

killed thousands of people. Some regions were left completely depopulated after their residents died or left. Historians describe families abandoning their children and people turning to cannibalism to stave off starvation. Between 1148 and 1159 India suffered one long, continuous drought and famine.

The famine of 1344–45 was known as the Great Famine. Even the emperor could not acquire enough food to keep his household fed. The effects of this famine lasted for years. Many thousands of people died. The 12-year Durga Devi famine occurred between 1396 and 1407. Some towns were abandoned by their residents. It was said that some regions did not fully recover for 25 years after the droughts ended, a recovery that was not aided by another brief drought and famine period in 1412–13.



Sandstone stela depicting Matsya, the first incarnation of Vishnu; central India, ninth century. At the time of a great flood Vishnu took the form of a fish (Matsya) to save the primeval human and the sacred Vedas. (© The Trustees of the British Museum)

China was also prone to a wide variety of natural disasters. Rainstorms, dust storms, droughts, landslides, and floods all occurred regularly. The Yellow River regularly overflowed its banks, swamping farms and houses and leading to a regular program of levee building. Historians estimate that the Yellow River has flooded more than 1,000 times since about 1000 B.C.E. Each flood could kill thousands of people through drowning and subsequent famine. The river also changed its course unpredictably. Starting in 1194 it changed its course between its original route and the southern Huai River several times over the late medieval period.

Famines happened regularly throughout the rest of Asia. Some historians estimate that small, localized famines occurred nearly every year in medieval China, as droughts, storms, floods, landslides, excessively cold growing seasons, and other disasters destroyed crops in local areas. Often wars contributed to the bad effects of natural disasters by making it harder for people to grow crops. A large famine between 875 and 884 in China led to a peasant rebellion. China suffered another lengthy famine between 1333 and 1337. Korea was struck with famine in 1445. Japan suffered significant famines in 1231–32 and 1460–61. The Kanshō famine of 1460–61 killed an estimated 2,000 people per month in Kyoto. Many of the people dying in the city were not residents but were rural farmers who had been unable to produce crops and had fled to the city in search of food.

EUROPE

BY AMY HACKNEY BLACKWELL

Medieval Europeans were vulnerable to many kinds of natural disasters. Bad weather, volcanic eruptions, earthquakes, floods, and drought all killed large numbers of people and destroyed vast amounts of property. Disasters also precipitated famines, the effects of which could last for years.

Floods were a major problem in northwest Europe, where the combination of low terrain and bad storms in the North Sea could create rushing torrents quickly. In 1211 the Tay and Annan rivers in Perth, Scotland, overflowed. The king of Scotland escaped by boat, but most of his court drowned. Hundreds of people died in this flood. In 1219 Saint Lawrence Lake, in present-day Norway, flooded, killing 36,000 people. In January 1362 a major windstorm in the North Atlantic ravaged the land in England, Germany, Denmark, and the Netherlands. It destroyed crops and wiped out entire towns throughout the region. The storm surge swept across the Netherlands, where it killed about 25,000 people and left some land permanently submerged, increasing the size of the Zuider Zee.

The lowlands of the Netherlands were particularly prone to disastrous flooding by the North Sea, especially during fall

and winter storms. The people living in the area built dikes to keep out the water, but during the medieval period the dikes were incomplete and often ineffective. Storm surges from the North Atlantic would force themselves up the many rivers in the region, pushing water over and through the earthen dikes. A number of floods were recorded by monks and priests who kept records at the time. (Many of the floods were named for the saint's day on which they occurred.) On December 26, 838, a large flood struck the northwest part of the Netherlands. In September 1014 a storm surge breached the dikes on the coast and killed thousands of people. Ten years later a November flood hit the Flemish coast and the area around the Yser River. In 1163 several floods hit the Netherlands, closing the mouth of the Oude Rijn with silt. On All Saints' Day (November 1), 1170, a major flood covered the northern Netherlands with seawater; this flood was known as the All Saints' Flood. Saint Nicholas's Flood of 1196 inundated the same region, washing large areas of peat out to sea. Major floods hit the Netherlands in 1212, 1213, and 1219.

In 1228 an enormous flood reportedly killed 100,000 people. Floods in 1248 and 1249 breached the seawalls and dunes in northern Holland. On December 14, 1287, Saint Lucia's Flood breached the seawalls on the Zuider Zee and killed about 50,000 people, mostly in Friesland. On October 8, 1375, Zeeland and Flanders were flooded; this flood formed the Zuudzee.

The two Saint Elizabeth's floods were major disasters in the 1400s. The first Saint Elizabeth's Flood occurred on November 19, 1404, wiping out villages on the banks of the new Zuudzee and engulfing other towns in areas. The coastal islands of Flanders were submerged. After this flood the duke of Burgundy, John the Fearless, created a straight line of dikes to protect the entire coastline of his territory. On November 19, 1421, another massive storm in the North Sea caused flooding that breached the dikes in Holland and Zeeland. The result was that 72 counties ended up submerged, 20 of them permanently, and perhaps 100,000 people died. The cities of Dordrecht and Geertruidenberg were permanently separated by the new bodies of water. The South Holland Kinderdijk, or "child's dike," took its name from a story that came out of the 1421 flood. Supposedly, a man walking the dikes after the flood found a cradle floating in the water with a cat on top of it, trying to keep it level and dry. Inside the cradle lay a baby that the cat had saved.

The many floods and storms that hit the Low Countries ended up reshaping the land. The 1170 All Saints' Flood contributed to the early formation of the Zuider Zee, opening a channel between the freshwater Flevo Lacus that made it accessible to seawater. The floods of 1212 to 1219 enlarged the Zuider Zee and caused another inland sea to form, the Wad-

denzee. The flood of 1277 created a bay known as the Dollart, currently between the Netherlands and Germany at the mouth of the Ems River; about 33 villages ended up under water.

Some of the worst disasters to befall medieval Europeans were caused by changing climate in the 1300s. Scientists believe that pack ice in the Atlantic began to increase around 1250, which led to a gradually cooler climate. By 1300 summers in northern Europe were no longer consistently warm, and the cool growing seasons led to many isolated instances of famine. The increase in bad weather that began around this time brought with it repeated severe storms in the North Atlantic and North Sea. The most severe cold of the Little Ice Age did not appear until the 1600s, after the end of the medieval period, but by the 1400s the climate in Greenland had become cold enough to make it impossible to survive by raising livestock and hunting, causing the European colonies there to die out.

Between 1315 and 1322 all of Europe suffered a major famine that killed millions of people. This famine became known as the Great Famine. During the spring of 1315, unseasonably cool weather and incessant rain ruined crops across the continent. Some farmers could not grow plants at all. Those who did could not dry their grain or cure their hay. Salt producers could not evaporate seawater to make dry salt. Food prices rose, and the poor began to starve. Travel became difficult if not impossible as roads turned to deep mud. The cool weather and rain continued during the spring of 1316, which led people to slaughter most of their livestock, including working animals needed to pull plows. Farmers ate their seed wheat instead of saving it to plant. The rains held steady through the spring of 1317. By this time many people had fallen ill with the diseases that accompany continuing damp, cold conditions, and the supplies needed to start the agricultural economy back were almost completely gone. It took Europe's people until about 1325 to restore the economy to normal.

Famine was a regular consequence of natural disasters, because any kind of disaster disrupted peoples' ability to produce and store food. Natural events combined with human unrest could compound famines. Droughts were a major cause of famine; low or nonexistent rainfall made it impossible for farmers to grow crops. The weather and the natural world were usually unreliable, so famines were unfortunately regular. Local famines occurred almost yearly in all of Europe. In 592 and 605 England experienced droughts that led to crop failures and famines. Spain suffered a famine in the 750s and Ireland experienced a famine in 772. A famine struck the Frankish Empire in 809. England experienced famines in 1005 and 1066. Another drought struck England in the years from 1135 to 1137, causing thousands of people

to starve. Famines occurred in England in 1235, 1294, and 1390; in Portugal in 1255 and 1333; in Spain in 1333; and in Germany in 1258.

Although Europe's land was not as geologically active as that of the Asian and Pacific regions, Europe had its share of earthquakes and volcanic eruptions. Most of these occurred in the area of the Mediterranean, though Iceland was also prone to volcanic activity. For example, one of the largest medieval volcanic eruptions was that of Iceland's Eldgja volcano in 934.

Several active volcanoes in southern Italy erupted during the medieval period. Although the most famous eruption of Mount Vesuvius was the one of 79 C.E., which engulfed Pompeii, the volcano was quite active throughout the medieval period. The eruption of 472 shot ashes so high that they landed in Constantinople. An eruption in 512 disrupted local commerce to the point that King Theodoric temporarily exempted residents from taxes. Vesuvius erupted again in 787, 968, 991, 999, 1007, 1036, 1198, and 1302. After this period of activity, the volcano went quiet for 300 years. People moved back onto the slopes, where they built houses and grew crops, even planting some inside the crater. This period of complacency lasted through the end of the medieval period and was not disturbed until the major eruption of 1631.

Mount Etna in western Sicily erupted several times in the ancient period, starting around 1226 B.C.E. Its best-known eruption was that of 386 B.C.E., which thwarted the Carthaginians who were attacking Syracuse. It was quiescent, however, for most of the early medieval period. Its first eruption since ancient times occurred in 1169. This eruption destroyed 50 towns and killed 15,000 people. Other volcanoes were active in the Mediterranean region. Stromboli, in the Lipari Islands north of Sicily, has exploded and shed lava almost continuously since 1 C.E., placing villages on the island at regular risk of damage. Stromboli's neighbor Vulcano was also consistently active and thus had few inhabitants.

The largest earthquake to hit medieval Europe was the Basel earthquake of October 18, 1356. Modern scientists have estimated that it was 6.2 on the Richter scale. This earthquake's epicenter was in the upper Rhine valley of Germany, but the greatest effects were felt in Basel, Switzerland, which was destroyed by fires caused by a strong aftershock. About 300 people in Basel died. The earthquake's destruction extended into Germany and France. A number of the castles in the area suffered damage.

Several other notable earthquakes occurred during the medieval period. In December 557 a large earthquake shook Constantinople. Much of the city was destroyed. The church of Hagia Sophia, then under construction, suffered a crack in its dome, which resulted in its collapse on May 7 the follow-

ing year. Another earthquake damaged Constantinople in 936. In Greece the earthquake that struck Corinth in 856 reportedly killed 45,000 people. Some 15,000 people died in an earthquake that struck Sicily in 1170. An earthquake shook England in 1318. At the end of the medieval period 35,000 people died in Naples in the earthquake of 1456.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Wind, sand, sun, earth, and water were elements of disaster for the medieval Islamic world. Much of the story of natural disasters in the Islamic world consists of the responses of people to events that were sometimes out of their control and sometimes partly of their own making. The most devastating long-term disasters were probably to be found in Arabia, the Sahara, and central Asia, where climatic change that had begun thousands of years earlier slowly dried up water resources and often mummified once-thriving cities. Short-term disasters were chronic, including earthquakes, floods, droughts, and crop failures.

Islam arose in a land of varied geography. The Hejaz along the Red Sea coast was rough, hilly terrain marked mostly by small towns and villages that were part of the trade routes between the Mediterranean world, East Africa, and southern Asia. The southwest of Arabia was Yemen, the southeast was Oman. Oman had a range of mountains along its eastern end against which winds pressed clouds that dropped rain. At the outset of the medieval era Oman had forests as well as lands that were already desert. From the 500s to the 1000s those forests were continuously logged to provide fuel not only for homes but also for smelting the copper ore that brought medieval Oman much of its wealth. As the forests fell, the land that they had anchored dried and became part of the desert. Archaeologists are still trying to sort out how the peoples of Oman responded, but at present evidence indicates that they abandoned much of their land, only to begin repopulating it in the 1100s.

On the other hand, Yemen had mountains on its western and southern coasts that extended deep into its interior. There, drought and floods were the most common natural disasters. Winds from the Arabian Sea carried clouds into the mountains, where they would sometimes release torrential downpours that cascaded down the mountainsides, flooding the settlements at the foot of the mountains. The people of Yemen developed adaptations that were unusual for the Arabian Peninsula. They built tall apartment houses in the foothills and the flatlands close to the mountains, seemingly where they would be most vulnerable to flooding but also where they were likeliest to retrieve whatever water fell during the land's fre-

quent droughts. They built dams that their governments made sure were maintained, preventing much water from gushing through gullies and valleys into the sea. Further, they built terraces on the mountainsides that curved with their contours and looked like giant steps above their settlements. These terraces prevented flooding by catching water, with the upper terraces allowing water to flow into lower ones, each absorbing enough water in its soil to prevent the people at the bottom of the terraced steps from being inundated.

During droughts, oases in Arabia could dry up, forcing people to move to the coastal towns or perish. A severe drought in 639 placed even the coastal towns in jeopardy because their crops failed. This occurred during the caliphate of Umar I (r. 634–44), who demonstrated one of the early benefits of the conquest of the Byzantine territories. He organized relief caravans to bring food from the newly conquered lands of Syria and Iraq to aid the towns of Arabia. For the long term he and his successors cleared Amnis Trajanus, an ancient canal that connected the Nile to the Red Sea, dubbing the reopened channel the Canal of the Commander of the Faithful. Via this canal, harvests of grain from Egypt were taken to Arabia. A further measure was the construction of pools to retain water for pilgrims along their routes to Mecca and Medina.

To further safeguard against droughts and famines, the governments of the Near East built irrigation canals to send water to what had been wastelands in order to spread agriculture. This was an enterprise that required constant effort, because the major sources of water, the Tigris and Euphrates rivers, periodically changed their courses. The land around them was usually flat, and they had to be kept in their courses by levees built along their banks; even so, the rivers would sometimes break the levees, shifting to new courses. People tended to build their cities near rivers, and such a shift in a river's course could end a city's history. The ruins of Babylon are testimony to what happened when its river moved away. In Syria there is the bridge of Ayn Diwar, built in the 1100s or 1200s to span the Tigris but now a bridge to nowhere over dry land.

The medieval Islamic world was notable for the abundance of food usually available to its cities, but famines sometimes struck. These were often caused by a combination of natural and human circumstances including drought, mismanagement, and war. Perhaps the worst of these occurred in India in the 1330s or 1340s and in Egypt from 1403 to 1404. The dating of the Indian famine is uncertain because the records of the time are somewhat imprecise, although it is known to have occurred during the reign of Sultan Muhammad ibn Tughluq (r. 1325–51). He was creative, talented, and very intelligent, but he was also cruel and sometimes seemed to be oblivious to why

his subjects often loathed him. During his reign he raised taxes on farmers to such a level that many of them, big landowners as well as small farmers, refused to cultivate their lands. This occurred at the same time as a drought, which led to catastrophic crop failures throughout northern India. The result was starvation so severe that entire provinces were depopulated. The sultan distributed the government's stored grain, and then imported grain from abroad, but an uncounted number of people died, perhaps in the millions. He also paid agents to bring unused land into cultivation, but these agents pocketed the money and failed in their obligations.

Off and on for several decades before 1403 Egypt's harvests had been erratic because of recurring droughts. When Timur (ca. 1336–1405) led his armies into the Near East, the Mamluk government of Egypt nearly bankrupted itself in financing the defense of Egypt and consequently raised taxes on Christians and Jews, people vital to farming in Egypt. In 1403 the Nile's annual flood was very small; most land that normally received nutrient-rich silt as well as water remained dry. Farmers became financially unable to farm and this, when combined with the drought, resulted in a death toll that remains uncertain, but hundreds of thousands probably died and recovery doubtless took decades.

As aberrations in the climate, droughts were usually not part of another phenomenon that shaped the Islamic world throughout the medieval era. This was a gradual drying of the climate in North Africa, the Near East, and central Asia. Studies of the Sahara show that as recently as 3000 B.C.E. it was a verdant land of prairies and forests. By 2000 B.C.E. people were moving to escape the drying of the land. At the outset of medieval times, the southern end of the Sahara was farther north than it is now, but it slowly spread south into overgrazed lands, drying out oases and widening the distances caravans had to travel from North Africa to sub-Saharan Africa. Archaeologists occasionally find the dried remains of a caravan from the medieval era that may have been overcome by a sandstorm and left buried for hundreds of years until winds blew the sand away. All it took for catastrophe was for an anticipated watering at an oasis to be lost because the oasis had dried. To wander away from a caravan for even a few minutes could mean death in a desert that became more unforgiving daily.

In central Asia archaeologists have barely begun to explore the once-fabulous cities of the many trade routes collectively called the Silk Road. During the early medieval era China had extended its range north of the Himalayas to include the Silk Road all the way to the Near East. When Islamic armies pushed the Chinese out of much of central Asia, the lands of the Silk Road were already drying. Water ceased flowing from the mountains because glaciers had withdrawn,

or wells had run dry. Cities that were considered in their own day to be among the most civilized and technologically advanced in the world became deserted. War further depleted the lands of their people, especially the conquests of the Mongols and Timur.

Another phenomenon that profoundly affected lives in central Asia and the Near East was the earthquake. Details for most earthquakes are scant, partly because people often deserted the devastated land without leaving records and partly because few chroniclers in the medieval era wrote in detail about what happened. An exception to this desertion was Tabriz, a town in northern Iraq that people persistently rebuilt. The city was ruined by earthquakes in 791, 858, and 1041, and because it was rebuilt each time archaeologists can identify the breakage and ruin of each event by examining its walls as well as buildings that were constructed on top of old ones. The rebuilding of Tabriz in 791 was so remarkable that Zubaidah, wife of Caliph Harun ar-Rashid (r. 786–809), who organized the rebuilding, was thereafter declared the founder of Tabriz. Later chroniclers lamented the loss in the earthquakes of 858 and 1041 of the many monuments built in Tabriz after 791.

One of the most catastrophic earthquakes in history occurred in the region of the city of Aleppo in present-day Syria on October 11, 1138. This date and much information about the events after the earthquake come from the author Ibn al-Qalanisi (ca. 1070–1160). He recorded four aftershocks. Modern geologists estimate that the earthquake was over 8.0 on the Richter scale and may have originated from earth movements in the Himalayas. Another large earthquake near the town of Gāncā in present-day Azerbaijan on September 30, 1139, may have been related to the same earth movements that devastated Aleppo. About 230,000 people died during the Aleppo earthquake. A foreshock on October 10, 1138, had been enough to warn the 67,000 or so residents of Aleppo, nearly all of whom fled the city. Buildings collapsed in Aleppo, but most of the casualties seem to have been in nearby towns and villages. The knowledge existed of how to build earthquake-resistant structures: People in what is now Pakistan had been constructing walls from a mix of stone and wood that could flex with earthquakes, and much of the destruction caused by the Aleppo quake and similar ones in the region in 1114, 1157, and 1170 may have been due in part to poor building practices. Yet even sturdy structures such as castles could not withstand the landslides that carried them off the hills on which they had been built. After each of these earthquakes, people tended to stay near their homes or search for mosques or fortresses that might be intact enough to offer shelter. They tended to forage for food as families and cooked food outdoors near where they were staying.

Perhaps a more traumatic earthquake, although not as well recorded, occurred on March 18, 1068, near Jerusalem, where the later Aleppo earthquake was not felt. The center of the earthquake was in the Hejaz, which would suggest it may have damaged sacred sites such as Medina, but what happened at Jerusalem seems to have been of greatest concern. About 100 people died in Jerusalem; moreover, the Dome of the Rock seems to have been shifted out of position. People moved it back to its customary place.

See also AGRICULTURE; ARCHITECTURE; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CHILDREN; CLIMATE AND GEOGRAPHY; FOOD AND DIET; FORESTS AND FORESTRY; HEALTH AND DISEASE; MIGRATION AND POPULATION MOVEMENTS; MINING, QUARRYING, AND SALT MAKING; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; WAR AND CONQUEST.

Europe

≈ Johannes de Trokelowe: “The Famine of 1315” (ca. 1315–17) ≈

In the year of our Lord 1315, apart from the other hardships with which England was afflicted, hunger grew in the land. . . . Meat and eggs began to run out, capons and fowl could hardly be found, animals died of pest, swine could not be fed because of the excessive price of fodder. A quarter of wheat or beans or peas sold for twenty shillings, barley for a mark, oats for ten shillings. A quarter of salt was commonly sold for thirty-five shillings, which in former times was quite unheard of. The land was so oppressed with want that the king came to St. Albans on the feast of St. Laurence [August 10] it was hardly possible to find bread on sale to supply his immediate household. . . .

The dearth began in the month of May and lasted until the feast of the nativity of the Virgin [September 8]. The summer rains were so heavy that grain could not ripen. It could hardly be gathered and used to bake bread down to the said feast day unless it was first put in vessels to dry. Around the end of autumn the dearth was mitigated in part, but toward Christmas it became as bad as before. Bread did not have its usual nourishing power and strength because the grain was not nourished by the warmth of summer sunshine. Hence those who ate it, even in large quantities, were hungry again after a little while. There can be no doubt that the

poor wasted away when even the rich were constantly hungry. . . .

Considering and understanding these past miseries and those that were still to come, we can see how the prophecy of Jeremiah is fulfilled in the English people: “If I go forth into the fields, behold those slain with the sword, and if I enter into the city behold them that are consumed with famine.” Going “forth into the fields” when we call to mind the ruin of our people in Scotland and Gascony, Wales and Ireland . . . Entering the city we consider “them that are consumed with famine” when we see the poor and needy, crushed with hunger, lying stiff and dead in the wards and streets. . . .

Four pennies worth of coarse bread was not enough to feed a common man for one day. The usual kinds of meat, suitable for eating, were too scarce; horse meat was precious; plump dogs were stolen. And, according to many reports, men and women in many places secretly ate their own children.

From: Johannes de Trokelowe, *Chronica et annales, regnantibus Henrico Tertio, Edwardo Primo, Edwardo Secundo, Ricardo Secundo, et Henrico Quarto*, trans. Brian Tierney (London: Longmans, Green, Reader and Dyer, 1866).

FURTHER READING

- Nicholas N. Ambraseys, “The 12th Century Seismic Paroxysm in the Middle East: A Historical Perspective,” *Annals of Geophysics* 47 (April–June 2004): 733–758.
- Richardson Benedict Gill, *The Great Maya Droughts: Water, Life, and Death* (Albuquerque: University of New Mexico Press, 2000).

- William Chester Jordan, *The Great Famine* (Princeton, N.J.: Princeton University Press, 1997).
- David Keys, *Catastrophe: An Investigation into the Origins of the Modern World* (New York: Ballantine Publishing Group, 2000).
- James E. Lindsay, “Geography and Environment,” In his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005): 35–37.

- Alwyn Scarth, *Vulcan's Fury: Man against the Volcano* (New Haven, Conn.: Yale University Press, 2001).
- Payson Sheets, ed., *Before the Volcano Erupted: The Ancient Cerén Village in Central America* (Austin: University of Texas Press, 2002).
- Payson Sheets, *The Cerén Site: An Ancient Village Buried by Volcanic Ash in Central America*, 2nd ed. (Belmont, Calif.: Thomson Higher Education, 2006).
- Stephen J. Spignesi, *Catastrophe! The 100 Greatest Disasters of All Time* (New York: Citadel, 2002).
- David Webster, *The Fall of the Ancient Maya: Solving the Mystery of the Maya Collapse* (New York: Thames and Hudson, 2002).

► nomadic and pastoral societies

INTRODUCTION

Throughout human history, one of the most fundamental changes in people's way of life was brought about by the agricultural revolution that occurred during the Neolithic Period 10,000 to 12,000 years ago. Up to that time people had lived as hunter-gatherers, depending on wild game and wild plants and often wandering great distances to obtain them. The abundance of wild food sources in the Middle East and in the valley of the Yellow River in central China made it possible for people to settle in permanent dwellings. The domestication of food plants followed quickly. Animals were also domesticated hand in hand with plants, since their dung was useful for fertilizing (as well as for fuel for cooking fires) and their labor for agricultural work, besides being a source of meat, leather, bones for tools, and other items. Cattle and goats were domesticated in the Near East and horses and swine in China. The use of the domesticated species spread rapidly to surrounding peoples, and eventually most of the domestic species were distributed throughout Eurasia and Africa. Only the dog seems to have been domesticated much earlier, although the details of that are not clear.

Many peoples on the fringes of the fertile areas, who did not have land suitable for farming, used the animals in a different way. Two kinds of animal-herding cultures developed distinct kinds of pastoralism, or ways of life based primarily on herding domestic livestock common during the Middle Ages: transhumance and nomadism.

Transhumance is a type of pastoralism that is implemented together with settled agriculture. In this form of pastoralism, some members of a family (usually boys or women) led domestic animals onto hillsides or alpine valleys that could not be used for farming cereal crops and let them graze through the summer. In the winter the herds would be moved into lowland regions near the family farm and fed on hay that was grown during the summer. This allowed otherwise marginal land to become highly productive. Specialized

breeds of dogs, extensively trained for the role, often would assist in the herding. This exploited the animals' natural instincts as predator and prey to keep the herd moving away from the dogs and in the direction the herders wished. Because male animals were more aggressive and would want to control the movement of the herd themselves, they were mostly slaughtered as calves. This left the mountain herds composed entirely of females with their calves, so that they could produce milk. Only a few selected males were kept in the valleys for breeding.

Nomadic pastoralism is a more intensive exploitation of the domesticated herds on arid land or grasslands unsuitable for the cultivation of cereal crops. In this case the herders have no permanent dwellings or farmsteads but follow the herds continuously, living in tents or wagons. Every part of the animals was used since no other agricultural source of food was available. Vegetables and cereals, when they could be had at all, were gathered from wild plants or obtained in trade. Usually the herders rode domesticated horses themselves and used horses or oxen as draft animals, even if they herded other species such as sheep or musk oxen.

American cultures were at a disadvantage because they did not bring any domestic animals (except dogs) with them during their migration from Asia in prehistoric times. North American tribes had to fall back on the less-sophisticated practice of following herds of wild animals. Ice Age hunters in Eurasia lived in this way, following herds of mammoth and other animals. Many American tribal peoples took up the same way of life, following and hunting bison (buffalo). These peoples made extensive use of every part of the hunted animals in the same way as nomad pastoralists, but they did not have any control over the movements or breeding of the herd. Hunting was carried out with simple weapons like the bow or spear; when occasion permitted, larger numbers of animals would be taken by expedients such as stampeding the herd over a cliff. The Sami or Lapps in northern Europe lived in this way, too, following reindeer herds. The peoples of the Andean cultures of South America, at least, changed this situation by domesticating a native species—the llama, a relative of Old World camels. They came to be herded between mountain valleys and lowlands in transhumant pastoralism.

AFRICA

BY KATHARINE DELUNA

During the last three to four millennia of African history most Africans practiced a form of mixed farming in which they combined the cultivation of crops with the tending of a few animals at their homestead and supplemented such activities with hunting, fishing, and foraging in the surrounding

bush. Thus, the development of economies focused solely on animal tending, and particularly forms in which communities are nomadic for part or all of the year, represents a specialization to fit both an economic and environmental niche on the fringes of the mixed farming economy.

Pastoralism is a specialization in tending domesticated livestock such as cattle, goats, sheep, and camels for food and trade products. In Africa pastoralism has long been associated with several characteristics: the habitation of dry grassland environments, mobility within those environments, and interaction with neighbors specializing in agriculture and in hunting, fishing, and foraging. In addition to these characteristics, scholars sometimes associate nomadic pastoralists with expertise in warfare because the skills and organization necessary to defend large, dispersed herds from predators transfer well to those required for success in warfare.

Pastoralists inhabited grasslands to ensure that their livestock had access to adequate pasturage. In Africa annual weather patterns concentrating precipitation into one rainy season play an important role in determining the lifestyle of pastoralists. In many areas like the Sahel, the dry steppe region stretching south of the Sahara from the Atlantic to the Ethiopian highlands, herders spent the dry season in a base camp located near a permanent water hole and then moved away from this camp as grasses grew and rainy-season water holes filled. This seasonal pattern of movement is known as transhumance. Often some community members would stay behind in the permanent camp to cultivate a few fields. Other societies, such as the Berber-speaking camel herders of the Sahara, moved constantly from one known water hole to the next in a fully nomadic pattern resembling the mobility of hunter-forager groups. Generally, pastoralists in Africa emphasized herd size rather than the production of meat; archaeological remains consistently demonstrate that specialist herders slaughtered only those animals that were not in their reproductive prime.

As pastoralists engaged in these differing forms of mobility, they kept contact with agricultural communities on the fringes of their grassland homes. Pastoralists produced a surplus of food products, such as milk, blood, and meat, and items of utility such as skins and bone tools. These surpluses were traded with neighboring farming communities for grains, tools, cloth, and other products of sedentary life. While cooperation characterized most interactions between pastoralists and their farming neighbors, there could also be competition between them for the control of land and sometimes trade. Furthermore, both the symbiosis and the tensions between communities with different economic specializations could lead to the development of ideas about eth-

THE KHOI

During the medieval era, the Khoi lived in the grasslands of southern Africa. They were nomadic pastoralists. Their movements may have taken advantage of the changes in weather during the year, especially the rainy season. Their name is sometimes rendered as Khoikhoi, meaning “people-people.” Historians disagree about where the Khoi originated. Their language is similar to that of the San of southern Africa, suggesting an affinity with the San, who were hunter-gatherers rather than herders in the medieval era. Even so, some linguists believe the Khoi were related to herders of sheep in northeastern Africa. Some historians suggest that the Khoi originated in what is now Botswana.

Archaeological evidence indicates that they were shepherding sheep in the 400s, but they may have been doing so since the first century. From the 400s to about the 600s the Khoi ranged over almost the whole of Africa east of Namibia. Near the end of that period Bantu-speaking peoples arrived in southern Africa and pushed the Khoi out of the eastern lands, leaving them the central plains of southern Africa. These later migrants may have come south by way of the central woodlands of Africa as well as along the eastern coast of Africa. It is likely that the migrants who took the coastal route are the ones who displaced the Khoi from the more fertile lowlands.

The early Khoi herded sheep and goats. Exactly when they added cattle is not as yet known. Their cattle were descended from cattle that had originated in northern Africa. It is possible that cattle were at first introduced to the Khoi by way of central Africa, but evidence at present indicates that the cattle were introduced by herders from northeastern Africa. The Khoi’s wealth and social status depended on how many cattle they owned. If a Khoi lost his cattle, he would turn to hunting and gathering. He could sell items such as feathers to the settled peoples of eastern Africa, thereby earning enough to purchase cattle and reinstate his status in his community.

nic identity based on subsistence practices, as was the case in 19th-century Rwanda with Tutsi pastoralists and their Hutu agriculturalist neighbors. Of course, the development of ideas tying ethnic identity to economic specialization allowed for



Ivory pyxis carved with pastoral scenes; early Byzantine, possibly Egypt, sixth century (© The Trustees of the British Museum)

fluid, rather than rigid, interpretations of those identities and their markers.

Specialist herding communities played an important role in northern and western Africa from the middle of the first to the middle of the second millennium c.e. These nomadic and seminomadic peoples lived within and on the fringes of the Sahara desert and played a vital role in communication across the Sahara along trade routes and between oases. With the introduction of domesticated camels in the first centuries c.e. pastoralists acquired the capacity to maintain a fully nomadic lifestyle within the Sahara desert, the Red Sea hills, and other marginal environments that had long been too dry for cattle. With camels, herders gained the mobility necessary to foster long-distance trade connections across these lands; the trans-Saharan trade network remains the most famous example.

In many areas, such as the inland Niger delta, specialists in herding, farming, fishing, hunting, and foraging came to rely on each other's skills in a cooperative fashion. In other areas of western and northern Africa, however, agriculturalists and pastoralists were often in competition for those lands that, while marginal to either activity, could be harnessed to expand the different economies and their practitioners' territorial influence. In fact, in the 14th century the Tunisian historian Ibn Khaldun (1332–1406) argued that as a result of technologies like cavalry, camels, and chariots that arrived in the fourth century, North African history could be understood as the alternation of power between sedentary farmers

and nomadic pastoralists, with the pastoralists often raiding and conquering the farmers. This pattern continued long past the 14th century and is a common theme tying western and northern African history to historical patterns in Eurasia and beyond.

Another western African pastoralist community is the Fula. The community's history is important because it influenced local culture and politics across a wide expanse of western Africa during and after the medieval period. The Fula homeland was in the Senegal River valley, and its development as a community around 1000 was influenced by, and perhaps included intermarriage with, nomadic Znaga Berber pastoralists of the western Sahara. A few centuries later, in the context of several decades of poor rains and overgrazing, some of the Fula began to spread eastward in search of new pastures for their system of transhumant herding. Over the next few centuries the Fula came to stretch across the western African savanna from Senegal to northern Nigeria, always interacting with and sometimes integrating into the farming communities they found on the fringes of their pastureland. The Fula who settled in the towns came to be important in the spread of Islam across western Africa and often held positions as clerics. One such Fula Islamic scholar, Uthman dan Fodio, led a successful jihad (holy war) against the kings of the Hausa states in northern Nigeria in the 19th century and founded the Sokoto Caliphate, an Islamic empire in northern Nigeria.

The development and spread of pastoralism in southern Africa predated the spread of agriculture and was often practiced in combination with foraging, a practice known as *pasto-foraging*. Scholars once assumed that hunting and gathering dominated the immediate precolonial economy of southern Africa, but it is probable that *pasto-foraging*, rather than hunting and gathering, was the most common form of subsistence economy in southern Africa for much of the first millennium.

Other communities in eastern and southeastern Africa practiced mixed farming. When specialized cattle keeping finally developed in these regions, it took a very different form from that in northern and western Africa. Although some specialist seminomadic herding tribes such as the Masai did emerge, most societies that emphasized intensive cattle keeping were sedentary communities, such as the Toutswe of eastern Botswana, the Nkore of western Uganda, and the herding elite of Rwanda. Most of these sedentary communities developed into large polities and kingdoms beginning around 1000 because people recognized the economic value of livestock as a form of wealth that reproduces itself and may be easily transferred via trade or forms of gifting that create networks of social obligation. The specialized seminomadic

herders who practiced their craft in the grasslands of eastern and southern Africa worked closely with neighbors who specialized in farming, hunting, fishing, or foraging. These specializations often exploited ecological niches, such as the different elevations of the hills and mountains of the Great Rift Valley, so it was important for communities to work together to ensure food security in the face of the specific threats of each environment.

THE AMERICAS

BY DAVID H. VALLILEE

The term *nomadism* derives from the Greek word *nomas*, meaning “feed” or “pasture.” Generally, it has been defined as a circumstance in which people have no permanent home and wander in search of food and pasture. It also applies to peoples whose subsistence is largely based on hunting migrating mammals, with the result that the location of their temporary shelter is contingent upon herd movements and a need to avoid excessive hunting in one place. In many regions movement is based on seasonal changes in which some areas are abundant in animals and plants in the warmer months and others more abundant in colder months.

Nomadic pastoralism is based upon herding domesticated animals and often requires moving animals to the best pastures. Pastures in arid regions may not be useful outside of the rainy season, while pastures in mountainous and colder regions may not be accessible in winter. These conditions necessitate moving livestock between different regions seasonally. Nomadic pastoralists can move to a wide variety of places according to the availability of pastureland, whereas transhumant pastoralists move between fixed locations each season. While much of the population of the Americas during the medieval period lived in permanent settlements, people in some regions still practiced nomadic ways of life.

Between 500 and 1500 the North American Arctic region from Alaska to Greenland was dominated by two cultures, the Dorset and the Thule. The Dorset culture dominated the northern area of the present-day Northwest Territories of Canada and western Greenland from about 500 to 1000. The Dorset were a seminomadic people whose primary economic activity was hunting. They occupied autumn camps for hunting seal and walrus; late-winter and spring camps for hunting caribou, musk oxen, and polar bears on the polar edge; and summer camps for hunting, fishing, and gathering plant foods. Late in their culture they built longhouses for ceremonies during snow-free parts of the year.

More than 90 percent of the Dorset diet consisted of game and sea animals augmented by plant and sea foods, such as clams, mussels, berries, leaves, lichens, and seaweed. They

carved harpoons for hunting sea mammals and spearheads for hunting fish. The Dorset had considerable knowledge of animal behavior and precisely timed their hunting activity during the year. They intercepted migrating harp seal in narrow channels, concentrated on hunting nesting birds rather than on the more elusive migratory fowl, and specialized in the selective hunting of animals of particular ages when these groups were most abundant. Dorset carving achieved a high level of naturalism in miniature, such as tiny ivory carvings of humans holding infants, animals and human-bear composite figures, carved figures of wood and stone of humans wearing parkas, and ivory harpoon heads with animal effigies.

Around 1000 the Thule culture emerged in northern Alaska. After spreading across Alaska they began a period of great expansion from about 1000 to 1300, extending eastward across the entire North American Arctic zone and into western Greenland, overtaking most of the Dorset territory. The Thule migrated between two types of settlements, winter base camps and hunting and fishing camps. Their subsistence was based on hunting large game animals (caribou and musk oxen) and sea mammals (seal, walrus, and whale), net fishing at sea, and freshwater fishing from rivers and streams. Agricultural products were not present in their diet. The Thule economic pattern, facilitated by long-distance kayak and dogsled travel, appears to have been focused upon particular hunting endeavors and opportunities to exploit a greater variety of food resources. They also achieved cooperative hunting activities, such as whaling crews.

The Native Americans of the Great Plains encountered by Euro-Americans during the period of exploration, expansion, and trade (about 1550–1900) became emblematic of nomadic, indigenous North America, well known for their portable teepee shelters, their military achievements, and their buffalo-hunting skills. In the centuries prior to the introduction of guns and horses to the region, the nomadic inhabitants of the Great Plains hunted bison on foot with bow and arrow. Often their aim was to procure large numbers of these bountiful animals through communal hunting activities, such as bison jumps and bison corrals.

Bison jump sites are characterized by a high bluff over which the animals were stampeded so that large numbers of them would be killed and crippled by their fall and others would be killed by hunters waiting at the base of the bluff. Bison corrals were bowl-shaped rock formations where large numbers of bison could be driven into the enclosed area, trapped, and slaughtered quickly. One of the most prolific bison jumps was the Head-Smashed-In site in southern Alberta, Canada, with evidence of continuous use between 3600 B.C.E. and 1300 C.E. The Wardell Bison Corral in western Wyoming, which included a large butchering, process-

ing, and camping area adjacent to the site, was used between about 400 and 1100 C.E.

In addition to bison, Great Plains peoples in the medieval era hunted deer, antelope, elk, and a variety of smaller game animals. Seasonally available plant foods, such as sunflowers, choke cherries, grapes, acorns, wild grass seeds, turnips, and onions, contributed to their diet. These peoples moved seasonally between diverse environments, and two types of settlements were common. Base camps (winter camps and summer camps) consisted of groupings of tepees with access to seasonal resources, and hunting camps were used during times of the communal bison hunt.

By 500 most regions outside the Great Plains in the United States and southern Canada consisted of sedentary, year-round communities—ranging from hamlets to small cities—with a subsistence base of hunting, gathering, and agriculture. In some areas of the Great Plains, particularly in the eastern and southern regions, limited sedentary agriculture developed in the period between 500 and 1000. Farmers focused predominantly the cultivation of maize, beans, and squash, often making use of the fertile soil near rivers.

Between 2500 and 1200 B.C.E. most regions of Mexico and Central America shifted from hunting and gathering to sedentary, agriculturally based subsistence; however, an area in the far northeast of Mexico, the Coahuilan region, remained nomadic. The Coahuilan culture (ca. 6000 B.C.E.–1500 C.E.) occupied the Mexican states of Nuevo León, Tamaulipas, and Coahuila, along with southern Texas across the border. Inhabitants of this arid region were largely nomadic and made only sporadic or seasonal use of shelters, such as caves, grass-covered huts, cliff shelters, and open camp sites. The profusion of rock art with shamanic themes suggests that ritual practices were an important part of the society.

The gathering of wild vegetal foods was the primary subsistence in the Coahuila region. Foods gathered included agave, yucca, prickly pear, and foods from leguminous trees and shrubs such as mesquite, huisache, and huizachillo. These plants ripen at different times of the year, a condition that demanded mobility of the inhabitants to achieve a continuous food supply. Their diet was augmented by deer, antelope, bear, bison (though only sporadically), and smaller animals such as rabbits, rodents, and reptiles. While the aboriginal people had to roam the region in search of large quantities of food, they also had to remain within traveling distance of water sources in the mountains, because they lacked a means for transporting and storing water.

In addition to settled living, during the medieval period pastoralism and transhumance (seasonal movement) were prevalent in the mountainous regions of South America. The dominant ancient city of Tiwanaku (ca. 400–ca. 1100),

high in the Andean mountains in present-day Bolivia, had an agro-pastoral subsistence base and a thriving ceremonial center with monumental architecture. Subsistence included the herding of camelids (llamas and alpacas) and the cultivation of potatoes, quinoa, caníwa, coca, and mushwa, all of which adapted to the cold climate and high elevation. Their diet was augmented by hunting smaller game (deer, vicuña, guanaco, rodents, and amphibians) with bow and arrow and fishing in nearby Lake Titicaca. The total camelid population for this region probably exceeded 500,000 at the time of European contact in the 16th century. Grazing required the seasonal movement of the enormous herds between the sierra basins (above 8,200 feet) and the cold, semiarid grasslands of the highland plateaus.

Medieval inhabitants of the Andean northern coast of present-day Peru also relied heavily upon llama and alpaca husbandry. Other mammalian food sources included dogs, deer, guinea pigs, foxes, siscachas, and seals, augmented by penguins and other birds, fish, and shellfish. At the site of Pampa Grande archaeological evidence indicates that camelids were the primary food source and were also used for religious sacrifice. The bodies of several sacrificed camelids were interred in the bottoms of postholes of the central pyramid of the site, and in other regions, such as Huanacho, sacrificed camelids were interred in tomb burials.

The practice of moving herds between valleys to take advantage of fresh pastureland (intravalley transhumance) was common in the northern Andean region. Llama caravans, known through ceramic depictions, were used for moving goods in Tiwanaku and the Andean northern coast. In the northern region llama caravans were used to transport ores from mines to cities.

ASIA AND THE PACIFIC

BY KEN HALL

Nomads populated the marginally productive regions of Asia in the medieval age. These peoples included the tribesmen who pastured their livestock in the harsh central Asian steppes and the adjacent mountainous regions of south Asia; the trading nomads whose commerce and transport of goods connected the Silk Road caravan and the Indian Ocean maritime network marketplaces; the hunting and gathering foragers who lived in Southeast Asia's dense tropical jungles; the sea gypsies who fished, gathered sea creatures, and provided local transport in the South China Sea and its adjacent regions; and the slash-and-burn cultivators who farmed the highlands of Southeast Asia, Taiwan, and elsewhere in the Pacific basin. Nomadic societies commonly made restricted cyclical movements between a series of habitation sites.

Settlement was determined by the availability of food sources, topography, and climate. Periodic community relocations were necessary when the food sources or the potential to sustain the dominant food sources was depleted at one site—due to overgrazing, depletion of the soil quality, overhunting, and seasonality. The abandoned site would again host the community after the natural habitat had reconstituted sufficiently. The survival and livelihood of some nomads depended almost exclusively on herding livestock (goats and sheep); others supplemented their livestock income with variations of settled agriculture, trading with and supplying supplemental labor to neighboring settled agriculturalists, and hunting and gathering. Some enterprising chieftains might forge temporary patron-client links among several nomad communities, using the natural mobility of their nomadic society to defend against threatening outsiders and to raid or to establish an authority over neighboring agriculturalists.

Nomads commonly lived in encampments populated by nuclear families connected by descent to the other community residents. In addition to their shared bloodlines, tribesmen shared a common language, ethnicity, religion, and culture as well as the need to cooperate to defend their grazing and otherwise productive lands against infringing neighboring tribesmen. They might ally with neighboring tribes against threatening outsiders, such as Chinese, Turk, Mongol, or assorted court-based armies. Nomadic communities were continuously vulnerable to changing circumstances, resources,

and the death of a chief, which often led to warfare among the various claimants who wished to succeed to power.

The tribal community depended on an internal patron-clientage network and a code of honor, which dictated the defense and protection of women, riches, and homeland. The tribal community consisted of segmented linkages among semiautonomous households, lineages, clans, and tribes who shared a common ancestor and formed a social pyramid dominated by the head of the senior ancestral lineage or a dominant chief. Successful leaders were temporary: A chief who acted as patron and his dependent client network continuously had to satisfy local need for a leader who could provide unity, opportunity, and protection. The supreme chief needed resources to reward his loyal followers and provide them with security in order to maintain his client base, whose loyalty and following in turn marked him as a powerful and important figure in the region. The tribal community was institutionally unstable.

While there was a patron-chief, in order to deal with immediate concerns that affected the entire group, nomads held regular tribal councils, where all men had the equal right to speak. Tribal law was enforced by a council of elders whose judgments were based on a code of honor that specified personal rights and obligations, rights of revenge, guidelines for granting and receiving asylum, hospitality, bravery, steadfastness, righteousness, persistence, defense of property, honor, and the chastity of females. While a guilty verdict in sexual crimes (notably adultery) dictated a mandatory death penalty, the code of honor favored restoration justice, by which the guilty made restitution rather than be subjected to retribution. Tribunals acted as arbitrators rather than judges in negotiations that determined guilt and consequent penalties paid in cash, services, livestock, and transfers of land rights, women, and bondsmen. The system tried to achieve a consensus, wherein an individual retained his honor rather than be subjected to alienating disgrace.

The nomads of the central Asian steppes raised sheep and goats (with a sheep-to-goat ratio of 4 to 1—sheep being the more valuable asset), which were well suited to the region's frequently dry grasslands; the region was unable to sustain cattle grazing. By choice, most central Asian tribesmen did not practice agriculture, preferring their free lifestyle on the steppes, where there was limited political centrality. Mongol tribesmen associated settled agriculture with their despised Chinese neighbors, who forced captive tribesmen to become farmers; to settle in one place was equivalent to slavery.

While the sheep and goats demanded little from the natural habitat, they were close crop eaters and quickly exhausted local pasturage. Herders had to move before their livestock destroyed the land's capability to recover. Horses were nec-



Nomad bridle bit; Khazar; Bielowodsk, Perm region, Russia; ninth to 10th centuries (© The Trustees of the British Museum)

essary to herd and drive the livestock; a rider on horseback increased the speed of herd movement and guarded against natural predators. The sheep and goats provided hair, wool, skins, and dairy products that were used locally and were also traded to neighboring agriculturalists for grain, salt, metal, and luxuries, such as tea, porcelain, cloth, and other manufactures the nomads could not make for themselves. Exchanges with their settled neighbors were tenuous; the nomads preferred to minimize their dependence on trade and remained as self-sufficient as possible to maintain their local autonomy. In some cases, tribesmen might enter the military service of their neighbors; wealthy tribesmen were sometimes moneylenders to their agricultural neighbors and might also become landholders who embraced resident farmers. Landholding, money lending, and other negotiated relations with settled neighbors also provided the nomads access to the grassy grazing grounds of the agricultural areas.

Central Asian nomads were skilled horsemen and horse breeders. The steppe pony was small but hardy, able to survive with limited pasturage and, because of its heavy coat, to withstand the harsh steppe winters. Nomadic horsemen were using breast straps, stirrups, and horse collars (for cart transport) by the fifth century. A variety of horses were bred for sale to their neighbors, who were always in need of horses for their military; for biological reasons horses could not be bred in the Asian tropics. Horses were supplemented by camels, which were raised for their meat, hair, and milk, but especially as a mode of transportation in both long-distance trade and travel. Camels had long-term subsistence capacity; properly fed before embarkation, camels had marginal need for additional food and water for travel that might last for weeks. The camel's broad feet allowed it to walk in the rugged rocky and sandy central Asian terrain where horses could not. The camel's transparent eyelids protected its eyes and allowed it to see in dust storms and sandstorms. Camels were especially vital to the nomad traders who dominated the transport of goods along the Silk Road overland passageway.

Central Asian tribesmen moved seasonally, annually, and in multiple-year cyclical rotations covering hundreds of miles that were determined by overgrazing, the time needed for the land to recover, variants in rainfall, and warfare in the region. Pastoral nomads moved among a network of pasturage areas that they regarded as their own and that they would defend against anyone who infringed on their unused lands. Since grass was their most valuable resource, pastoral nomads most frequently went to war over grazing rights and defended themselves from the armies of neighboring agrarian-based empires.

In contrast to the central Asian tribesmen, Afghan and other south Asian nomads made seasonal migrations, graz-

ing their herds in highland mountainous pastures in the spring and summer and returning to the lowland valleys in the fall and winter to avoid the harsh highland winters. Some of the tribes' pastoral population migrated seasonally, while others remained in the lowlands year-round to farm, trade, and provide seasonal supplemental labor to their agrarian neighbors. The balance depended on local opportunities and personal preference.

The Mongol chieftain Genghis Khan (r. 1206–27) united the diverse central Asian tribesmen and reorganized them into 1,000-man fighting and administrative forces (*minggan*). To maintain order among his ranks, he institutionalized the local codes of honor into a common code of law that provided examples of appropriate military and social behavior. The code emphasized loyalty to the Mongol military over family clans, promised rewards for meritorious service rather than for hereditary social standing, and promoted ethnic and gender equality. The Mongols adapted to the more culturally sophisticated societies they ruled. Although they had previously worshipped a universal sky god as well as various ancestral and natural spirits, the Mongols became patrons of and later converted to Buddhism, Islam, and Christianity in the various lands they conquered. Like the patron-chiefs, Mongol rulers sought prosperity for themselves and their subjects by entering into profitable business partnerships with prominent businessmen (*ortaqi*) and encouraging their maritime trade initiatives as well as the creativity of artisans and artists. Above all the Mongols' widespread authority and their victories over and subsequent incorporation of conquered peoples from China to the Middle East ensured the security of the vital East-West Silk Road trade route, which also provided the means for cultural exchange.

Central Asian nomad warriors were expert horsemen who kept several of the small, tough steppe ponies. Warriors in battle would make quick cavalry charges, shooting arrows at their enemies and then retreating to mount a new horse. Using his string of horses, a warrior could continue charging indefinitely. Opponents feared the tribesmen so much that many paid tribute to avoid being the target of mounted attacks. Until the time of the Mongols most Eurasian populations viewed the central Asian tribesmen as symbolic of ferocious barbarian cruelty and deceit. Tributary payments by their neighbors, use and sales of war captive slaves, and collections of ransoms on war prisoners subsidized a comfortable lifestyle. Warriors lived most of their lives in tents, some quite large, that were lavishly furnished.

Until the development of breech-loading (cartridge) firearms in the 19th century, the central Asian (Mongolian) composite bow was the most effective long-range tool in war and hunting. It was vastly superior to any military technol-

ogy in the medieval West, including the famed English longbow. Warriors, both male and female, always carried at least two bows, one for long-range shooting and another for close-range combat. The Mongol bow was shot from horseback, pulling the bow away from the string rather than pulling the bowstring back. A skilled archer timed shots to release when the horse's hooves were in midair, to avoid distortion in aim when the shots hit the ground.

Compared to an English longbow, which had a draw of 70–80 pounds, the Mongol bow had a pull of 100–170 pounds, depending on the strength of the archer. The English longbow could shoot up to 250 yards, but the Mongol bow could hit a target at 350 yards and well beyond. A 13th-century record of Genghis Khan reports that a shot made by one of his master archers reached 428 yards.

In south Asia and Southeast Asia the medieval era was marked by the spread of settled agriculture from lowland and coastal river valleys into previous nomadic tribal regions populated by assorted foraging and slash-and-burn cultivators, resulting in regular conflict between agrarian and nomadic populations, with substantial consequence to both. This conflict inevitably gave prominence to warrior armies, which were clients or mercenaries in the service of a coastal warrior-chief or a lowland court-based monarch. Warrior-chiefs became powerful figures in the resulting lowland and coastal-based political systems, often as retainers who were assigned political authority, landholding rights, and income rights over the conquered highlands and upstream, the proceeds of which they shared with their military clients. Frequently as an alternative to a mutually expensive fight to the death, the highland or upstream chiefs were offered and accepted a service relationship as semiautonomous clients of their would-be opponents. While inevitably the nomads lost control of the upland river valleys to newly settled agricultural communities, the negotiated alliance protected their tribal autonomy and preserved their nomadic lifestyle in the uplands and dense tropical rain forests. The upstream nomads and downstream agriculturalists engaged in peaceful exchanges, as their exchanges regularized rather than remained consequential to raids.

Symbolic of their regularized relationship, lowland and highland leaders cooperated in the establishment of symbolic Hindu and Buddhist temples in the newly incorporated regions, which linked upstream and downstream populations in a common religious tradition that superseded previous local animistic and ancestral tribal cults. Hindu and Buddhist temples were self-interested agents in the development of settled agriculture in the previously uncultivated upstream since they held assigned income rights to productive property. Temples were also indirect agents of political

centralization in the absence of effective government administrations in the border zones because each temple was ritually and administratively linked to a central temple at or near a royal court.

EUROPE

BY BRADLEY A. SKEEN

Pastoralism, the way of life based on tending herds of domestic animals, was one form of medieval farming, but it was not the most common. Nomads drove herds of animals through the Russian steppe, while dairy and sheep and goat herders practiced transhumance (seasonal movement of livestock) on mountainsides and other marginal land. However, most medieval farmers made a living through agriculture in the strict sense (tending fields) and raised cereal crops on small plots of land; still, no farm would have been without some domestic animals. They were used for both agricultural labor (pulling plows, turning millstones, and so on) and the production of meat and other agricultural products. Bulls (oxen) used to pull plows were usually castrated to render them more docile. The diet of agriculturalists consisted mostly of items such as gruel or bread. Meat was less frequently eaten. It was rarely eaten by wheat and barley farmers as opposed to dairy farmers and steppe nomads. It would enter the diet usually at the beginning of winter, when a few domestic animals would be slaughtered and some wild animals would be taken by hunting. Some agricultural farmland probably was dedicated to horticulture and provided items like fruit, vegetables, wine, or olives.

Another way of life, nomadic pastoralism and transhumance, nevertheless was practiced widely in the Middle Ages. It was based on animal husbandry (tending livestock, such as cattle, horses, sheep or goats) in pastures. Peoples who lived in this way also ate varying amounts of cereals and fruits and vegetables (whether from a limited practice of agriculture and horticulture or from trade), but a much larger proportion of their diets was made up of foods that are rich in fat and protein, such as milk, cheese, and meat.

While pastoralism offers many advantages as a way of life, it also has limiting factors. One is that the population of herders tends to expand rapidly beyond what is needed to control the herd or is even possible to sustain from the herd. Another is that the quality of the fields used for pasturage tends to degrade relatively quickly (but still on a scale of generations) and become unusable wasteland or desert. As a result, pastoralism is usually practiced only on land that is marginal to begin with, either because it is too dry (as in Africa and the Middle East) for agricultural or because it is at too high an elevation (for example, mountain slopes).

Most of the animals used in agriculture in medieval Europe had been domesticated in the ancient Near East, but the Sami (sometimes called Lapps) people of northern Scandinavia practiced a form of pastoralism that seems to have evolved from hunting. At one time the Sami must have followed herds of reindeer and lived by hunting them, together with gathering any other resources they could from the wilderness. Eventually, the Sami began to domesticate the herds. The Sami took some animals and isolated them, either for milking or for use as draft animals to pull sledges. Some Sami still live in this way.

Nomadism is a type of pastoralism in which the herders follow the animals across vast distances as they graze on arid or semiarid plains (steppe). The herders, who by the Middle Ages were usually mounted on horses, drove herds of fully domesticated animals such as horses or cattle in a seasonal cycle, always seeking fresh pasturage. The exploitation of the animal herds is far more intensive in this type of nomadism. Every product of every animal was used: meat and skin (for leather) and also secondary products, such as milk, fur, and blood (as a foodstuff). Even animal dung was used as fuel for fires. The animals were both ridden and used to haul wagons or carry packs.

In Europe nomadism of this kind was limited to the steppes of the Ukraine and Caucasus in southern Russia, the western edge of the vast inner Asian ecosystem and cultural system, where this type life was common. Out-migration from inner Asia by nomadic Altaic and Finno-Ugric tribes, however, caused waves first of displaced Germans and then of Huns, Magyars, and Turks to invade Europe throughout the Middle Ages, bringing about the collapse of the Western Roman Empire (476), the Viking Age (ca. 400–600), and the conquest of Russia by the Mongols (1223) and of the Byzantine Empire by the Ottoman Turks (1453).

At the beginning of the Middle Ages the Roman historian Ammianus describes the Huns, who were then living in the eastern Ukraine. Their entire way of life and livelihood was tied up with the horses they herded. Ammianus expressed amazement that they had no houses of any kind and lived entirely in wagons. They dressed in the furs and leathers of the animals from their herds and of the wild animals of the steppe, especially sheep or goatskin chaps. Perhaps he exaggerates when he says that they did not understand the purpose of houses or other buildings and so dreaded going into them. Naturally they had no specific homeland. Because they were constantly moving, they attached no significance even to their places of birth.

Ammianus describes them as expert foragers, capable of living on a diet consisting almost entirely of wild roots they could find wherever they happened to be. They could sleep on



Reins guide fitting for a horse harness; Viking; Anga on the island of Gotland, Sweden; ninth to 10th centuries. This copper-alloy openwork fitting was used for guiding the reins of a horse when pulling a wagon or sledge. (© The Trustees of the British Museum)

their horses. Precisely because they were bred in the saddle and spent their lives riding, they made the finest light cavalry that Ammianus, himself an experienced military officer, had ever seen. They were fearless in battle and impossible to break. If their wedge-shaped formations were broken by heavier troops, they simply use their superior speed to ride off a short distance and then reform and attack again, either with arrows or a saber charge. They were also capable of using the lariats with which they controlled their herds to attack and pull down the mounted troops of the enemy. The stirrup had been developed in inner Asia at some time in the past and had reached Europe with the Hunnic and other tribes that invaded the Roman Empire throughout the fourth to the sixth centuries, making them far more effective cavalry. Steppe tribesmen were unable, however, to attack either fixed or field fortifications.

The existence of this kind of nomadism made the vast steppes of inner Asia (beginning in southern Russia) into an open highway for trade and the transmission of ideas vital to the development of Europe. The trade was possible because of two facets of nomadism. The nomads themselves could transport goods across the steppes without an intensive transportation network such as roads, and the absence of fixed settlements across most of inner Asia meant that political and tax barriers to trade did not generally exist. However, the Islamic control of inner Asia and the terminus of the trade routes on the Black Sea and the Mediterranean in some periods of the Middle Ages at times made this trade artificially expensive and at others stopped it altogether. Commercial items such as silk and porcelain crossed the steppes to Europe, along with inventions such as the spinning wheel and gunpowder. So did epidemic diseases, including the bubonic plague that devastated the European population in the

years 1348 to 1350. Coming out of inner Asia, the disease was carried on a single Genoese ship from a trading post on the Black Sea. Islamic control of this trade was the main stimulus to the exploration of the Atlantic and Indian oceans by the Portuguese and Spanish after 1450.

Another type of pastoralism, called transhumance, was practiced in mountainous regions. In medieval Europe it was common in the Alps, Scandinavia, Scotland, Wales, Ireland, the Balkans, and the Pyrenees. In this kind of culture most people lived in small villages or individual farmsteads, and only a small proportion tended the animals (especially young people and in many places young women). The herd was sent to alpine meadows in the summer and then brought back to live in valleys during the winter, when their diet might be supplemented by hay harvested from the valleys. Trained dogs were commonly used to help control the herds and protect them from predators. The remainder of the population cultivated crops and grew hay, transported and processed items like milk and cheese, or worked as hunters or craftsmen or in other occupations. The herd sent to the high meadows consisted entirely of female animals because they were more docile. Most male animals were killed as calves because they would not be as productive as females, who could bear new calves and produce milk. Those few males kept for breeding were left in the lower valleys.

Transhumance could also be remarkably profitable. The production of wool by sheepherding in the mountains of Spain was the principal source of revenue for the Spanish crown in the Middle Ages. The taxes it generated paid for the Reconquista, the retaking of the country from its Islamic rulers, as well as for Spain's overseas exploration (for example, Columbus' discovery of the Americas) and her rise to become a great power. Accordingly, sheepherders were given many special privileges in Spanish law. It was, for example, illegal to build fences or other obstacles over their droving paths or to try to exclude them from private land.

The culture of transhumance is especially productive of soldiers, usually called in English *highlanders* (after the Scots "highland" soldiers) or by the borrowed French term *montanyards*. Because of their high-protein diet, highlanders were usually larger and more physically fit than other soldiers. They spent much of their early life hunting, which was excellent training for war in the Middle Ages. In part because of the low infant mortality rate of transhumant cultures and in part because of the small amount of labor necessary to operate the system, there were always many highlanders able and willing to leave their family farms to fight as soldiers. Transhumance was the cultural background of many of the most famous medieval soldiers, from the army of the Byzantine Empire recruited from the mountains of Asia Minor to

the knights of the kingdom of Asturias in the Pyrenees who began the Reconquista of Spain to the Vikings who terrorized Europe in the Viking Age to the Scots highlanders and to the Welsh longbowmen who repeatedly slaughtered armies of French knights during the Hundred Years' War and the Swiss pikemen who revolutionized warfare at the end of the Middle Ages.

THE ISLAMIC WORLD

BY RASHEED HOSEIN

While the Near East was home to some of the earliest human communities, as late as the Middle Ages there were still some regions that were largely uninhabited. This lack of habitation was due largely to the limited availability of well-watered arable land. Areas that could support cultivation were quickly utilized for this purpose, leading to population accumulations in those regions. These arable regions included coastal settlements, where food from the seas could be utilized and where agriculture was possible because of the temperate climate. Inland settlements near rivers or other bodies of water used the water to produce crops via irrigation networks. Oases were regions where groundwater reservoirs permitted agricultural activities. However, any other use of this precious land would have been very difficult to justify, given the razor-thin margin between subsistence and starvation throughout much of the region.

However, just beyond those settled lands lay marginal lands, areas that were not totally desiccated but that still lacked the ability to sustain continuous or even prolonged human settlement. The masters of these borderlands were the pastoral nomads (often called by other names, such as Bedouin or herdsmen). Owing to the dryness of the land a sedentary lifestyle was impossible. Instead, these groups pastured large animal herds, drove them in migratory patterns (often well established and demarcated) in search of seasonal fodder, and occasionally resorted to raids of settled areas (*ghazw*). This lifestyle is referred to as pastoral nomadism, a lifestyle that is migratory in nature and that involves the shepherding of animals.

In many ways it can be argued that the pastoralist lifestyle was the negation of an agricultural lifestyle, in that pastoralist activities were often diametrically opposed to the responsibilities of the cultivator. In keeping with the nature of their livelihood, nomad-pastoralists were fully specialized animal herders who were able—through specific techniques—to utilize land that was otherwise unusable, effectively allowing for limited habitation and economic production upon otherwise unsuitable land. Their mobility, the marginal fecundity of the land upon which their animals pastured, and their spe-

cialized reliance on both their animals and the environment were all mutually contingent: Movement, which was a necessary precondition of this lifestyle, precluded agriculture for the nomad-pastoralist.

While life in the wild was often brutal and harsh, it is important to note that many of the issues that people faced in medieval cities, such as crime, overcrowding, and disease, were not a part of the nomad-pastoralist life. Coupled with the somewhat salubrious and healthy nature of the dry climate, populations among the pastoralists could reach high levels, forcing migrations. This situation meant that pastoral-nomadic elements were pressed into contact (sometimes of a violent nature) with the stronger, sedentary people beyond the desert's margins.

Historical records from settled lands and empires are quick to enumerate the violent aspects of the association between pastoral-nomadic and sedentary peoples, and this image of the nomad vis-à-vis civilized society is very enduring. However, it must also be noted that while these sources relate the attacks of the pastoralists on sedentary societies, many of these same societies also conferred a higher social ranking to pastoralists than to agriculturalists. In both the classical pagan religions and the Abrahamic religious traditions, deities often show a higher appreciation for meat offerings, hinting at a different aspect of the nomadic-sedentary interchange.

Medieval historians of the Middle East were singularly interested in the dynamic of nomadic-sedentary relations. The great North African historian and sociologist Ibn Khaldun (1332–1406) presents some interesting observations on the dynamic social interactions between city dwellers (whom he terms *hadara*) and nomads (called *badawi*). Agreeing with the earlier Muslim historian al-Masudi (d. 957), Ibn Khaldun suggests that there was also a concomitant evolutionary relationship between the two groups. Al-Masudi defines the *badawi* as those people who are not yet sedentary in their lifestyle, living a rough and free existence in the borderlands. They fought and stole as necessity demanded, and as the result of the marginal life that pastoral nomadism required, the welfare of the group became paramount. The collective could supply the various needs of the individual far better than the individual could supply by himself.

Ibn Khaldun also observes that it was a natural occurrence for the *badawi* to mature and become *hadara*. The most important identity construct for each of these groups was a notion of group solidarity, which Ibn Khaldun calls *'asabiyyah*. This solidarity was born out of necessity, for living in the wilds required a high degree of cooperation. This *'asabiyyah* made the *badawi* superior to the *hadara* because living a civilized town life required one to live within the strictures of man-made law, which forcibly subverted the nature of hu-

man beings, making them weak. When conflict occurred, the group with the higher *'asabiyyah* always won. Once the conflict was finished, the transition from *badawi* to *hadara* began anew as the victorious nomadic elements settled in to city life, unintentionally weakening themselves and opening the door to their downfall when the next nomadic group arrived two or three generations later.

This cyclical pattern was repeated throughout the Middle East during the Middle Ages. Starting with the Arab conquest and empire in the seventh century, the Turkic migrations and subsequent empires of the 10th century and later periods, and most notably the great Mongol invasion of the 13th century, waves of essentially pastoralist groups came from the margins and violently interacted with the established sedentary groups they encountered, forever changing the political and cultural landscape of the region. However, it is important to note that such medieval historians as Ibn Khaldun do not glorify these people, for while civilized life



Pastoral scene from a manuscript of the *Divan (Poems)* by Sultan Ahmad Jalayir (ink, color, and gold on paper; ca. 1400) (Freer Gallery of Art, Smithsonian Institution, Purchase, F1932-30)

destroys fortitude and resistance, Khaldun equates the existence of the *badawi* with that of wild, untamable animals and dumb beasts of burden. Whether this recorded legacy of warfare and raiding is accurate or merely a case of historical source bias, the nomadic lifestyle as we understand it was not a self-sufficient enterprise. Nomadism was simply the best way to maximize the meager resources of areas that were otherwise unusable.

The domestication of livestock, specifically of sheep, goats, and the now-extinct aurochs (related to modern cattle), was the key for pastoral-nomadism. Based on the topography and the moisture of a region, there are different types of pastoral-nomadism. Transhumance, or “vertical” pastoralism, was practiced in regions where mountains are prevalent, such as the Zagros region in Iran and the eastern regions of the Anatolian peninsula. This form of pastoralism was characterized by the movement of herds (primarily sheep and goats) from low-lying winter pastures to elevated summer pastures located in the mountains. These pasturages were fixed territories under the control of a single group, and the region between the two pastures was usually a dimorphic zone (a region where both pastoral and sedentary activities and modes of production may overlap).

Riverain, or “horizontal,” pastoralism was the method of nomadism practiced by the pastoralists of central Iraq and the Fergana plains in central Asia. In this model the nomads pastured animals on the marginal lands adjacent to well-watered river districts. When the land could no longer support the flocks, the animals were gathered and herded into the river districts, where the pastoralists wintered with their herds. This form of pastoralism brought the pastoralists into close contact with the sedentary groups who practiced agriculture. The nature of interaction in this dimorphic zone ranged from hostility and conflict to close social ties and the creation of new social groupings.

The third major form of pastoralism was a derivative of the “horizontal” model and was best demonstrated by the Bedouin of Arabia and their use of the camel. Owing to the severe desiccation of the majority of the Arabian Peninsula, sheep and goats were of limited usefulness to the Bedouin. The camel, though, provided the Bedouin with a means to traverse the desert and locate places for habitation. Additionally, the durability and hardiness of the camel allowed for the creation of an overland aromatics trade network that connected south Arabia to the Syrian littoral. The camel also marked an important moment when populations began to leave the settled areas of the Tihamah cultural zone and move farther into the deserts, a process now referred to as “bedouinization.” In many ways the domestication of the camel allowed for the birth and eventual success of the Bedouin, as

the population of the Arabian Peninsula inverted the more accepted transition from nomadic to sedentary lifestyles.

All three of these models reflect an interesting feature of the nomadic-sedentary interchange. While there is ample evidence to support the notion that there was conflict between nomad-pastoralists and sedentary groups, there is also evidence to support the notion of cooperation. Cuneiform records from earlier historical periods, such as those that have survived from the city of Mari—located on the western bank of the Euphrates River—lay out the regional distributions of grazing lands and water rights over the dimorphic zone that marks the fringe of the Arabian Desert and the Syrian littoral, creating a picture of cooperation rather than just conflict. Due to the mobile and autarkic nature of pastoralist activities, the nomad-pastoralists could not produce refined goods, such as metal for tools or weapons, or enjoy the products of an agricultural lifestyle. Likewise, the city dwellers and agriculturalists would not have had as wide an access to meat and animal products without the pastoralists. What seems to be emerging is not a relationship of conflict but rather one of cooperation.

See also AGRICULTURE; ARCHITECTURE; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; DEATH AND BURIAL PRACTICES; ECONOMY; FOOD AND DIET; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; HUNTING, FISHING, AND GATHERING; INVENTIONS; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; MILITARY; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WEAPONRY AND ARMOR.

FURTHER READING

- Mahdi Adamu and Anthony H. M. Kirk-Greene, eds., *Pastoralists of the West African Savanna* (Manchester, U.K.: Manchester University Press, 1986).
- Roger M. Blench and Kevin C. MacDonald, eds., *The Origins and Development of African Livestock: Archaeology, Genetics, Linguistics, and Ethnography* (London: UCL Press, 2000).
- Juliet Clutton-Brock, ed., *The Walking Larder: Patterns of Domestication, Pastoralism, and Predation* (London: Unwin Hyman, 1989).
- Rada Dyson-Hudson and Neville Dyson-Hudson, “Nomadic Pastoralism,” *Annual Review of Anthropology* 9 (1980): 15–61.
- Christopher Ehret, “The First Spread of Food Production to Southern Africa.” In *The Archaeological and Linguistic Reconstruction of African History*, ed. Christopher Ehret and Merrick Posnansky (Berkeley: University of California Press, 1982).
- Peter B. Golden, *Nomads and their Neighbours in the Russian Steppe: Turks, Khazars and Qipchaqs* (Burlington, Vt.: Ashgate/Vari-orum, 2003).

- Martin Hall, *Farmers, Kings, and Traders: The People of Southern Africa, 200–1860* (Chicago: University of Chicago Press, 1990).
- Erik Hildinger, *Warriors of the Steppe: A Military History of Central Asia, 500 B.C. to 1700 A.D.* (New York: Da Capo Press, 2001).
- Hugh Kennedy, *Mongols, Huns and Vikings: Nomads at War* (London: Cassell, 2002).
- Anatoly M. Khazanov, *Nomads and the Outside World*, 2nd ed., trans. Julia Crookenden. (Madison: University of Wisconsin Press, 1994).
- Kathleen D. Morrison and Laura L. Junker, eds., *Forager-Traders in South and Southeast Asia: Long-Term Histories* (Cambridge, U.K.: Cambridge University Press, 2002).
- Robert Paine, *Herds of the Tundra: A Portrait of Saami Reindeer Pastoralism* (Washington, D.C.: Smithsonian Institution Press, 1994).
- Carla Rahn Phillips and William D. Phillips, Jr., *Spain's Golden Fleece: Wool Production and the Wool Trade from the Middle Ages to the Nineteenth Century* (Baltimore: Johns Hopkins University Press, 1997).
- Karl H. Schlesier, *Plains Indians, A.D. 500–1500* (Norman: University of Oklahoma Press, 1994).
- Svat Soucek, *A History of Inner Asia* (New York: Cambridge University Press, 2000).
- Derrick J. Stenning, *Savannah Nomads* (London: Oxford University Press, 1959).

► numbers and counting

INTRODUCTION

Owing to our physiological makeup—we have 10 fingers and 10 toes—human beings naturally use the base 10 (decimal) numerical system. The only other numerical system that was ever widely used before the 20th century was the base 60 (sexagesimal) system, which was developed by the ancient Sumerians and, in modified forms, is still used in calculating angles and in timekeeping. To people who have gone through modern educational systems, simple mathematical operations might seem almost intuitive, and more complicated operations can be carried out quickly with the aid of writing. But the situation in the Middle Ages was quite different. One trick that people used to perform, which seemed miraculous to crowds of onlookers, was to calculate simple sums in their heads (such as 50×10). The ability of Pope Sylvester II (who imported Arabic numerals to Europe) to do the same inspired the attribution of several books of magic to him.

At the beginning of the Middle Ages many different systems of writing numbers existed, varying from culture to culture. In the Byzantine Empire and India, for instance, letters were assigned to stand for certain numbers, and large numbers often had to be written out in words (as if writing *thousand* instead of *1,000*). Western Europe used the system of Roman numerals that is still employed in some archaizing

contexts today (such as on clock faces). The forms of the Roman numerals might have arisen at least in part from finger counting. But calculating was done on number tables or abacuses. The use of the abacus was limited to specially trained professionals. These devices used a base 10 system of numerals with place columns (for 1s, 10s, 100s, and so on) exactly as in modern numerical notation. The sums in each column were marked with pebbles (*calculi* in Latin) or beads. Calculations were done by adding or removing beads from the appropriate column and adding one to the next column to the right when a column reached 10. But before the Middle Ages there was no way of directly reproducing this system in writing.

The modern system of numbers now used throughout the world was developed in medieval India. In the sixth century the Indian mathematician Aryabhata introduced a new system of numerals based on the Sanskrit alphabet. (Before that time whole words were used to allegorically represent the numbers, such as *fire* for the number 3.) He differentiated consonants and vowels so that a vowel written after a consonant functioned as a power of 10 (and 100, 1,000, and so on). In the seventh century Brahmagupta became the first mathematician to use zero as a proper number rather than an empty placeholder (like a number-table column with no pebbles). With this innovation, it became possible to write down directly the decimal columns of the abacus, producing the modern form of numerical representation. This discovery was spread throughout the Islamic world by the Persian philosopher al-Khwarizmi and then to western Europe by the reception of Arabic learning in 12th-century Spain. The new mathematical concepts also were borrowed by China, in that case through anonymous merchants.

Because western Europeans received them from Islamic culture, we wrongly call the numbers of the 10-digit number system Arabic numerals, when they are actually derived from India. Arabic speakers know them as Indian numerals. They are based on some of the ancient Indian system of Brahmi numerals (which did not originally include the concept of decimal places). Many scholars today call them Indo-Arabic numerals to better reflect the historical reality.

The isolated peoples of the Americas developed their own systems of counting. Most were base 10, derived from counting on the fingers. But the system of counting in Central America was base 20, from counting on the hands and the feet. In antiquity the Maya had developed a system of numerical notation fully equivalent to modern Arabic numerals and decimal places, even without the aid of a device like an abacus. Since they used base 20, each of the numerals from 0 to 19 was represented by an individual sign. Rather than powers of 10 (10s, 100s, 1,000s, and so on), they used powers of 20 (20s, 400s, 8,000s, and so on) to express large numbers.

The zero was a sketch of a seashell, while the other numbers were additive, with a dot representing 1 and bars representing 5, so that 18 was rendered by three horizontal bars with three dots on top. Numbers were written in columns from the bottom up, such that the places were marked by rows rather than columns. For example, 404 would be written with four dots in the 1s row, a zero above that in the 20s row, and a single dot in the 400s row. The Mayan and Indian inventions of zero were quite independent.

AFRICA

BY OLUTAYO C. ADESINA

The medieval period in Africa was a time of unprecedented advances in the idea of mathematics and a sense of arithmetic as both a cultural and an economic phenomenon. Through the fresh introduction of ideas, Africans contributed significantly to human cultures of numbers and counting. This development was manifested in several ways, one of which was in the area of computing roots of difficult equations. During the medieval period the system of numbering and counting in Africa had undergone evolution that reflected the metamorphosis from lower to higher forms of social development through political and cultural contacts with diverse parts of the world. Numerous numbering and counting systems began to exist side by side. These had a variety of origins, forms, and consequences. Therefore, in a sense, a distinction is sometimes drawn between indigenous number and counting systems and imported systems. Ancient Africans developed and adopted systems and instruments of numbering and counting, such as counting glyphs, tally marks on bones, base-10 counting systems, the quinary and denary scale of numeration (counting by fingers and toes), and games and puzzles as part of their system of numeration. For more than 10 centuries, however, from about 300 to 1450, Africa experienced major influences from other parts of the world, with diverse impacts on developments on the continent and in other parts of the world.

Despite the contacts with other parts of the world, there were marked contrasts in the development of different societies in Africa, ranging from highly organized kingdoms and empires, such as Egypt, Ghana, Mali, Ethiopia, Kongo, Ile-Ife, and Benin, with the knowledge of basic concepts of mathematics, to lower social formations, such as the hunter-gatherer societies of the Kalahari Desert, the Mbuti of the Congo forests, and the remnants of other such Stone Age communities in which changes appeared to be slow or even nonexistent. Nevertheless, in more developed social formations that experienced contacts with the outside world, it was also still possible to distinguish between what was uniquely

indigenous to Africa and what appeared to be borrowed from elsewhere.

Africa in the medieval period experienced major influences from the Romans, the Arabs, and the Iberians. From then on, numbers and counting developed in tandem with indigenous African systems. These became the precursors of many modern practices and systems in Africa. The influence of the Roman Empire, which by 200 included North Africa, contributed to transformations in the age. Thus, in the northern part of Africa the number system borrowed from or took after the Roman system. The system created by the Romans had a total of seven symbols and could be used to express numbers from 1 to 1 million. These include I for 1, V for 5, X for 10, C for 100, D for 500, and M for 1,000. The Roman numerals are read from left to right, and the symbols standing for the largest quantities are placed at the left.

The Hindu-Arabic numeral system was part of the culture introduced into Africa from other areas. This system was represented by the use of positional notation of 10 symbols from 0 to 9, with individual symbols assuming specific values according to their position in the numerals. This system made it possible to differentiate between, for instance, the numbers 2, 202, and 2,002, all without the use of additional or cumbersome symbols. The first recorded use of the system in Europe was in 976, and this followed European explorers, navigators, and adventurers into Africa in the age of European contact and exploration. The transmission of mathematical knowledge from other cultures into Africa after the Roman conquest can be traced from Iraq into Egypt, then to Morocco, and on into the Iberian world.

There is no disputing the fact that the influence of the Romans and the Arabs in the expansion of mathematics in Africa remains very important. However, there is evidence to show that some of the central ideas of calculus reached Europe from Africa. Africans continued to make profound expansions in the world of mathematical ideas. Some of the basic ideas of calculus were already known in Egypt before Sir Isaac Newton (1642–1727) created his own version between 1665 and 1670. Egyptians had been able to combine ideas under the unifying themes of the derivative and the integral to show the connection between the two and then evolve the calculus into a problem-solving tool. In particular, the idea of the sums of integral powers and the area formula were developed in Egypt in the 11th century, when Caliph al-Hakim invited Ibn al-Haytham (965–1039), a native of Basra in Iraq, to work on a Nile-control project.

Not all mathematical ideas appeared as numerate skills. The indigenous population in Africa retained the capacity for mathematical ideas—ideas that they retained in informal ways and manners. The general consciousness of an arith-

metical sense extended into artistic works as well as cultural and commercial practices. The needs of commerce reflected an underlying culture of mathematics that remained a potent force. The utilitarian demand of counting adopted by financial and commercial interests expanded the scope of mathematics. It is significant that when the Portuguese arrived in western Africa in 1440, they were impressed by the dexterity shown by the Mandinga merchants, who traded in gold, on the upper reaches of Gambia. The use of finely balanced scales inlaid with silver and suspended from cords of twisted silk managed to convey a sense of costs, weights, and proportions. The gold dust and nuggets were weighed with brass weights. The Africans' expertise in measuring gold and in other forms of commerce was largely due to the fact that there were professionals within the group with a sense of numbers and counting. Nevertheless, that potential was not restricted to trading alone. Mathematical ideas were manifested in extraordinary and complex designs through decorative patterns. In several African cultures weaving patterns in cloths, carpets, and other products have some kind of symmetrical arrangement. This phenomenon suggests that different cultures in Africa arrived at different ways of projecting mathematical ideas. African achievements of the medieval period in mathematical ideas and practices stand as positive contributions to man's heritage of utilitarian creations.

THE AMERICAS

BY PENELOPE OJEDA DE HUALA

A great diversity exists in the numbering systems developed in the New World. A base-10 system of counting existed among the native groups in both North and South America, including the Algonquin, the Siouan, the Athapascan, the Iroquian, and the Salishan linguistic groups of North America and the Quechua-speaking groups of South America. A base-20 system of counting existed amongst the Inuit, the Mesoamericans, and several tribal groups of California. The base-10 system, the system used today, developed by using digits of both hands to count. The base-20 system, or vigesimal system, employs both hands and feet to count.

Several number and counting systems were recorded in the period after European contact with North America. The sophistication of these systems indicates that they were in use prior to contact. Among the Zuñi of New Mexico a digitally based system, using the 10 digits of the hands, was used during the early colonial period. For example, the Zuñi word for 10 is *astemthla*, which means "all of the fingers of the hand." Similarly, among the Takelma of southwestern Oregon the number 10 is called *ixdil*, meaning "both hands." Other native groups in North America also indicate that their words for

numbers originate from digit counting. For example, among the Omaha the number 7, *penompa*, means "finger two," and the number 8, *pethatbathi*, means "finger three."

For the Inuit people, two hands represent the number 10, a single foot represents the number 15, and two feet represent the number 20. The number 20 also represents a person. For example, among the Inuit of southwestern Alaska, the word for the number 20, *yuenok*, means "man completed." In this way, two people would represent the number 40, three people the number 60, and so on. Five people indicate the number 100, and the term for 100 means "bundle." This designation probably originates from the fact that animal skins were often bundled in groups of 100. Numbers in between show that the digits of the hands were used for counting. For example, among the Inuit of Hudson Bay, the word for the number 8 is *kittukleemot*, or "middle finger," and the word for the number 10 is *eerkitkoka*, or "little finger." The act of counting is demonstrated even further among the Inuit in Greenland, whose word for the number 9, *mikkelerak*, means the "fourth finger."

The presence of larger units, such as words for the number 1,000, have been recorded among various tribes, including the Delaware, the Choctaw, the Kwakiutl, the Biloxi, the Wiyot, the Fox, the Dakota, the Cherokee, the Ojibwa, the Osage, the Winnebago, the Wyandot, the Micmac, and the Apache. Many tribes seem to include numbers over 1,000 in their counting systems.

In Mesoamerica a vigesimal system was employed, based on the 20 digits found on a human being, using both hands and feet. This system was employed by the Maya (ca. 1000 B.C.E.–1521 C.E.), a civilization that dominated parts of Guatemala, southern Mexico, Belize, and Honduras. During the Classical Period the erection of stelae, or upright stone slabs, was fundamentally linked to the Mayan concept of time, as stelae were often built to celebrate the passage of a ritually significant period. For example, stelae were erected to commemorate *k'atuns*, or 20-year cycles, the fundamental unit of measuring time. These events were set into stone and indicate the importance of time keeping in Mesoamerica. For example, a 20-day period was called a *uinal*. Several words exist for the number 20, including *kal*, *may*, and *uinic*. *Uinic* also means "man" or "human being" and refers to the total number of digits on a human being.

The Maya developed a counting system based on bars and dots. A dot indicates a unit of one, and a bar a unit of five. The Maya invented the concept of zero, which was represented by a Maltese cross or a shell. The Maya developed a capacity to count exponentially, and their monuments record large numbers. They were particularly obsessed with recording time, both historic and cosmic events, and were the only

culture in the Americas to develop a real written language that could be read phonetically.

This basis of counting contributed to the development of the ritually significant calendar, since the main purpose of counting was related to calendrics. Like most Mesoamerican cultures, the Maya used a 260-day ritual calendar called a *tzolkin*. This calendar, which has its origin in the Preclassic Period, probably reflects the gestation period of an infant, from the time of the first missed menstrual cycle to birth. It is divided not by months but by 20 day names and 13 day numbers. In conjunction with the ritual calendar, a 365-day solar calendar was also used, consisting of 18 months (also with individual names) of 20 days (this period of 360 days is called a *tun*) plus five unnamed days called the *Uayeb*. These two calendars were used together, simultaneously, a cycle taking 52 years to complete. This period, related to our concept of a century, was called a calendar round. To distinguish between different 52-year periods, another counting system was created, called the Long Count. This count, which began for the Maya at the mythical date that corresponds to the year 3114 B.C.E. of our dating system, was a way for the Mayan kings to record historical time.

The Aztec (ca. 1200–1521), who spoke Nahuatl, developed a pictorial language, using a mixture of pictograms, ideograms, and phonetics. Bark paper books from after European contact include sections on the 260-day ritual calendar, called the *tonalpohualli*, and the 365-day solar calendar, called the *xihuitl*. Like the Mayan version, these calendars worked in conjunction with each other and were used for ritual divination; they were also similarly divided, including the 52-year cycle, which was called a *xuihpohualli*. The Aztec picture books also include information on Aztec counting practices. Like the Maya, the Aztec used a base-20 system. Symbols were used to represent each number; for example, the flag symbol stood for the number 20, and a tree stood for the number 400. Like many indigenous groups, the meaning of certain numbers reveals their digital counting origin. For example, the number 5, *macuilli*, probably derived from the word *maitl*, or “hand.”

In the Andes no written form of language existed prior to European contact. However, records were documented by the Inca (1438–1533), a civilization that dominated the entire South American continent, including present-day Ecuador, Bolivia, Peru, Chile, and parts of Argentina and Columbia. Records were kept using a knotted textile device called a quipu, which recorded various kinds of information, such as tax or census data. The quipu contained a main horizontal cord from which yarns of different colors were hung vertically. Different-colored string as well as the type of knots, cord length, and position on the cord indicated different informa-

tion. Specialists created and read these instruments, and the development of the quipu reflects the importance of textiles in the Andean region. Chronicles from after European contact indicate that a base-10 system of counting was used in the Andes. The Quechuan (Incan) term for 10 was *chunka*.

ASIA AND THE PACIFIC

BY TOM STREISSGUTH

The counting and numbering system of medieval China had its earliest origins in the writing of the Shang Dynasty of the second millennium B.C.E. Historians have theorized that Shang numerals were phonetic, with the symbols for the numbers correlating to the shape of certain objects. The Chinese juxtaposed figures to create larger numbers: For example, the symbol for 4,000 combines the symbol for 4 and the symbol for 1,000. Shang numerals had given way to a more abstract system of horizontal and vertical lines by the time of the Han Dynasty, which lasted until the fourth century C.E.

The short lines of Han numerals derived from the use of counting boards for calculations and arithmetic. The counting board had a series of columns, with places for counting rods made of contrasting materials or colors. A blank space without a rod indicated zero. There were arrangements of the rods for nine different values and a place-value system that changed the value of the symbols depending on their position in the matrix. The far-right column represented single digits, for example, while the next left column represented multiples of 10, the next multiples of 100, and so on. The famous *Xiahou Yang suanjing* (Mathematical Manual) of Xiahou Yang (ca. 400–ca. 470), written in the fifth century, explains the various methods of addition, subtraction, multiplication, and division on the counting board.

Mathematics was an essential part of China's educational system, which prepared young men for service in the imperial government. A standard textbook known as the *Jiuzhang suanshu* (Nine Chapters on the Mathematical Art), dating to the Han Dynasty, includes 246 word problems covering many different topics in arithmetic, trigonometry, and geometry as applied to real-world problems in engineering, finance, farming, and marketing. The book provides solutions as well as detailed explanations for how the problems are solved. The method inspired many able medieval mathematicians, including Ding Ju (fl. 1355), He Pingzong, Wu Jing (fl. 1450), and Liu Shilong (fl. 1424), to write detailed commentaries on the *Jiuzhang suanshu*.

Historians believe that the concept of zero was introduced to China during the Tang Dynasty, which began in the early seventh century. At this time Chinese merchants, pilgrims, and explorers were traveling to the Indian Subcon-

tinent, where the concept of zero and the decimal point originated. In the medieval period the Chinese also discovered the use of negative numbers, the binomial theorem (a method of calculating sums of unknown integers and their powers), matrices (tables used for solving addition and multiplication problems), the useful number matrix later known in the West as Pascal's triangle, and the rule of three (a method of finding a fourth term in a proportion when three terms are already known). The golden age of mathematics in China came during the 13th century, a time of several brilliant scholars. These scholars included Qin Jiushao (1202–61), the author of the *Shushu jiuzhang* (Mathematical Treatise, 1247), and Li Zhi (1192–1279), who wrote *Ce yuan hai jing* (Sea Mirror of Circle Measurements, 1248) and *Yi gu yan duan* (New Steps in Computation, 1259), books that set out the author's method of solving algebraic equations. Other major figures of mathematics in medieval China were Guo Shoujing (1231–1316) and Zhu Shijie (ca. 1260–ca. 1320), who wrote *Suanxue qimeng* (Introduction to Mathematical Studies, 1299). In 1275 Yang Hui (ca. 1238–ca. 98) wrote *Yang Hui suanfa* (Yang Hui's Methods of Computation), describing various methods of multiplication and division, quadratic equations, and geometrical calculations. Yang Hui is best known for the composition of a magic square and his theorems in geometry that echoed the discoveries of the Greek mathematician Euclid (fl. ca. 300 B.C.E.).

The Chinese system of counting and mathematics traveled to Korea and Japan as well as to areas colonized by the Chinese, including Southeast Asia. While the Japanese adopted the Chinese system entirely, the Koreans developed their own system of counting and used the two sets of numerals, Sino-Korean and native Korean, as well as varying pronunciations when indicating abstract numbers, the passing of time, and quantities.

Along with Chinese mathematics came the *suanpan*, or Chinese abacus, which by the time of the Ming Dynasty, beginning in the 14th century, had replaced the ancient system of counting rods. This device contains a series of rods, divided into upper and lower compartments with a set of sliding beads—two in the upper compartment and five in the lower compartment. The device can make decimal (base-10) and hexadecimal (base-16) calculations, including addition, subtraction, multiplication, division, and square and cube roots.

India was the ancestral home of the modern system of numbering, counting, and mathematics. Numbers in the classical Vedic literature of India were represented by phrases. The value for 2, for example, could be expressed by the words for arm or eye; the word for fire represented 3, and the words for sky represented zero. The words were combined to give a



Terra-cotta tile with crouching figures; Harwan, Kashmir, ca. fourth to fifth centuries. Terra-cotta tiles were used to pave the floor of the courtyard of this Buddhist sanctuary; the tiles are all inscribed with numerals in the Kharoshthi script. (© The Trustees of the British Museum)

number greater than 9, with the 10s given first and then the single digits.

This decimal system of numeric notation and the concept of zero were passed to Arabic mathematicians studying in south Asia in the early medieval period. The numeric symbols discovered by Arab scholars in the Sanskrit texts of India eventually made their way, via the Abbasid Caliphate, to Europe, where they replaced the Roman system with what became known as Arabic numerals. Two important ninth-century Arabic texts transmitting the Indian system to the West were the Latin *Algoritmi de numero Indorum* (On the Calculation with Hindu Numerals, ca. 825) by al-Khwarizmi (ca. 780–ca.

850) and *Ketab fi isti'mal al-'adad al-Hindi* (On the Use of the Indian Numerals, ca. 830) by al-Kindi (d. ca. 870).

Indian scholars studied mathematics through Sanskrit texts and their sutras, verses that were learned by heart and transmitted to students orally. Mathematics in medieval India was an integral part of religious ritual as well as the study of the heavens. The science of trigonometry, for example, developed through the measurement of distance and azimuth of the sun, the moon, and the planets and their relation to one another.

The Gupta numerals developed in the early medieval period, during the time of the Gupta Empire, and spread across India with the armies of the Gupta rulers. This system developed into the Nagari numerals, also known as the Devanagari numerals, the “writing of the gods,” which originated in the seventh century and which were adopted into Hindi, Sanskrit, and other languages of the Indian Subcontinent. Some historians hypothesize that the idea for place value in Indian number systems came from the decimal counting rod system of the Chinese.

India's most prestigious medieval mathematician, Aryabhata, lived from 476 to around 550, during the time of the Guptas. He spent most of his life in the northern town of Kusumapura, where he wrote the *Aryabhatiya* (Treatise of Aryabhata). This work consists of 118 verse stanzas divided into four sections. The section known as “Ganitapada” (Mathematics) includes 33 verses and 66 rules. In previous times mathematics scholars worked in the form of sulbasutras, which included rules of arithmetic applied to measuring distance. Aryabhata incorporates this material in his work, in which he takes mathematics further into the realms of algebra, trigonometry, and geometry. Aryabhata teaches methods of calculating cube roots, sums of a series, the sines of angles, the volume of solids, and the solutions to indeterminate linear equations (containing variables, or unknown quantities).

Working with a base-10 counting system, Aryabhata uses 33 consonants of the Hindu alphabet to stand for integers from 1 to 25 and multiples of 10 from 30 to 100. The syllable *kha* is used to indicate zero. Consonants followed by vowels stand for a power of 10, up to 10^{18} . With this system, he develops methods for calculating cube roots, formulas for adding numbers in series, and algebraic solutions to linear equations.

Brahmagupta (598–ca. 665) wrote the first books to employ negative numbers and the zero within mathematical operations. In his *Brahmasphuta-siddhanta* (Improved Astronomical System of Brahma), Brahmagupta covers quadratic and linear equations, trigonometric methods for solving distance, the measurement of arcs and spheres, and such astronomical problems as the measurement of the earth's circumference and the precise length of the year. He devel-

ops several different methods for complex multiplication, calculating the area of cyclic quadrilaterals (those defined by points on a circle), reducing compound fractions to simple fractions, and calculating compound interest.

There was no system of written notation in Polynesia, a region that encompassed several different systems of indicating number. At some period before the medieval era the inhabitants of the Pacific Islands migrated eastward from their ancestral homes in Indonesia and Southeast Asia, regions that used a base-10 system of counting. There were words denoting numbers 1 through 9 and distinct words indicating a certain power of 10. The oldest-known numbering system in the Polynesia region was also decimal, but later societies—including Maori, Hawaiian, and Tongan—developed mixed-base systems, counting by both 10 and 4, for example, in the Hawaiian Islands. Some Polynesian islanders created different numbering systems for different objects. In the Tongan language, for example, certain objects were counted by pairs (including sugarcane stalks) or scores (groups of 20): yams, fish, coconuts, and the pandanus leaf, used in weaving and cooking. Fish were also counted in their own way in Hawaii, New Zealand, and Samoa. When European explorers and missionaries arrived, Hindu-Arabic numerals were introduced, as was the concept of zero.

EUROPE

BY JULIE-ANN VICKERS

In the early Middle Ages numerals and methods of calculation were similar to those used in Greco-Roman antiquity. The numbers we use today, known as Hindu-Arabic numerals, were first transmitted to western Europe in the 10th century. The spread of this numerical system in medieval Europe was an important factor in the development of scientific knowledge. However, medieval scholars in the Latin West and the Byzantine East did not immediately recognize the advantages of the Hindu-Arabic number system and in some cases were hostile to its adoption. Because of this view, the spread of Hindu-Arabic numerals was a slow process, taking place over centuries. It was not until after the medieval period that Hindu-Arabic numbers finally superseded the numerical systems inherited from the ancient world.

Dactylonomy, or finger counting, was one of the numerical systems from the ancient world that continued in use throughout the medieval period. This method employed the fingers of the hand for forming signs that represented numbers, as well as for counting and making calculations. A uniform system of finger numbers was common to the Byzantine Empire and western Europe at this time. From the written evidence it is not clear, however, whether numerical calcu-

lations were actually carried out on fingers or whether the fingers acted as memory aids for performing mental calculations. Although finger counting was a common and easily utilized method of performing everyday calculations, it was also used and taught by the most educated scholars in early medieval society. The Venerable Bede (672 or 673–735), an English Benedictine monk and one of the most respected scholars of his age, included a chapter on finger counting in his work *De temporum ratione* (The Calculation of Time). In this he explains how to use finger counting to assist in the calculation of the date of Easter, a feast whose date moves from year to year in accordance with the lunar cycles. In the later Middle Ages finger counting continued to be used as an aid in performing calculations with other numerical systems.

To record numbers in a permanent, written form, medieval scribes used either Greek or Roman numerals. In the Byzantine East the Ionic number system, which first appeared in ancient Greece, remained in use for the duration of the medieval period. This was a system of alphabetic numerals in which each letter of the Greek alphabet corresponded to a numerical value. Scribes wrote these numerals with a horizontal dash on top or between dots, in order to distinguish them from letters. The Roman numerals used in the West were also the continuation of a system used in the ancient world. Unlike the Greek system, Roman numerals were originally abstract signs that represented numerals. However, over the course of the Middle Ages these forms were adapted to correspond with letters of the Latin alphabet. It is important to note that the numeral zero did not exist in either the Greek or the Roman system of the early Middle Ages. The absence of zero meant that there was no place-value notation system for recording numbers. As a result, carrying out written computations in both systems was extremely complex and difficult.

For performing calculations, medieval scholars instead used an abacus, or counting board. Only after they had finished a calculation was the final result then written down using Greek or Roman numerals. The abaci of the Middle Ages were different from their modern counterparts. They consisted of a table, a board, or another flat surface drawn up with columns. These columns represented ranks, and counters were used to represent the relevant number of units in each rank column. In this way medieval scholars practiced a form of place-value notation for calculations but did not incorporate this into their written numerical systems. Still, by today's standards, calculations using the abacus look convoluted and time-consuming. In particular, multiplication and division were long and complicated procedures. In the Middle Ages mathematics was a specialized field of knowledge, and abacists, as they were known, undertook many years of study in order to become competent in these techniques. This

two-tiered process of calculating with one system and writing down results in the traditional Roman or Greek numerals persisted until the entire method was challenged by the emergence of Hindu-Arabic numerals.

The adoption of Hindu-Arabic numerals is one of the key developments in the history of mathematics because the system was the first to incorporate three important elements: decimal notation, place value, and the use of nine digits to represent all numbers. With these three elements, it was possible to perform more complex calculations with greater efficiency. The numerals originated in sixth-century India, but Arab scholars were responsible for spreading them throughout the Muslim civilizations of the Middle East and the Iberian Peninsula in the eighth and ninth centuries. For this reason we call them Hindu-Arabic numerals. Although these numerals were used in Islamic Spain from the ninth century, it was many centuries before they were commonly used in the rest of western Europe.

A French scholar and monk of the 10th century, Gerbert of Aurillac (ca. 945–1003), who later became Pope Sylvester II, was the first to bring formal knowledge of the Hindu-Arabic numerals to the West. After entering monastic life, Gerbert went to Barcelona to study and while there came in contact with the numbers used by the Arabs. He brought this knowledge back to the West and began to teach. Gerbert, however, taught only the nine Hindu-Arabic numerals and had no knowledge of zero, by that time an important element of the place-value notational system. In addition, Gerbert was not familiar with the methods used to perform calculations with the numerals, which was one of the major advantages of the system over the classical Greek and Roman numerals. Despite Gerbert's work, knowledge of the Hindu-Arabic numerals made little impact on the intellectual culture of the West at this time. These numerals were used by only a small number of scholars, and then chiefly as a means of modifying the existing methods of calculation on the abacus.

One of the major obstacles to the adoption of the Hindu-Arabic numerals was the language barrier that existed between the Islamic world and western Europe. In 12th-century Spain this barrier began to break down. Such towns as Toledo fostered exchanges between Jewish, Christian, and Muslim intellectuals, with the result that many scholarly works of Arabic origin were translated into Latin—still the language of Western scholars—for the first time. In the middle of the 12th century Robert of Chester (fl. 1150), an English scholar working in Spain, translated a book by the Arab scholar Muhammad ibn Musu al-Khwarizmi (ca. 780–ca. 850) titled *Algoritmi de numero Indorum* (Calculation with the Hindu Numerals). Al-Khwarizmi's work, written around 825, had been influential in the spread of the Hindu numerals in the

Arab world. The translation of this work into Latin meant that the West now had access to a comprehensive treatise on the operation of the Hindu-Arabic system. In Europe the system became known as *algorismus*, a Latin corruption of the name al-Khwarizmi, from which we derive the modern word *algorithm*. The practitioners of the Hindu-Arabic system were called algorists.

Despite the availability of translations, scholars of the Latin West were slow to adopt the Hindu-Arabic system. They preferred to keep using Roman numerals and the abacus, methods that had been inherited from the Roman Empire and that were steeped in prestige and tradition. It was not until the 13th century that the Hindu-Arabic numerals began seriously to challenge the traditional methods of calculation. In 1202 Leonardo Fibonacci (ca. 1170–after 1240), the son of a Pisan merchant, wrote *Liber abaci* (Book of the Abacus). The title is misleading, for the work focuses not on the abacus but rather on the methods of performing calculations with the Hindu-Arabic numerals. It describes the key concepts of place value and zero in the system. Fibonacci came into contact with the numerals in northern Africa, where his father had business interests. He soon recognized the advantages of the Hindu-Arabic method for performing complex calculations, particularly those involving commercial transactions. His book was therefore important for highlighting the practical applications of the Hindu-Arabic numerals.

Two other figures are also credited with popularizing these numerals in the West. Alexander de Villedieu (ca. 1175–1240) was a French monk who wrote a poem called *Carmen de algorismo* (Song of the Algorismus). In this poem he relates the basic operations of the numerals. Johannes de Sacrobosco (d. 1244 or 1256), otherwise known as John of Holywood or John of Halifax, was an English scholar who taught at the University of Paris. He wrote *Algorismus*, an introductory account of computations with the Hindu-Arabic numerals, a text that was responsible for introducing them into the university curriculum.

Resistance to the Hindu-Arabic numerals was still widespread at this time, and in some instances the new numerals were openly attacked. In the Byzantine East knowledge of the Hindu-Arabic system had filtered through at the same time as in the West. However, in Byzantium the Arabic symbols for the digits were replaced with the first nine letters of the Greek alphabet, while a special symbol was used for zero. In this way Byzantine scholars tried to preserve something of their traditional alphabetic numeral system. Meanwhile in western Europe during the 13th and 14th centuries, clerics became openly critical of the Hindu-Arabic system, calling the numerals profane and wicked. In Florence laws were passed to prevent bankers from using the numerals. Often the Hindu-

Arabic numbers were viewed suspiciously as a form of secret code, giving rise to the modern meaning of the word *cipher*, which stems from *zephyrum*, the term used in this period for “zero.” The highly trained abacists were also eager to prevent the spread of the Hindu-Arabic numerals. The new system made their specialized knowledge redundant and allowed a much larger section of society to become familiar with computational methods.

The fight between the abacists and the algorists continued for the rest of the medieval period. During this time the advantages of the Hindu-Arabic system were gradually recognized, particularly by scientists, who used the numerals for measuring natural phenomena. However, in administration and finance, the abacists still tended to dominate. The increasing availability of paper in the late medieval period hastened the spread of the Hindu-Arabic system as paper made it easier to write down, perform, and record calculations. From this period onward the use of the abacus fell into decline, and by the 16th century the Hindu-Arabic numeral system had become the dominant method of calculation.

THE ISLAMIC WORLD

BY DAVID TSCHANZ

One of the great ironies of history is that the numbers that are in common use in the West, the so-called Arabic numerals (1, 2, 3, and so on) are not the ones that are used by Arabic speakers. The numbers used by most Arabs since the beginning of Islam (in the seventh century) were actually Indian in origin. The primary numeral system in common use today originated from the Hindu numeral system, which is a pure place-value system that requires a zero. In Sanskrit literature number words for 1 through 9, 10, 100, and further powers of 10 were used (similar to the decimal system). The most widely used place-value symbols belong to the Nagari script numerals, very similar to the Brahmi numerals, which form the basis of the modern Hindu-Arabic numerals.

Historians trace many modern numerals to the Brahmi numerals, which were in use around the middle of the third century B.C.E. The place-value system, however, evolved later. The Brahmi numerals have been found in inscriptions in caves and on coins in regions near Pune, Mumbai, and Uttar Pradesh. Dating these numerals tells us that they were in use over quite a long time span up to the fourth century C.E. During the Gupta Period (early fourth to the late sixth century C.E.) the Gupta numerals developed from the Brahmi numerals and were spread over large areas by the Gupta Empire as the Guptas conquered territory. Beginning around the seventh century the Gupta numerals evolved into the Nagari numerals.

These Hindu numerals form the basis of the European number systems that are now widely used. They were not transmitted directly from India to Europe but rather came first to the Arabic-speaking peoples and from them to Europe. The story of this transmission is not, however, a simple one. The eastern and western parts of the Islamic world both saw separate developments of Indian numerals with relatively little interaction between the two. It was through the western part of the Arabic world (North Africa and Spain) that transmission to Europe occurred, initially through Spain.

The Arabs did not simply take over the Indian number system. Instead, different number systems coexisted in the Arabic world over a long period of time. There were at least three different types of arithmetic used in Arab countries in the 11th century. First, there was a system derived from counting on the fingers, with the numerals written entirely in words; this finger-reckoning arithmetic was the system used for by the business community. Second was the sexagesimal system, with numerals denoted by letters of the Arabic alphabet. Last was the arithmetic of the Indian numerals and fractions with the decimal place-value system.

The first sign that the Indian numerals were moving west comes from a source that predates the rise of the Arab nations. In 662 Severus Sebokht, a Nestorian bishop who lived in Keneshra on the Euphrates River, wrote that Indian "computation is done by means of nine signs." He went on to state that "if those who believe, because they speak Greek, that they have arrived at the limits of science would read the Indian texts, they would be convinced, even if a little late in the day, that there are others who know something of value." By 776, as the Islamic Empire was beginning to take shape, another reference to the transmission of Indian numerals, is mentioned. Al-Qifti, writing in the 12th century but quoting earlier sources) states that "a person from India presented himself before the Caliph al-Mansur . . . who was well versed in the siddhanta method of calculation related to the movement of the heavenly bodies, and having ways of calculating equations based on the half-chord [essentially the sine] calculated in half-degrees."

Tradition holds that the first Arabic text that explains the Indian number system was written by al-Khwarizmi, who invented algebra. The Arabic text is lost, but a 12th-century Latin translation, *Algoritmi de numero Indorum* (Al-Khwarizmi on the Hindu Art of Reckoning), gave rise to the word *algorithm*, deriving from his name in the title. At first the Indian methods were applied using a dust board. In fact, in the western part of the Arabic world the Indian numerals came to be known as Guba (or Gubar or Ghubar) numerals from the Arabic word meaning "dust." A dust board was used because the arithmetical methods required the moving

of numbers around in the calculation and rubbing some out as the calculation proceeded. The dust board was thus used in the same sort of way as a blackboard, chalk, and eraser.

Around the middle of the 10th century al-Uqlidisi wrote *Kitab al-fusul fi al-hisab al-Hindi*, the earliest surviving book that presents the Indian system. Al-Uqlidisi argues that the new system is more practical: "Most arithmeticians are obliged to use it in their work: since it is easy and immediate, requires little memorization, provides quick answers, demands little thought." In the fourth part of this book al-Uqlidisi shows how to modify the methods of calculating with Indian symbols, which had required a dust (or sand) board, to methods that could be carried out with pen and paper. Belief that the Indian system required a dust board was a major obstacle to its acceptance.

A contemporary of al-Baghdadi, writing near the beginning of the 11th century, was ibn Sina (known to the West as Avicenna). According to his autobiography, a group of scholars from Egypt came to his father's house in about 997 when he was 10 years old and taught him Indian arithmetic. He also tells of being taught Indian calculation and algebra by a grocery store owner. The key to this description is that by the beginning of the 11th century calculation with Indian symbols was fairly widespread and, quite significantly, was known to a vegetable trader. Whatever the case may be, it should be pointed out that Arabic works give no reference whatsoever to any Sanskrit text or Hindu arithmetician, nor do they quote any Sanskrit term or statement.

Not everyone agreed with the new system right away. While scholars were now calculating with Indian symbols, the business community continued to use their finger arithmetic throughout the 10th century. The numbers were represented by letters but not in the dictionary order. The system was known as *huruf al jumar*, which meant "letters for calculating," and also sometimes as *abjad*, which is just the first four numbers (1 = a, 2 = b, 3 = j, 4 = d). The numbers from 1 to 9 were represented by letters; then the numbers 10, 20, 30, and so on to 90 by the next nine letters (10 = y, 20 = k, 30 = l, 40 = m, ...); then 100, 200, 300, and so on to 900 by the next letters (100 = q, 200 = r, 300 = sh, 400 = ta, and so forth). There were 28 Arabic letters, and so one was left over, which was used to represent 1,000. At the same time, Muslim astronomers used a base 60 version of the Arabic letter system.

Fibonacci, an Italian mathematician who had studied in Béjaia Bougie, Algeria, promoted the Arabic numeral system in Europe with his book *Liber abaci* (Book of Calculation), published in 1202. While Fibonacci's book was well received, the "Arabic numeral" system did not come into wide use in Europe until the invention of printing, and they became commonly known during the 15th century. The

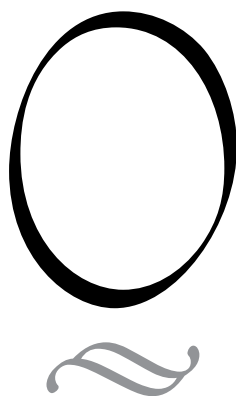
first known use in England was on a 1487 inscription (the date being written in Arabic numerals) at Piddletrenthide church, in Dorset. By the mid-16th century, they were in common use in most of Europe. Roman numerals remained in use mostly for the notation of years of the Common Era and for numbers on clock faces. Sometimes Roman numerals are still used for enumeration of lists (as an alternative to alphabetical enumeration), and numbering pages in prefatory material in books.

In the last few centuries the European variety of Arabic numbers was spread around the world and gradually became the most commonly used numeral system throughout the globe. Even in many countries in languages that have their own numeral systems, the European Arabic numerals are widely used in commerce and mathematics.

See also ASTRONOMY; CALENDARS AND CLOCKS; EDUCATION; INVENTIONS; LANGUAGE; OCCUPATIONS; RELIGION AND COSMOLOGY; SCIENCE; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; WEIGHTS AND MEASURES.

FURTHER READING

- Carl B. Boyer, *A History of Mathematics*, 2nd rev. ed. (New York: Wiley, 1991).
- Calvin C. Clawson, *The Mathematical Traveler: Exploring the Grand History of Numbers* (Plenum Press, 1994).
- Michael P. Closs, *Native American Mathematics* (Austin: University of Texas Press, 1986).
- Graham Flegg, *Numbers: Their History and Meaning* (Mineola, N.Y.: Dover, 2002).
- Georges Ifrah, *The Universal History of Numbers: From Prehistory to the Invention of the Computer* (New York: John Wiley, 2000).
- Victor J. Katz, ed., *The Mathematics of Egypt, Mesopotamia, China, India, and Islam: A Sourcebook* (Princeton, N.J.: Princeton University Press, 2007).
- Jean-Claude Martzloff, *A History of Chinese Mathematics* (New York: Springer, 2006).
- John Mcleish, *The Story of Numbers: How Mathematics Has Shaped Civilization* (New York: Fawcett Columbine, 1994).
- Karl W. Menninger, *Number Words and Number Symbols: A Cultural History of Numbers*, trans. Paul Broneer, rev. German ed. (New York: Dover Publications, 1992).
- Claudia Zaslavsky, *Africa Counts: Number and Pattern in African Culture*, 3rd ed. (Chicago: Lawrence Hill Books, 1999).



► occupations

INTRODUCTION

History can sometimes seem to be all about people who did not do much: indolent monarchs, aristocrats who spent their time gambling or having scandalous romances, or spoiled princes who let their lands decay from neglect. But most people actually did something with their lives. Day in and day out they worked at their occupations. The textile makers, the teachers, the farmers, the homemakers, and a multitude of others kept their cultures functioning, filled government coffers with their taxes, and worked together to create livable societies. The kinds of occupations a society had can speak to how people saw themselves and their roles in the world. They can reveal how people managed their environments and exploited their resources. They can also tell about what people in different cultures valued.

For much of the medieval era survival was the foremost objective of most people. Even people who were fortunate not to live in a place overrun by wars or plagues still had to worry about feeding themselves and their families, maintaining shelter, and finding clothing. A somewhat misleading notion is that the more occupations a society had, the more prosperous the society was. Crafts are often cited: The development of specialized crafts such as goldsmithing, jewelry making and others suggest that a society generated enough material wealth, especially food, for some people to make their living providing services that did not require them to devote them-

selves to farming, hunting, or gathering. As attractive as this idea has been, it is not necessarily true.

For example, the city of Changan, one of the capitals of medieval China, had an enormous number of different occupations during the Tang Dynasty; the great variety of occupations did not derive from prosperity but from extreme poverty. Millions of medieval Chinese had to struggle from moment to moment to avoid starvation and illnesses associated with malnutrition and exposure. Many people in Changan had no land on which to farm and lived in the city because that was where wealth and food accumulated. They invented occupations in order to create social niches for themselves that would give them some hope of feeding themselves and their families. Thus there were people who walked the streets selling fried food, who sang songs in the streets, or who invented other ways to persuade people to give them coins or morsels of food. On occasion, the government tried to rid the streets of destitute people but they did not go completely away.

Having an occupation that was both accepted as an occupation by the community and legally recognized by the government was of considerable value. Farmers often were the first people to be drafted into armies or public works programs such as building levees, but in lands such as China and Japan they often had an advantage over others because their occupations were recognized by law, which meant they had legal protections some other occupations did not have. They had a recognized value to the survival of the state.

Occupations can be a clue to the natural resources of a culture. For example, miners indicate the existence of minerals. In Africa the mines could be for metals or for salt. In South America the mines were for metals such as gold. In China, mines could be for salt, coal, or metals. The mere fact that there were coal miners shows that the Chinese had found a use for coal that was important to them. That salt was mined in places as far apart as Africa and China speaks to the importance of salt as a mineral. The profession of horse tending would indicate a culture in which there were people who valued and used horses. In India one occupation was that of forester. Foresters selected trees for felling, captured animals for the parks belonging to kings, and planted new trees to replace ones lost to felling or disease, usually selecting trees that were valuable to people for their timber or their fruits. This speaks volumes about medieval Indian values and foresight, and it helps explain why the heavily populated land retained many of its forest lands into modern times.

Thus the study of medieval occupations offers much food for thought. Within the occupations of medieval societies were clues to the ways in which people coped with their environments, what they valued, and how they found ways to fit into their societies and achieve some security for themselves and their families.

AFRICA

BY LEAH A. J. COHEN

Trade between groups and the development of centrally governed civilizations, such as Kush in Nubia, had produced a specialization of livelihoods before the start of the medieval era. Specialized occupations developed further with the rise of the great states of the medieval period—including Ghana, Mali, Songhai, and Great Zimbabwe—and the dramatic growth of the trans-Saharan trade network.

Despite an increased variety in occupations, many people during the medieval period were still engaged primarily in farming or, in places near major water bodies, fishing. Farmers employed numerous strategies to increase the amount of food they could produce for the growing population. Farming was often done using iron hand tools. Some farming was done by alternating productive times with periods of fallow (times when fields are not cultivated) to allow the fields to replenish their nutrient content. In more densely populated areas, such as around Lake Victoria in East Africa, it became advantageous to avoid periods of fallow by employing intensive farming methods such as intercropping, manure application, terracing, irrigation, and crop rotation. The use of draft animals in farming had become common in areas outside the tsetse fly zone.

Many groups tended livestock for a living. Continually migrating herders were able to occupy areas with less rainfall in and near the Sahara and the deserts of southern Africa. Herders and farmers were dependent on trade with each other. In the northern regions of Africa cattle herders lived off the consumption of milk and blood and did not kill their cattle for meat. In the south cattle were raised for milk and meat.

Some groups still made their living by hunting and gathering, especially in the central forest areas. The San were still living by hunting and gathering in southern Africa during the medieval period. Hunter-gatherer groups had increased contact with settled farming communities during this period and often traded meat, hides, and gathered food for produce and products from farming and herding groups.

One of the key economic bases for the major civilizations during the medieval period was the extraction, use, and trade of natural resources, including gold (as early as the seventh and eighth centuries in Jenne-jeno, western Africa, and in the 12th century in Mapungubwe, southern Africa), salt (northern Africa), iron ore, copper (mainly in central and southern Africa), bronze, and other metals. Mining—the extraction of metal ores from the landscape—was common during this period in western, central, and southern Africa. The mining of metals was done by sifting both dry soils and those from river beds and bogs. Later medieval mines in southern Africa were shafts ranging from a few feet to more than 100 feet deep. Miners were lowered with ropes to dislodge the metals with hand tools, and the ores were lifted up in baskets to the surface. Gold was panned in rivers or by digging holes in hard ground. The ore deposits and attached rock were smashed with stone hammers and sifted. Archaeological remains suggest that men, women, and children all worked in the mines, and often slave labor was used.

Smelting is the conversion of ores into raw metals through the application of heat and chemical processes. This was done in a number of ways in medieval Africa. Wood from the surrounding areas was used in the furnaces as charcoal. For iron ore, many different types of furnaces were used throughout Africa, including one that appears to have been uniquely African. This furnace employed a natural draft system in which air was fed to the fire through several tall shafts, eliminating the need for the labor-intensive use of bellows to blow air on the fires to maintain the high temperatures required to smelt iron. Controlling the temperature was very important as different temperatures produced different types of iron. For example, a furnace that was too hot produced cast iron, which was too brittle to be forged by hand. By about 1000 carbon steel, an alloy of iron, was produced in Africa. This process was most often done by men, although women helped pre-

pare charcoal or the ore for smelting. In some areas smelters did nothing but smelt metal, and in others they also forged the metal into desired objects.

Metalsmithing dates back to at least as early as 4000 B.C.E. in sub-Saharan Africa and probably first developed with metals that were easier to smelt and forge, such as copper. Forging—the shaping of raw metals into useful objects—was done throughout Africa, and the techniques changed as the processes were refined and the environmental conditions and resources changed. Making iron and copper objects was often done by repeating heating and hammering. Several artifacts cast in a lost-wax process have been uncovered in southeastern Nigeria dating to the eighth through the 10th centuries, and there is evidence that wire was made by hammering, heating, and drawing at least as early as the 15th century in present-day Zimbabwe and Zambia.

Many of the occupations in civilization centers, including scribes, soldiers, bureaucrats, religious leaders, advisers, nobility, and judges, were essential to maintaining centrally organized systems of governance. Numerous professions de-

veloped with increased urbanization. For example, people were employed as doctors, artists, merchants, architects, builders, weavers, potters, and entertainers. The royal courts of Ghana, Songhai, Mali, Axum, and Great Zimbabwe employed artists, entertainers, architects, and engineers who created the homes and luxurious environments of the noble classes. Weaving was prized and cloth was traded, in addition to precious metals and salt, across the Sahara. In western Africa, especially Ghana, mud was used to make designs on woven fabrics. The sun was used to bake the design into the fabric, which became known as mud cloth. Some people were employed as griots, or storytellers. Stories were told in the evening when people would gather together to listen. These stories, told over and over, became the cultural heritage of people in the western African states. The griots were elevated to high status in the kingdom of Mali, where they were appointed as spokesmen and advisers to the noble class.

The major empires of the medieval period revolved around the ruling elite. The spread of Islam during this period resulted in a change in the perception of the leaders of some of the great states. For example, prior to the adoption of Islam by leaders in Mali, the king was attributed power and viewed with awe through his reputation as a mighty warrior; once Islam had been adopted and the kings made pilgrimages to Mecca, the power of this role was seen as more divine, with powers granted by Allah.

The military became important in many large empires that were based on the control of highly valued natural resources, and many individuals made their livelihoods as soldiers. Particularly well known are the Ghanaian warriors who fought with iron-tipped spears and arrows made by the highly skilled Ghanaian iron craftsmen. Other warriors used weapons made from less-durable substances such as bone and wood. Ethiopian warriors used spears in addition to other hand weapons. One task of the military was to conquer new territory, and another was to protect traders from raids on the trans-Saharan trade routes.

During the medieval period Arabs controlled a large-scale slave trade through the east coast of Africa. This trade brought slaves from Africa to the Muslim areas in the Middle East and southern Asia. Slaves were also transferred through the trans-Saharan trade network to be used in North Africa and beyond. Tasks assigned to slave workers included military service, agricultural work, domestic work, mineral extraction, and labor in metalworking, pottery making, and other artisan specialties. Slaves in medieval Africa were not all subject to the same restrictions. Some types of slavery were less brutal than the chattel slavery associated with the massive transatlantic African slave trade during the colonial era. A type of slavery existed in Africa known as pawnship,



Part of a silk panel used as a sleeve ornament on a tunic; Akhmim, Upper Egypt, eighth century. A woven inscription above reads "Zachariou," thought to identify the owner of the textile workshop as a Zacharias or Zachariah. (© The Trustees of the British Museum)

where a person would serve another person or family within his or her own community to pay a debt. At least in theory, once the debt was paid, the person was free. There are examples of former slaves attaining positions of high status in medieval Africa, including military leaders (in 13th-century Mali) and political leaders (in the 15th-century Hausa states). Slaves were often obtained through raids of nomadic or sedentary rural communities or were captives from wars. Slaves were sold in trading centers and transported long distances across the continent.

Trade was important during medieval times, and increasingly more people became known as traders, whose livelihoods were based on transferring goods from one place to another. Prior to this period much of the trade occurred through farmers trading directly with herders without the use of middlemen. Because Berber traders had been crossing the Sahara long before the medieval period to trade salt and clothing for gold and ivory with peoples south of the Sahara, when the trans-Saharan trade networks flourished after the widespread adoption of the camel for desert travel around 300 C.E., the Berbers were employed to lead the large caravans through the desert. These caravans could include 1,000 to 10,000 camels. In southern Africa trade networks also developed via the eastern coast and the Indian Ocean, and trading occurred directly with Europeans after the Portuguese established a sea trade route in the 15th century. Increased trade marked the medieval period in Africa and allowed for increases in wealth, population, interactions between groups, and specialized occupations.

THE AMERICAS

BY PENELOPE OJEDA DE HUALA

By 700 C.E. maize farming dominated the North and South American continents. This crop allowed for the development of semipermanent and permanent settlements, which in turn allowed for the development of more specialized jobs and occupations. The transition from foraging economies to farming cultures was not uniform in North America. In the southwest maize made its appearance as early as 300 B.C.E., but it was not substantially cultivated until 600 C.E. with the establishment of small permanent and semipermanent settlements devoted to agriculture and pottery making.

Around 700 to 900 the major traditions of the Hohokam, Mogollon, and Anasazi established agricultural centers. The Hohokam culture of northern Arizona is distinguished by the presence of Mesoamerican features such as ball courts, platform mounds, and sophisticated irrigation systems. The Hohokam depended on farming but also produced fine ceramics and stonework, probably employing specialized art-

ists. The settlements of the Mogollon of Arizona, New Mexico, and Chihuahua, Mexico, strongly resemble those of the Hohokam. They also feature fine ceramics and stonework. The Mogollon depended on crops as well as hunting and foraging. The Anasazi of Colorado, Utah, New Mexico, and Arizona (the ancestors of the modern-day Pueblo of Arizona and New Mexico) were the most highly developed culture of the Southwest; their stone and adobe buildings were communal complexes built around a central ritual room called a kiva. Some of the later structures are multistoried, indicating both increased populations and a more complicated social organization, including specialized laborers. Artisans were employed to create a variety of ritual objects, including ceramics, baskets, textiles, objects made of animals skins, and works made of a variety of materials, including stone, bone, metal, shell, feather, and wood.

In eastern North America the Mississippian cultures adopted full-scale maize agriculture around 800. Squash was farmed as early as 200 C.E. Maize agriculture accompanied the development of stratified societies with fortified ceremonial centers. By 1000 these communities centered on maize agriculture and were ruled by kin-based chiefdoms, and they continued to fortify their diet by hunting, fishing, and foraging. Complex chiefdoms developed around the 14th and 15th centuries, just before European contact. As in other agriculturally based societies, ceramics making was a central occupation in Mississippian cultures. As these societies grew, they built centralized mounds and platforms for ritual functions, and priests were employed to perform ceremonies. As in the Southwest, artisans were employed to create a variety of ritual paraphernalia.

Woodworkers were employed in the heavily forested regions of North America, such as the Northwest Coast, to create homes, sleds, boats, snowshoes, traps, totem poles, and masks. Throughout North America traders and merchants held important positions in the long-distance trade of prestige objects.

Mesoamerica during the Classic Period (ca. 300–ca. 950) was dominated by two cultures, Teotihuacán (ca. 1–ca. 650) and the Maya (ca. 1000 B.C.E.–1521 C.E.). Teotihuacán, a great metropolis in central Mexico, was a commercial and political center during the Classic Period. Although much is unknown of this great culture, archaeological evidence suggests that it held great influence throughout Mesoamerica as far as the important Mayan city-state of Tikal in Guatemala. In Teotihuacán specialized architects and builders were employed to erect monumental pyramid mounds and large open plazas. Stucco workers, painters, and sculptors also were employed to decorate these elaborate pyramids. In these paintings and sculptures, images of warriors and deities perform ritual

warfare, sacrifice, and elaborate ceremonies. Priests, rulers, and warriors seem to have played an important role in Teotihuacán society. Artisan specialists, both local and foreign, were employed to create various ritual objects, including ceramics, shell objects, obsidian works, sculpture, masks, and miniature figurines.

The Early Classic (ca. 1–ca. 600) polities grew from chiefdoms to elaborate kingships during the Classic Period in the agriculturally based Mayan regions of Yucatán, Mexico; Petén, Guatemala; Chiapas, Mexico; and Copán, Honduras. Monumental architecture projects employed various specialists, including architects, stone workers, stucco workers, and painters. Ceramic and manuscript painting were specialties of the elite Mayan scribes. Upright stone monuments called stelae were inscribed with historical and mythological narrative scenes. Stonework probably evolved from woodwork, although few objects remain in this perishable medium. Specialists in jade and greenstone were employed to create ritual objects. These green stones were highly prized because their color, that of a maize plant, symbolized life itself. Obsidian and flint were worked by specialists into a variety of shapes. Textile remnants are scarce; however, their presence in modern-day Guatemala and on monumental sculpture hints at the importance of textiles and their manufacture. Mural painting was present from the Early Classic Period, and in the Late Classic Period (ca. 800–ca. 1200) the art became more masterly and specialized. This can be seen in the mural program in Bonampak in Chiapas, Mexico.

The Aztec (ca. 1200–1521), the last of the great Mesoamerican civilizations, built upon many of the earlier civilizations, including Teotihuacán. An agriculturally based society, the Aztec centered their empire in their great city of Tenochtitlán in the basin of Mexico. The Aztec were warriors who conquered vast regions, including parts of Guatemala, Oaxaca (in Mexico), and El Salvador. The rulers employed stone workers to create monumental religious works. Temple pyramids and crisscrossing canals were part of the great plan of Tenochtitlán, a city laid out on a grid, and probably the work of specialized engineers and city planners. As with the Maya, an elite occupation among the Aztec was the creation of painted manuscripts. Woodworkers, ceramic artists, and specialists in jade, feather, and turquoise were also employed.

In the formidable Andean region, various cultures arose in the Middle Horizon (600–1000), Late Intermediate (ca. 1000–1476), and Late Horizon (1476–1534) periods. In an environment that was dramatically varied, from dry coastal villages to rugged highland settlements, societies developed sophisticated strategies to survive and prosper.

The Moche (ca. 100–ca. 700) were farmers and fishermen who conquered the entire northern coast of present-day Peru.

Their settlements were based in the river valleys that pierced the dry desert coast. Moche iconography was dominated by warfare, prisoner sacrifice, portraits of leaders, and the hunting of animals, indicating the importance of their rulers, warriors, and hunters. These positions were probably occupied by elites. Moche iconography concentrated on political, mythical, and supernatural events, including shamanic transformation stories associated with the restoration of order. As in previous Andean cultures, the shaman or healer played a pivotal role in ritual and ceremony. The Moche created some of the largest adobe mounds in the Americas and great tombs dedicated to various religious figures such as the Lord of Sipan, the Owl Priestess, and the Priestess. Excavations have found that real people held these roles, as there were individuals buried with full paraphernalia. Painted ceramics, metalwork, and murals were extremely refined and were probably created by specialists. Women seemed to play pivotal roles, including the positions of priestesses, shamans, and midwives. They also created exceptional textiles, although few of these remain. Textile work was considered a high-status occupation.

Tiwanaku and Wari cultures developed during the Middle Horizon and Late Intermediate periods in the central Andes. Although culturally distinct, both cultures created monumental architecture in stone. The Tiwanaku (ca. 200 B.C.E.–ca. 1000 C.E.) were based in highland areas of Peru and Bolivia near Lake Titicaca, an inland sea. They were agriculturalists, fishermen, and herders whose success led to urbanization in the highlands around 600 C.E. that would be rivaled only by the imperial Inca. Stone and adobe builders constructed their urban sprawl, and the refined nature of their stonework points to specialized stonemasons. For example, the Inca recruited stonemasons from this area to create their own unique stonework. Priests and shamans held prominent positions as seen in Tiwanaku iconography. Woodworkers and ceramic and fiber artists also were employed to create portable ritual objects. Merchants and traders performed important work in the acquisition of precious objects.

The Wari (ca. 500–ca. 1200) were based in the coastal and highland areas of present-day Peru. Their architecture reflects their militarist nature. Wari society was probably ruled by a series of generals or royalty. Both Wari textile and architecture figured prominently in ceremonial observation, one in the form of sacred articles worn during ceremonies and the other as the site of such rites. Both also embody the significant power of the Wari. Each necessitated significant time and expertise on the part of the laborers, thus signifying Wari control of its environment and its people.

The imperial Inca (1438–1533) dominated the South American continent, including present-day Ecuador, Bolivia, Peru, Chile, and parts of Argentina and Columbia. From

their highland capital of Tawantinsuyo (present-day Cuzco, Peru), the Sapa Inca, or emperor, ruled over his vast empire. Fishermen and seamen from the coast depended on the rich marine life of the Pacific. Agriculturalists worked in the river valleys that punctuated the dry desert coast. In the highlands they developed a system of mountain farming using terracing, called *andenes*. The empire had an economy based on exchange and tribute. Tribute was paid in materials and in time in the form of labor, an arrangement called *mita*. The Inca dominated their vast realm through a system of common ritual practices. They built large stone structures throughout their empire using specialized engineers, stonemasons, and local labor. These structures were both functional and sacred, and they were important to Incan domination through ritual observation. Engineers also built irrigation systems and vast roads, which were used by specialized runners who would crisscross the entire Incan realm on foot. Artisans created ceramics, textiles, and metalworks. Specialized fiber artists wove different types of textiles worn by elites, including those worn by the Incan nobility. The nobility's fabrics were woven by virgin maidens who were taught the trade in schools called *acclawasi*. Trade specialists, called *mindala*, also played a significant role in the exchange of goods and luxury items.

ASIA AND THE PACIFIC

BY KENNETH HALL

Populations in Asia and the Pacific were highly productive throughout the medieval era. Their agricultural and sea-related activities satisfied local consumptive needs and sustained imperial and international demand for Asian crafts, spices, and exotic jungle products. Asian activities also provided the financial support for religious institutions and state projects. The most innovative of medieval Asian manufactured goods were silk and cotton textiles, metalwork, ceramics, and books.

Silk production required labor-intensive handwork in the raising and feeding of silkworms, the processing of the worm's cocoons into thread, the dying of the threads, and the weaving of the threads into the final product. One pound of silkworms at hatching, about 700,000 worms, had to be carefully tended for five weeks until they were mature. One pound of worms grew to five tons at maturity, consumed 12 tons of mulberry leaves, and produced 150 pounds of silk. After the silkworms hatched their cocoons were boiled in hot water, which released the raw silk threads that were then unraveled and gathered up on reels. In the 14th century the Chinese perfected a machine that could be powered by animals, water, or human labor to reel silk. This machine drew silk filaments from a tub of boiling water filled with silkworm cocoons, and

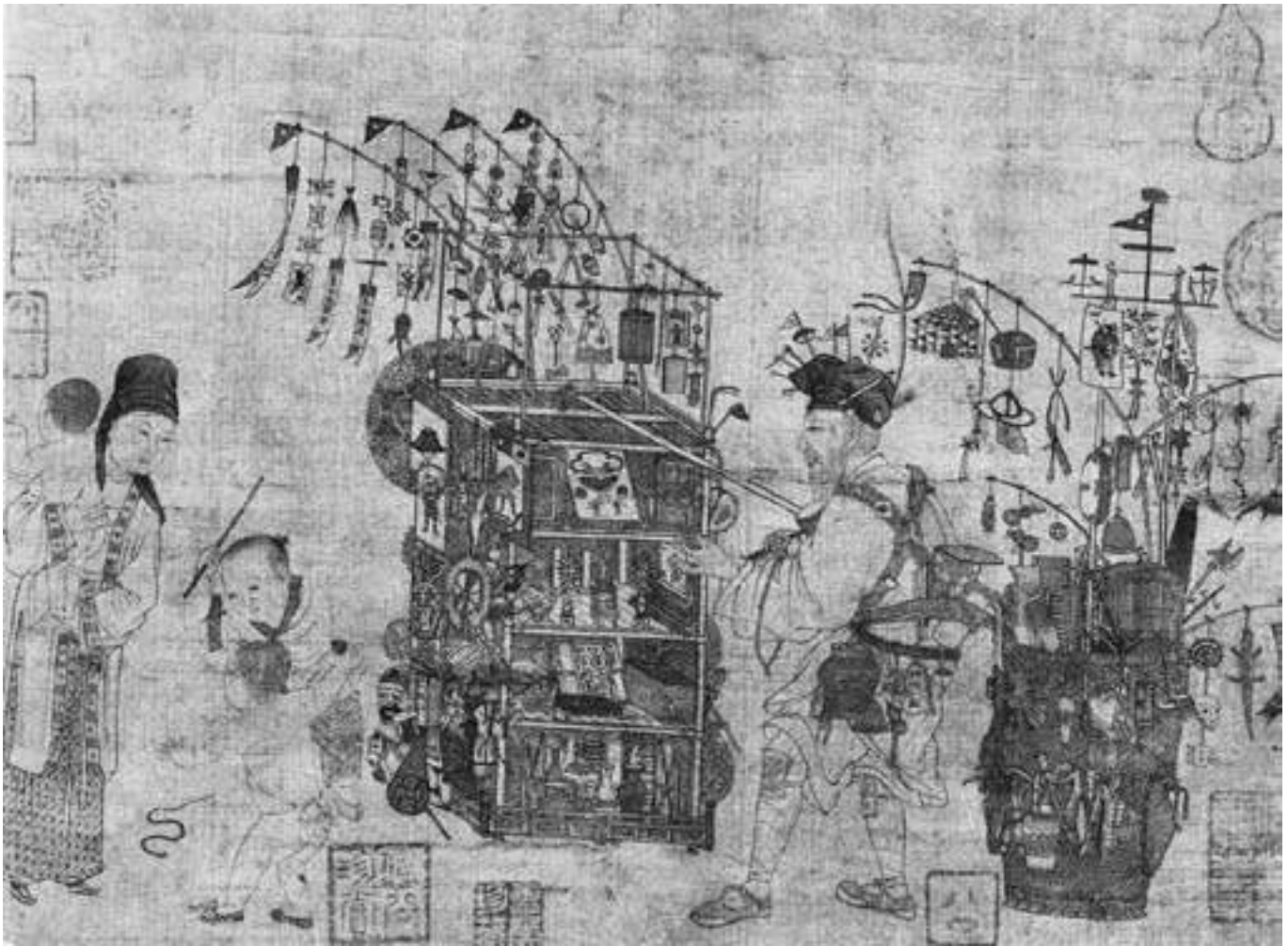
it was arguably the model for the later Italian introduction of the first reeling machine in the West. Each machine had 32 spindles and could spin about 130 pounds of thread in 24 hours. In comparison, a single spinner would take several days to match this output. The advent of this machine inevitably altered the price, availability, and quality of silk.

While many households in the silk-producing regions undertook silk production alongside the cultivation of other crops in an annual cycle, some rural households were devoted exclusively to silk weaving and subsidized local silk farmers in return for guaranteed deliveries of raw silk thread. In contrast to the West, where entrepreneurs distributed silk threads to a network of rural weavers, in China intermediate merchants competed as go-betweens in the transfer of locally produced threads to urban workshops. These workshops had sophisticated looms that could weave complex patterns and required two to three persons to operate. Some government workshops had as many as 400 looms and hundreds of workers; smaller household-based urban workshops supplemented their family labor by hiring day laborers.

Silk was expensive, and most members of society had to settle for the comfort of cotton clothing as an alternative to the less-expensive coarse fiber alternatives such as hemp and ramie. The bulk of cotton production took place in rural households throughout Asia. While Indian cottons were considered the best available, other regions produced cotton cloth intended primarily for local consumption and secondarily for the wider marketplace. Due to the traditional preference for silk and ramie cloth, China's cotton industry developed only after rulers of the Yuan Dynasty (1279–1368) supported the transfer of Indian cotton technology from southern Asia across the central Asian steppes. Asia's local cotton textiles were produced on a simple back-strap tension loom. The simplicity of these looms allowed weavers to work almost anywhere and to multitask, weaving while watching flocks graze, while on a break from field chores, or during periods of low activity in the agricultural cycle.

Indonesian weavers were the first to employ warp-stripe production methods to string threads that had been dyed different colors before being woven. By the ninth century this weaving method, called *ikat*, had produced the Javanese indigo-blue and red *ikat* cloth that is widely depicted in that era's temple statuary. By the 10th century Java's weavers produced high-quality cotton cloth on new looms, which were local versions of standing body-tension back looms used elsewhere in Asia.

Vietnam produced silk that was competitive with that of China and Japan, and it exported substantial raw silk to Japan into the early 17th century. Weavers during the Yuan Dynasty modified the traditional Asian spinning wheel into a



Peddler offering wares to a mother and her children; ink on silk, China, Yuan Dynasty, 14th century (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1911-161e)

new three-spindle cotton-spinning frame. This increased the production of cotton yarn and supported a major increase in China's cotton production, both in the local cultivation of cotton and in the weaving of cotton cloth.

Iron production in China and India was a highly developed skill. In contrast to China and India, which had access to iron ore locally, most Southeast Asians had to import iron ore through trade networks over land or sea. Villages throughout Asia had their own furnaces, and the larger villages had full-time blacksmiths. Clay furnaces, which produced the high temperatures needed to work metals, burned continuously day and night and stood 17 or 18 feet high, with an opening at the top to allow smoke to escape. Charcoal burned on the bottom, and iron ore was smelted in the middle. To maintain the furnace heat as many as 10 men took turns working the bellows on the sides of the furnace. The liquid metal that separated from the slag flowed out through ducts at the bot-

tom of the furnace. This molten iron was cast into iron slabs, which in turn were locally manufactured into pots, farm tools, military weapons, and other metal objects.

The productive process was managed by skilled artisans who determined the timing of the fire and who could distinguish the appearance of iron in its different stages. Up to 10 qualified artisans serviced each furnace, and they supervised numerous others who were required to keep the furnace supplied with ore and charcoal or operate the furnace bellows. Large, regional iron-smelting facilities included six or seven furnaces and employed up to 1,000 men. By modifying the iron furnaces to produce an even more intense heat, Asian craftsmen could fold steel—a process that strengthens the material—more than 200 times to produce high-quality steel products, among these Japan's samurai swords and Javanese kris knives.

Asians and Pacific Islanders produced a variety of ceramics throughout their history to meet the daily needs of

storing oils, wines, grains, and other foodstuffs, as well as the growing luxury trade in artistic pieces for display and as evidence of social and political status. Glazed celadon and porcelain technology developed in China during the Tang Dynasty (618–907) and spread to neighboring Korea, Japan, and Southeast Asia. Celadon production required the application of bright yellow, green, blue, and white glazes to earthenware forms that had been shaped from clay on a potter's wheel and were subsequently fired in brick-lined kilns. Common shapes included bowls, vases, plates, ritual vessels, and figurines representing animals, humans, and the gods. Porcelain was first produced during the Yuan Dynasty. The best Chinese porcelain was produced in the Jiangxi province in several factories that created imperial wares and lesser-quality porcelains for popular consumption and export. When the Ming Dynasty (1368–1644) restricted the export of porcelain from the late 1400s to the 1560s, Thai, Korean, Japanese, and Vietnamese producers filled the international trade void with high-quality glazed and decorated ceramics that mimicked Ming porcelain.

Printing developed out of the need for books in China among the elite and middle-class population who were studying for Confucian exams, which would qualify them for government posts that could support their families for generations; state administrators and local gentry who read books on new technologies that would increase local productivity; and an increasingly prosperous and literate public who embraced low-cost printed literature. By the 10th century wealthy Chinese could buy woodblock-printed copies of the Confucian and Buddhist classics printed on bamboo paper that had been produced with special additives to repulse insects. The woodblocks were prepared by craftsmen who used hardwood carved to the size of a book page. Pieces of wood were seasoned by being boiled, dried, and oiled. Then they were covered with a thin paste, and a paper was smoothed over them that contained handwritten Chinese characters and art. The blocks were allowed to dry, and the paper was rubbed to adhere the ink of the writings and artwork to form a pattern of the relief and characters in reverse. A woodcarver then carved the block. A finished block was inked to stamp sheets of paper with the block image; each woodblock could produce up to 25,000 copies.

By the 14th century the Chinese had invented moveable type that could be reused after one printing project was completed. This technology supplemented the carved woodblocks to print books, paper currency, and popular consumables such as playing cards, almanacs, and calendars in black or in color on printing presses, which the Koreans had invented. A wide variety of printed books was available to the Chinese public, including public records and inexpensive

publications using local vocabulary rather than elaborate classical Chinese.

EUROPE

BY AMY HACKNEY BLACKWELL

Almost all medieval Europeans had to work to support themselves. Even the wealthiest nobles had many responsibilities. Many people had no official occupation or education in the modern sense, but they still had jobs to do. Peasants throughout Europe occupied themselves with growing crops, hunting, and making the things they needed for daily life. As populations and towns grew, more people adopted specific occupations. These occupations often passed from father to son or mother to daughter for generations and formed the identity of many families, who came to be known by the jobs they did. Even today surnames such as “Smith” and “Chandler” tell of the occupations of ancestors.

The vast majority of European people were peasants. Most supported themselves as subsistence farmers, producing the food they needed to survive by raising crops and tending livestock. People who lived in this fashion often performed many jobs throughout the year. Men might plow fields, hunt, fish, herd animals, and construct buildings. Women would tend the house, spin, weave, make clothing, milk cows, and cook as well as help with agricultural tasks. Peasants did not receive wages for their work, and many rarely if ever owned money. Instead, they traded goods and services that they could themselves produce in exchange for other goods and services that they needed.

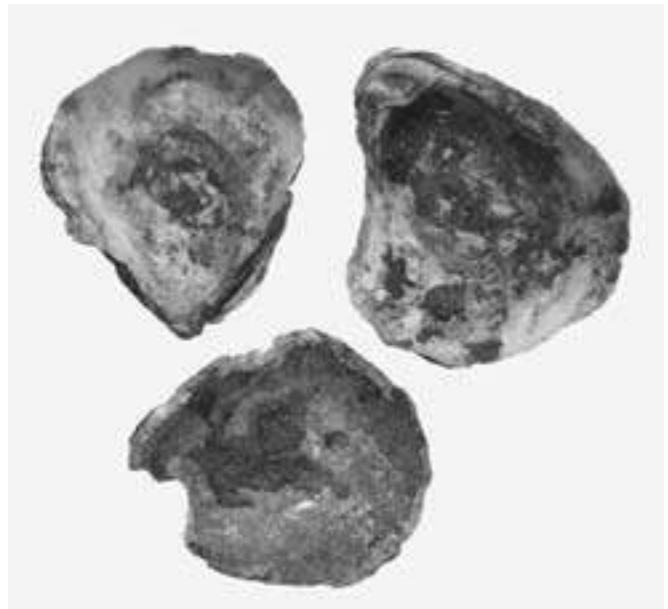
A small minority of medieval Europeans were nobles. These people owned most of the property and controlled the ways in which it was used. Within the noble class, people occupied themselves with various responsibilities. Lords of various ranks had to administer their lands, taxing the peasants, arbitrating disputes, and ensuring that there was adequate farmland, hunting territory, and milling capacity. Lords were in charge of local defense and usually themselves owed a military and economic obligation to higher-ranking nobles and to the king or other overlord. They had to maintain local fortifications, train soldiers, provide weapons, and organize military endeavors. Knights were themselves nobles, with various administrative responsibilities, but they were expected to spend much of their time practicing their military skills, drilling troops, and providing military training to boys. Pages and squires were noble boys and teenagers who worked for noble lords, doing household tasks while studying the skills they would need to be adult knights.

Noblewomen had their own responsibilities. A lord's wife often kept the keys to the household's food and other goods,

which were usually locked away to prevent theft. She was in charge of opening cupboards to get out food for the day's meals. She might be assisted by a steward or seneschal, who supervised household affairs. Noblewomen frequently cared for the health of everyone within the household, nursing the sick and dispensing medicine as needed. The wives of lords were expected to administer the estates while their husbands were away at war—to oversee planting and harvesting, collect taxes, and settle disputes as the men did. Noblewomen also wove cloth, did embroidery, and made clothes for their families. The lady of a house had many assistants, including ladies in waiting who might themselves be of high birth, chambermaids who did housekeeping and cleaning, laundresses to do laundry, and nurses to care for children.

Within noble households there were a number of specialized occupations. A castellan, or chatelaine, was in charge of a castle's entire administration. Chamberlains handled the finances of a castle. Clerks kept records and accounts. Almoners collected and distributed alms to the poor. A bailiff would coordinate work by peasants, providing them tools and allotting them jobs. A reeve performed a similar job, ensuring that work began and ended on time and that no one stole anything. A castle's porter opened the door to guests and ensured that no unwelcome visitors entered. The butler (or bottler) took care of the household's supply of beer and wine, making sure that local brewers made enough beer or vintners produced enough wine. Every large household had a head cook who prepared all meals, assisted by scullions or scullery maids who washed dishes and did other menial kitchen tasks. The household might have a marshal, who would take care of transportation needs. He might in turn employ grooms to care for horses, carters to carry goods, and smiths to make horseshoes and other metal objects. Minstrels played instruments and sang songs to entertain nobles and their guests. A noble who enjoyed hunting might employ a gamekeeper to keep his lands stocked with prey and a falconer to take care of his hunting birds.

Any noble who wanted a new large house or castle had to employ an architect and builder who understood how to design and build large stone structures. Builders employed carpenters to construct things out of wood, masons to work with stone, glaziers to make glass windows, joiners to build window frames, sawyers to saw boards, carters to carry materials from sawpits or quarries, and numerous other laborers, including painters, plasterers, and brick makers. In the Byzantine Empire, experts in mosaics covered the walls of churches with images formed from broken tiles. The medieval church also employed builders and all the other categories of construction artisans to build churches and cathedrals.



Oyster shells with traces of paint; Britain, 13th century. Such shells were used by illuminators and scribes to mix pigments. (© Museum of London)

Members of the clergy dedicated their life to religion, but this dedication could take many forms. Some monks and nuns cloistered themselves in monasteries or convents where they had little contact with the outside world, spending their time in prayer and contemplation. Other monastics, however, were very active in the world, teaching schools or caring for the sick. All monks and nuns were supposed to work to support themselves, so many monasteries kept gardens and livestock tended by the members. Nuns might earn money by making sweets, cheese, or embroidery. Some monks worked as scribes in scriptoria, or copying rooms, spending their days copying books by hand. Priests spent more of their time in the outside world than monastics. They held daily religious services, blessed undertakings, and sometimes taught in schools or universities. Chaplains worked as personal priests for noble households or military garrisons.

The educated, both lay and clergy, might work as teachers or clerks. Clerks did bookkeeping and kept accounts for nobles, churches, or merchants. Teachers became more common as schools appeared during the 12th and 13th centuries. The educated might also teach at universities. Some teachers worked for wealthy families as private tutors. Education prepared the way for work in a profession, such as law or medicine.

A few medieval people specialized in medical matters. Herbalists studied herbal medicines and grew and dispensed their own remedies. Midwives helped pregnant women deliver babies. Barbers could perform minor surgery and bloodletting in addition to shaving faces and cutting hair. Alchemists could

produce some drugs, although of varying effectiveness. Physicians were uncommon throughout Europe, though the Byzantine region did produce some university-educated doctors.

As the medieval period progressed, some townspeople began to specialize in particular crafts. There were many different types of medieval craftsmen. Blacksmiths made objects out of iron. Silversmiths worked with silver, and goldsmiths with gold. Shoemakers or cobblers made and mended shoes and often other leather goods. Tailors made clothing. Weavers made cloth, fullers shrank it to make it thick and windproof, dyers colored it, and shearers trimmed it smooth. Millers ran mills where local grain was ground between large millstones turned by animal or water power to make flour. Tanners processed animal skins into leather. Farriers shod horses and sometimes knew cures for sick ones. Chandlers made candles. Butchers killed animals and cut up their meat. Bakers made bread, sometimes baking the bread of an entire village in their large ovens. Milkmaids and dairy workers milked cows and made cheese and butter. Some people caught fish for a living, handing their catch over to fishmongers to sell. Throughout Europe, wherever a town was near a supply of suitable clay, there were likely to be specialists making bricks, pottery, or ceramic tiles.

Although most craftsmen were male, women also worked as artisans. Women often worked with textiles, spinning thread, weaving cloth, embroidering, and making garments, hats, gloves, and shoes. They also made candles, soap, and many other items. Many families of craftsmen depended on women working in the shop, assisting the craftsmen and

selling their wares. Women, like men, might support themselves by running inns, providing food and beds to travelers. Prostitution was also a fairly common way for women to earn money; many women used prostitution to supplement income, not as their main source of support.

During the later medieval period craftspeople began organizing themselves into professional organizations called guilds. Members paid regular dues. In return, guilds protected members from competition, took care of member families in adversity, and ensured quality of instruction. The guilds instituted a process of training in which young children would enter the trade as apprentices, doing simple tasks for adult tradesmen. An apprentice would become a journeyman when he had learned his craft sufficiently to perform all jobs without supervision, and then a master when he had produced a masterpiece that proved his virtuosity at his profession. By the 1300s guilds were well established in much of Europe and had become extremely specialized.

The growth of guilds was possible because of the emergence of a large-scale money economy, with banks and moneylenders available to provide capital to would-be businessmen. Moneylenders existed throughout the medieval period. They lent money to people who needed it, on condition that it be paid back with interest. Pawnbrokers also provided loans, accepting possessions from borrowers as collateral. Moneylenders and pawnbrokers were often Jews because Christians were prohibited from charging interest. The greater availability of capital and merchandise in the later medieval period made it possible for some people to become wealthy as merchants and traders, buying goods from craftsmen and transporting and selling them in likely markets.

THE ISLAMIC WORLD

BY ROSE ASLAN

Based on various manuscripts and documents collected throughout the Islamic world, historians have been able to piece together descriptions and list of jobs from the medieval period. In fact, scholars have been able to identify 1,853 distinct occupations that were common throughout the region between the eighth and 15th centuries. In the medieval period it was rare to find cities of more than 100,000 people, as most of the population resided in rural settings. In Egypt, for example, the urban population measured only 5.7 percent of the total population, which means a large proportion of the population was involved in agriculture. Most people were involved in three sectors of activity: the extractive sector, which included 2 to 6 percent of the population; the manufacturing sector, which included 32 to 44 percent;



A curb bit for a horse; late 13th to early 14th century. The manufacture of horse equipment was a skilled trade in medieval Britain. (© Museum of London)

and the service sector, which employed 51 to 66 percent of the workforce.

In the extractive sector people hunted and gathered such resources as wild honey, nuts, herbs, firewood, and animals. Fishing was a popular occupation, and fishermen often specialized in catching a certain kind of fish. Pearl divers or fishers were common in the countries on the Persian Gulf. The most common occupation in the extractive sector was agriculture. The system in the Islamic world was similar to the European feudal system, wherein the head of the village owned most of the land and hired sharecroppers to work on his land. There were also small landowners who lived off their land. In some regions workers were hired for cash wages to perform seasonal tasks. Animal husbandry was a specialized occupation that was often carried out by nomadic tribes in the region.

Mining for minerals such as gold, silver, copper, zinc, and alum was common, although the tools and technology were quite primitive. Miners were employed to perform tasks such as quarrying the stones, making tools, sifting the material, and carrying the fuel. Salt was an important and expensive commodity in the medieval era, and both salt miners and traders played critical roles in making it available.

Most work in the manufacturing sector took place in the cities, and most workers had highly specialized occupations. More than 256 different types of manufacturing trades have been identified from the 11th to the 13th centuries. There were around 90 occupations in professional services and the same number in commerce and banking. The main sectors in manufacturing were wood, wicker, textiles, pottery, paper, metal, leather, glass, food processing, construction, and chemicals. Textile manufacturing, food processing, and metal forging formed more than half the occupations, and the other sectors formed the rest. Those involved in the chemical sector produced items such as glues, dyes, paints, drugs, perfumes, soap, candles, wax, gunpowder, fireworks, and other things derived from chemicals. Those who were involved in production were not involved in selling their products, which was the responsibility of the service industry.

The service sector was the largest, and the types of different occupations increased by the end of the medieval period. The sector was divided into industrial, professional, and public services; the industrial services, including commerce occupations, transportation, and finance, formed the largest of these services. Industrial services were closely connected to the extractive sector because raw materials were bought by those in the industrial-services sector, who would sell the products in the city. Some merchants, for example, gathered and sold animal feed. Other common occupations included



Page from a manuscript of Dioscorides' *De materia medica*, showing a discussion between two doctors and a student; possibly Baghdad, Iraq, 1224. This Roman treatise was translated into Arabic in the mid-ninth century at a famous translation institute in Baghdad, known as the House of Wisdom. (© The Trustees of the British Museum)

dealers in pottery, textile, and dairy products. There was a thriving profession of middlemen who acted as brokers, selling land, books, slaves, and more. Their job was particularly important because they sold merchandise on behalf of women, who were often barred from engaging in direct trade. The traders were therefore responsible for empowering women to take control of their wealth and properties. Money changers were also important due to the diversity of coins that circulated throughout the Islamic world.

Professional services included both skilled and unskilled services, such as medical practitioners, scholars, scribes, entertainers, and unskilled laborers. The public-service sector was very important and employed a large number of workers in the fields of education, religion, legal practice, military service, and bureaucracy. While bureaucracy and military made up the majority of the public-service sector in the medieval period, education, legal, and religious trades made up 27 to

40 percent of the force and increased steadily throughout the era. Skilled and unskilled professions were in equal measure, and in general only a few people were involved in each trade in different cities.

Several highly technical trades required specialized training in schools. Some of the trades included applied sciences, secretarial duties, medicine, bookmaking, calligraphy, and veterinary science; often the state was involved in the training of professionals, although this was not always the case. In some cities these skilled occupations were present only where there was a court or ruling class; their activities and interests, in turn, would be spread to the general population through these skilled workers. Some occupations were limited in opportunity but had numerous specialties; for example, animal trainers were used only in some cities with a court and would tame and train birds of prey, cheetahs, hunting dogs, and pigeons for use by the elite classes. The occupation of falconer, for example, was present even before Islam and continued to be popular throughout the medieval period. This occupation demanded expertise and vast knowledge, and professional manuals were written about the subject. Other specialties included tracker, trainer of animals, and master of the hunting dogs.

Medical occupations also had a number of specialties, including circumcisers, cauterizers, surgeons, orthopedists, dentists, and cuppers. Generally these jobs offered high standing and pay to their practitioners, although women who worked in these trades did not study medicine in school and were not of high rank. Women did work as skilled professionals, such as washers of the dead, musical performers, dancers, wailing women, astronomers, matchmakers, nannies, and tutors. In addition, workers in trades that were considered shady, such as astrologers, soothsayers, magicians, jugglers, fortune-tellers, snake charmers, jugglers, clowns, and pimps, did require training although they are not considered formal occupations.

Many positions in the sciences required extensive training, such as timekeepers and astronomers, who would be trained in using astronomical tables and in performing calculations and creating astronomical maps. These trades were centered almost exclusively in Damascus, Cairo, and Istanbul. Other interesting trades included chess players; they would make money by playing in tournaments or by tutoring others in the game. Calligraphers played a vital role in Islamic society; they were involved in copying books and the Koran in addition to their work in the court, where they were employed by the administration. Other positions in the literary trade included editors, scribes, and secretaries, who worked for the elite class and offered their valuable services to the

mainly illiterate public. The entertainment industry thrived in the Middle Ages. Musicians, actors, and singers were common, and their positions were divided according to gender and expertise.

Unskilled occupations were ordinarily practiced in the domestic and public domains. Bathhouse workers were in this group; at one point during the Abbasid Dynasty (749–1258) Baghdad was home to around 60,000 bathhouses. There must have been a large number of people occupied in running them, although in the 10th and 11th centuries the number of bathhouses decreased dramatically. Different positions in a bathhouse included stoker, barber, cupper, superintendent of dressing rooms, patron of the bath, guards, and bath attendants. Other important unskilled trades included embalmers, sweepers, scrap collectors, trench and grave diggers, dung men, porters, and water carriers. In the domestic realm private households employed a variety of unskilled laborers, such as servants, clothes washers, household managers, fumigators, doormen, valets, night watchmen, and guards.

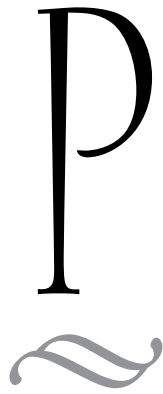
Muslim women traditionally were involved mainly in domestic work inside the home. Nonetheless, although little was written about women in the medieval period, a few records describe other activities women performed. Records do not refer to women working in agriculture, but historians assume they must have worked alongside men tending crops. There were certain occupations that only women did, such as tending to silkworms. Women also produced goods for their households, and they sometimes sold handmade good and food products in the markets. Based on legal literature, it appears that women were also involved in trading agricultural products and purchasing properties and farms using their personal wealth, although usually they hired middlemen to conduct the transactions. Women also worked as hairdressers, singers, soothsayers, wet nurses, midwives, doctors, schoolteachers, poets, laundrywomen, dyers, thread and textile spinners, and weavers. There are no records showing that they were involved in any way in the military, bureaucratic, legal, or religious-services sectors.

See also AGRICULTURE; ARCHITECTURE; ART; ASTRONOMY; CHILDREN; CITIES; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; CRAFTS; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FOOD AND DIET; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; INVENTIONS; LANGUAGE; METALLURGY; MILITARY; MILLS AND MILLING; MONEY AND COINAGE; NOMADIC AND PASTORAL SOCIETIES; RELIGION

AND COSMOLOGY; ROADS AND BRIDGES; SCIENCE; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; SPORTS AND RECREATION; STORAGE AND PRESERVATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE; TRANSPORTATION; WEAPONRY AND ARMOR; WRITING.

FURTHER READING

- Eliyahu Ashtor, *A Social and Economic History of the Near East in the Middle Ages* (London: Collins, 1976).
- Martin Hall, *The Changing Past: Farmers, Kings, and Traders in Southern Africa, 200–1860* (Cape Town, South Africa: D. Philip, 1987).
- David Herlihy, *Opera Muliebria: Women and Work in Medieval Europe* (New York, McGraw-Hill, 1990).
- E. Stuart Kirby, *Introduction to the Economic History of China* (Westport, Conn.: Hyperion Press, 1973).
- Maya Shatzmiller, *Labour in the Medieval Islamic World* (Leiden, Netherlands; New York: E. J. Brill, 1994).
- A. L. Udovitch, ed., *The Islamic Middle East, 700–1900: Studies in Economic and Social History* (Princeton, N.J.: Darwin Press, 1981).



► pandemics and epidemics

INTRODUCTION

Even in the medieval world, where effective treatment for illness was most often impossible and the germ theory of disease unknown and where epidemics of smallpox, tuberculosis, and a host of other sicknesses killed millions every year unchecked, the pandemic (or worldwide plague) of the bubonic plague, known as the Black Death in Europe, stands out as a catastrophe that devastated most of Eurasia and Africa. Within the space of three years (1347–50) between a third and a half of the population of Europe, North Africa and the Middle East, and northern India and inner Asia was wiped out.

The pandemic originated in inner Asia and moved west and south into Europe, the Middle East, and India along the Silk Road trading network. Areas such as the Americas and Oceania were spared by their isolation. Why eastern Asia did not become part of the pandemic is not clear, but the area was already subject to more severe and frequent epidemics of plague than was, for instance, western Europe. The degree to which southern Africa experienced the pandemic is not known, since we essentially possess no records for the area from the 14th century.

The contrast in the reactions to the pandemic between two cultures that were equally devastated by it, western Europe and the Islamic Near East, is illustrative. In both cultures, the visitation of the plague lent itself to religious interpretation

(religious explanations being the norm for epidemic disease throughout the medieval world), though of a different character. To the Christian, the pestilence seemed the wrath of god punishing human sin. To the Moslem, however, it seemed an act of divine mercy, spreading martyrdom and entrance into paradise. Both religions certainly vigorously carried out ritual responses to the plague, but religious authorities in both cultures also intervened in the secular response to the plague. Since Islamic opinion held that the plague was directly visited by god, there was no possibility that it was spread by contagion in the ordinary way that disease was believed to pass from victim to victim. Therefore, public health measures and medical treatment (and medical science was certainly as advanced in the Islamic world as in the Christian) were viewed as useless if not blasphemous.

The reaction of Christian religious authorities was quite different. The papacy commissioned a panel of physicians to discover the physical cause of the plague and encouraged physicians and cities to take whatever practical steps they could to fight it. While it is true that this medical explanation of the plague depended on the pseudo-science of astrology and whatever medical and public health measures were taken were mostly useless because no one understood the true nature of the plague and the cause of its spread (nor could they have), it is at least an acknowledgment that an independent secular response was both possible and desirable. The papacy used this “scientific” finding to argue against popular reactions to the plague, such as the mass murder of Jews who

were wrongly suspected of having caused it and the crowds of penitents marching throughout Europe who preached that the pestilence was in part a punishment for the corruption of the church. This is only one of many indications that a secular society was well on the way to being established in medieval Europe in a way that was not happening in much of the rest of the world.

Contagion is a confusing term used in the discussion of disease during the Middle Ages. This is because, like many old words, it has in modern times been given a new meaning to describe a new discovery that was not known in the Middle Ages. *Contagion* is a Latin word that literally means simply “touching together.” Today it denotes the transfer of the microorganisms (bacteria and viruses) that cause disease when two people touch or come into close contact with each other. But in the Middle Ages the existence of microorganisms was never suspected, still less their role in spreading disease. What medieval people meant by “contagion” is well described in a passage in the Christian New Testament. In one story (Luke 8:43–48) a sick woman follows Jesus in a crowd and touches the hem of his garment. She is immediately healed by the contact. Jesus is aware that he has been touched, not from the ordinary sensation of being jostled but because he feels some mysterious power issue forth from himself. When a medieval Christian or Islamic writer talks about contagion with respect to the Black Death, this is what he means: that the disease consists of a magical potency that contaminates a victim and which can be transmitted to another person by touching the victim or by touching something that a victim has touched, such as his clothing.

AFRICA

BY ALMAZ ZEWDE

African traditional medicine and medical practices go back many thousands of years and were generally considered the only healing resource until about 80 years ago, when relatively stable contact with the West brought some modern medical practices to Africa. As the oldest continent on earth, of vast size and diversity, Africa has many varieties of traditional medical practices. Knowledge of traditional medical practices has primarily been transmitted orally, although a few texts written in Arabic and Ethiopian have been found.

Throughout Africa, traditional medical practices separate physical illnesses and mental illnesses. The typical treatment scheme for physical diseases is herbal medicine, which includes not only herbs but also metal and animal derivatives. Mental illness is treated through the power of conjured spirits. Some researchers observe that in virtually all of sub-Saharan Africa diseases are categorized by their causes, either

natural or supernatural. Supernatural causes are chiefly the result of human malevolence that angers the spirits. Sorcerers, spiritual healers, and others with exceptional insight into people’s nonphysical states are called on to reverse or undo the afflictions. Many of the treatments are similar to hypnosis and modern forms of psychiatric treatment. Traditional healers of physical or natural diseases are herbalists and bone-setters, among others. Unlike faith healers, sorcerers, and spiritualists, herbalists apply specific traditional drug mixes targeting the diagnosed physical illness.

In medieval Africa diseases such as smallpox, measles, malaria, and typhoid sometimes reached epidemic proportions. All were treated by practitioners of traditional medicine. An important consideration in discussing medieval African epidemics and their treatment is that unlike Europe, where local governments and municipalities were beginning to institutionalize, license, and regulate medical practice, medieval Africa made few changes in medical thinking and practice from earlier forms. The foundations for recording, experimenting with, and discovering improved ways of disease treatment and management that were in place in Europe by the Middle Ages did not exist in medieval Africa. African traditional medical practice remained fragmented and in the hands of traditional practitioners dependent on oral tradition to transmit medical knowledge and skill. During the medieval era the slave trade that disorganized Africa and threw its society into chaos also disrupted any opportunity for African traditional medicine to better manage epidemic diseases in an increasingly dense population.

A disease is considered an epidemic when it affects populations within a very large geographic area. Three factors account for the occurrence of an epidemic disease: an agent, a host, and the environment. An agent like a virus or a bacterium causes the disease; hosts are the people susceptible to the agent; and the environment can include unhygienic, dark and damp, or congested conditions that facilitate a host’s exposure to the agent. Thus it takes the interaction among host, agent, and environment for an epidemic to spread fast and far.

An epidemic can spread through the air, as in tuberculosis spread by infected persons sneezing and coughing into the air shared by others. Disease can also spread through contaminated water or food, as is the case with typhoid. Vectors like mosquitoes and lice are known to cause epidemic diseases like malaria, river blindness, and typhus in Africa. Typhus is a communicable disease that often turns into an epidemic. It causes severe fever and nervous disorder. Epidemic diseases like smallpox and measles are transmitted by direct human contact with infected people or objects like blankets or eating utensils.

During the medieval period in Africa, many epidemic diseases were known to prevail. Among very serious diseases like smallpox were unique African varieties known to be far more benign than the variety experienced in western Europe and other world regions. British virologists studying the disease in Africa during the 1960s identified a strain of smallpox unique to Africa and assumed to have prevailed during the medieval period. Named *variola intermedius*, this African strain has a low mortality rate, between 3 percent and 11 percent, and is found in all parts of the African continent. An even more benign indigenous strain is prevalent in parts of Africa and caused periodic epidemics. Called *variola minor*, its mortality rate is only 1 percent. The low death rates resulting from the African smallpox strains compare with a rate as high as 40 percent for *variola major*, the strain prevalent in Europe. These data suggest that the smallpox epidemics that occurred in Africa's medieval villages were not devastating in their effects.

Although no recorded statistics exist for medieval Africa, the effect of diseases like typhoid and malaria must have visited periodic devastation among African populations despite treatment efforts. However, the African indigenous strains were much more benign than the one introduced through contacts with the outside world later in the medieval period, and the sparsely populated villages of medieval Africa may have reduced the full fury of epidemic diseases. A smallpox epidemic requires intensive contact to spread from person to person and from village to village. Africa's population spread and widely spaced settlements were probably designed with the idea of ensuring the health of communities. No great epidemics are known to have occurred during the centuries of slave raids in Africa, suggesting that epidemics were rare and the management of diseases fairly successful.

Little information is available on epidemic disease episodes and their effects on medieval African society. Serious study of African traditional medical systems and practices, especially of the medieval era, is rare. Through sharing of available medical knowledge, medieval Africans are believed to have had reasonable control over epidemic diseases.

The elaborate disease treatment and prevention rituals and systems still used in much of Africa likely reflect the diversity of practices used to prevent and ward off the threat of epidemics in the medieval period. In medieval villages vulnerable to a serious epidemic, medicine men and women would use sorcery and magic for disease prevention and make amulets for people to wear to protect them from disease. In addition, entire villages and affected families would be isolated, meticulous personal and environmental hygiene would be practiced, and careful water storage and food preparation would be prescribed to prevent or control the spread of epi-

demic disease. Morning and evening baths were part of the regime of personal hygiene, and cleaning homesteads and compounds was also considered an important environmental disease prevention method.

The advance of African medical sciences was disrupted by many external interventions, the greatest of which was the slave trade. Nevertheless, evidence shows that along with the spatial spread of traditional villages and the use of various prevention and treatment measures, including sorcery, magic, hygiene, and other prescriptions, Africans seem to have successfully limited the spread of epidemic diseases during the medieval period. Traditional African medical techniques endured despite all discouragement and are now evolving as a science recognized and incorporated into modern African medical research and treatment systems.

THE AMERICAS

BY MICHAEL J. O'NEAL

The issue of epidemic disease in the pre-Columbian Americas has become mired in modern politics. The earliest Americans who crossed the Bering land bridge from Siberia into Alaska inhabited extremely cold climates in which Old World microbes could not survive. Further, populations were so small that the impact of any disease was minimal. In the millennia that followed, people spread out over the two American continents, living in communities less densely populated than those of medieval Europe and often widely separated from one another. The conventional view has long been that the peoples of the pre-Columbian Americas were not subject to the same diseases as Europeans because they were not exposed to the same microbes.

Accordingly, when the first Europeans arrived they brought with them illnesses to which Americans were not immune, leading to devastating epidemics among native communities. The Europeans also brought domesticated animals, such as the pig, that were not domesticated in the New World. These animals were sources of diseases that mutated to infect humans and wild animals. Thus European contact resulted in an epidemic of monumental proportions among both humans and game animals. Some historians argue that European contact and colonization wiped out tens of millions of people.

However, some scientists dispute that claim, at least in part. They do not deny that Europeans brought diseases to which Americans were not immune, including smallpox, bubonic plague, measles, and possibly typhus. These so-called crowd diseases were most likely to erupt in densely populated cities where sanitation was poor, drinking water was often infected, and unwashed people lived in close contact with one

another. When people afflicted with these diseases arrived in the New World—and it would only take one—they arrived on what epidemiologists call “virgin soil,” meaning that the immune systems of native peoples were not equipped to resist European diseases.

These scientists do assert, however, that surviving native accounts of long-lived people who enjoyed good health in an American paradise are not entirely accurate. While widespread epidemics were not common, periodic outbreaks of disease, often made worse by drought and famine, were common in the centuries before the arrival of Europeans. Further, these scientists dispute the assertion that pre-Columbian Americans lived long lives, pointing to evidence that suggests that infant mortality may have been as high as 40 percent, and life expectancy for those who survived infancy was in the 20s for men and perhaps less for women. Although many deaths resulted from warfare and traumatic accidents, others were caused by disease.

People who remained hunters and gatherers were subject to many bacterial infections, including salmonellosis and shigellosis, and parasitic infections, including hookworms, tapeworms, pinworms, and whipworms. The bacterial infections cause acute illness in the digestive system, often leading to death. Salmonellosis was more common among North American natives, while shigellosis was more common in tropical regions. Although most parasitic infections are not in themselves fatal, they produce malaise and weakness that allow other infections to take over and possibly lead to death. Two other bacterial diseases, staphylococcus and streptococcus infections, were also prevalent. These often lead to fatal diseases such as pneumonia, meningitis, and endocarditis. Evidence of protozoan infections like amebiasis, giardiasis, and toxoplasmosis has been found from the medieval era and likely reached epidemic proportions in some communities.

Some illnesses were endemic to the New World, including leishmaniasis and trypanosomiasis, which are parasitic diseases common in tropical areas. New World spotted fever was common, especially in North America. Sandflies transmitted bartonellosis, sometimes called Carrión’s disease, in the mountain valleys of South America. Again, most of these were not fatal but became fatal during times of famine or by making the victim susceptible to other illnesses, especially pneumonia, one of the most common killers in the pre-Columbian Americas. Nonetheless, tick-borne relapsing fever may have had a mortality rate of up to 50 percent. While the leading causes of death among infants and children were pneumonia, tuberculosis, shigellosis, salmonellosis, amebiasis, and giardiasis, adults were more likely to succumb to leishmaniasis, trypanosomiasis, bartonellosis, leptospirosis, and relapsing fever.

It might be assumed that agriculture improved the health of Native Americans by providing a more predictable food supply, but that assumption is false. Archaeologists have shown that the physical stature of Americans declined after the advent of agriculture and that people who were slower to adopt agriculture remained taller for a longer period; both findings suggest that farmers generally had a poor diet. Throughout the Americas the reliance on one or two staple crops, particularly corn, led to significant dietary deficiencies, including a lack of protein, a lack of niacin (which causes a disease called pellagra), and a lack of iron (which causes anemia). Again, these conditions do not become epidemics because they are not transmitted from person to person. However, they were widespread illnesses that led to short life spans, aborted fetuses, and high mortality rates. Moreover, the ill person was likely to be more susceptible to an infectious disease like pneumonia that could spread throughout a village and lead to an epidemic.

Settled agricultural communities in the Americas in pre-Columbian times experienced “crowd diseases” in much the same way Europeans did. As people moved into villages and villages grew into cities, illness caused by poor sanitation, contaminated food and water, and crowded conditions became common. This occurred particularly in times of war, when people fled to cities for protection. A major cause of death was acute respiratory infection. Also common was tuberculosis, which was widespread throughout North America and in the highlands of South America. Respiratory tuberculosis often led to pneumonia, which was frequently fatal. Surviving tissue samples strongly suggest that many people suffered from pneumonia on more than one occasion. Another common respiratory infection was blastomycosis, which is caused by a fungus that lives in the soil and was especially prevalent in tropical and subtropical regions among people who worked the land and thus were exposed to the fungus.

A topic of some controversy is whether outbreaks of typhus occurred before the arrival of Europeans. The conventional theory is that explorers and traders from Spain and elsewhere in the Old World brought typhus to the New World. However, some historians believe that evidence points to typhus existing in the New World before the European ships began arriving. There are two types of typhus: endemic typhus is spread by fleas, and epidemic typhus is spread by lice. Hunter-gatherer cultures probably experienced outbreaks of endemic typhus, but because they did not live in crowded conditions, the outbreaks probably did not turn into widespread epidemics. However, as people moved into cities and lived in more crowded and unsanitary conditions, epidemic typhus may have become more common.

STUDYING EPIDEMICS AND PANDEMICS

One of the major problems historians and archaeologists have with studying any aspect of the Americas, including pandemics and epidemics, is the absence of written records. The only cultures that kept written records during the centuries before European contact were the Maya of Mesoamerica and, later, the Aztec. However, most of these records were destroyed by Europeans intent on rooting out all traces of indigenous belief systems in the territories they conquered. Accordingly, only a tantalizingly small written record exists.

Nonetheless, historians and archaeologists have developed ways to examine health, illness, and the possibility of epidemics among American peoples. For example, by examining surviving skeletal remains they can determine whether the person died of an injury or traumatic accident. Large numbers of skeletons with, for example, skull fractures are evidence that these people died during warfare. The size of skeletons also can tell researchers much about disease and epidemics. Bones lacking necessary nutrients suggest the types of diseases people contracted. In turn, large numbers of skeletons that show similar conditions are evidence that the disease reached epidemic proportions. The presence of such conditions as porotic hyperostosis, which is the porous enlargement of parts of the skull, suggests the possibility that the people were afflicted with anemia, scurvy, or infection. In general, numerous skeletons buried at the same site strongly indicate that many people died in a short period. If the skeletons do not show evidence of serious injury, the people probably died from a disease that swept through the community.

Further, historians have been able to determine the nature of American diets in the pre-Columbian period. They know, for example, that among many people the primary food staple was corn. They also know that many women weaned their infants with a “pap” made of corn juice. On this basis researchers can draw inferences about the kinds of dietary deficiencies that were almost inevitable.

Another source of information is pottery, especially figurines. Some of the pottery that survives from the pre-Columbian era depicts figures with abnormalities. Again, this evidence can add one small piece to the puzzle.

Finally, a few of the written records of the era survived. Although some of these documents were written down after the arrival of the Europeans, they record oral traditions that extended back to pre-Columbian times. One example is the Huarochiri Manuscript that was recorded in the 17th century and preserves oral traditions from the Andean regions of South America. This manuscript provides insights about famine and overpopulation. Another is the Florentine Codex, a text consisting of 12 books written in the Nahuatl language in the 16th century but based on older primary source material (now lost) from the cities of Tlatelolco, Texcoco, and Tenochtitlán. This codex, or manuscript book, is one of at least 18 surviving codices written by the Aztec in the years after the arrival of the Spanish. Many of the codices were written in pictorial form, and each provides a brief glimpse into the lives of Mesoamericans, including evidence that suggests the occurrence of epidemics, famine, and other catastrophic events.

Oddly, the spread of epidemic typhus may have been fostered by the spread of cotton and wool clothing. The lice that carry the disease prefer cool climates. The people who lived in temperate regions of North America, Mesoamerica, and the Andes Mountains in South America wore cotton and wool clothing for warmth. This clothing may have provided a home for the lice that carry typhus. Among North Americans typhus may have been spread by refuse dumps, scavenger animals, crowded living conditions in so-called longhouses, and the in-migrations of other peoples. The Aztec reported what may have been an outbreak of typhus late in the 13th century; they called the disease *matlazahuatl*, a word that refers to the skin lesions characteristic of typhus. However, because typhus does not leave behind physical markers, historians cannot be certain whether typhus afflicted pre-Columbian Americans.

Historians are also divided about the possibility of influenza epidemics. Like typhus, influenza leaves no markers in human remains, but some historians speculate that viral influenza likely swept through American populations periodically. Several species provide hospitable hosts for the influenza virus, including humans, pigs, and fowl. The virus mutates rapidly and accommodates itself to its host relatively easily, so it does not need a huge population to survive. Medical investigators have shown that ducks are a primary source of the influenza virus, and it is known that in South America the duck was domesticated as a food source. Ducks in turn may acquire the virus from migratory birds. All this suggests that with the advent and spread of agriculture, influenza epidemics may have been commonplace, especially in temperate zones during the winter and throughout the year in tropical

zones. Again, complications such as pneumonia would likely have developed, leading to death primarily among the very young and very old.

Throughout the Americas drought and other natural disasters, as well as war, often led to periods of famine. Among numerous examples are the climate change of 535 to 536 that led to famine in the Mesoamerican city of Teotihuacán, the so-called Little Ice Age that began in about 1350 and lasted for some 300 years in North America, and the 30 years of torrential rains followed by 30 years of drought that contributed to the collapse of the Moche of South America in the sixth and seventh centuries. Events such as these, as well as more routine dry spells, crop failures, pest infestations, and the like, severely reduced the food supplies of communities. Weakened by malnutrition and hunger, people were easy prey for viruses and bacteria that led to debilitation, dehydration, and death.

ASIA AND THE PACIFIC

BY TOM STREISSGUTH

Throughout the medieval period endemic Asian diseases—smallpox, yellow fever, cholera, dysentery, leprosy, and tuberculosis—frequently worsened into epidemics. The fact that bacteria and viruses caused these diseases was still unknown, and in most Asian societies the appearance of a plague was closely linked with supernatural beliefs and practices. The first recorded epidemic in Japan, for example, occurred in the year 552 C.E. and was widely blamed on the new and foreign practices of Buddhism.

At this time Japan was entering an era of devastating epidemics. Around the year 700 contagious measles, influenza, mumps, and dysentery were commonplace, especially in the marshy lowlands where rice was cultivated. In the years 735 to 737 Japan suffered a major outbreak of smallpox. Brought to Japan by a Korean fisherman, the epidemic began in northern Kyushu, the southernmost main island of the Japanese archipelago, and eventually reached all levels of society, from the poorest rural peasants to the emperor. The disease was spread throughout the archipelago by people traveling between the provinces and the capital of Heian (modern-day Kyoto). By the time the Great Smallpox Epidemic abated, the disease had killed about one in four people, a level of mortality approaching that of Europe's 14th-century Black Death. The Gion Festival, one of the major festivals of Japan today, originated with an epidemic of smallpox in Heian in the ninth century. To combat smallpox, the people of Heian carried spears to symbolically march the disease out of town.

This period of epidemic disease in Japan lasted for three centuries, until the 11th century. It coincided with a time of

closer contacts, through trading missions and diplomatic embassies, among Japan, Korea, and China. Bubonic plague arrived in the ninth century on ships coming from the Middle East carrying Arab traders. The same illness, which is transmitted to humans by fleas that have bitten infected rats and other rodents, was brought by Chinese traders who had come in contact with plague carriers along the Silk Route, which linked Asia with the Levant and Europe.

Smallpox and measles struck Japan during the warm months and had high rates of mortality. Two major epidemics of influenza, a winter disease, struck in the ninth century. Several more outbreaks occurred in the 13th century, a period when the weather grew much cooler. Malaria was common in the countryside and in the warm, humid lowlands of the south. During the centuries of epidemics the population of Japan stagnated, many rural villages were abandoned, and productive agricultural lands lay fallow. The migration of people fleeing the epidemics disrupted the economy, caused a shortage of available labor, and depleted the imperial army. Epidemic disease also had an effect on Japanese religious practice and philosophy, inspiring a peculiarly Japanese form of Buddhism that emphasized the fragility of life and the ephemeral nature of earthly existence.

As trade increased among the Middle East, Africa, and southern Asia, port cities throughout Asia became important transit points for diseases brought to new lands where human immune systems could offer little resistance. Southeast Asia and Indonesia were subject to frequent epidemics of malaria, a disease transmitted by the bite of a tropical mosquito. In Korea malaria, diphtheria, and respiratory diseases, including tuberculosis and asthma, were frequent and deadly visitors.

The Indian Subcontinent experienced many epidemics of waterborne diseases, including cholera, a disease that has been recorded by Indian texts for more than 2,000 years. The Ganges River, which flows through northern India, served as an immense reservoir of cholera bacteria, carrying the disease to the crowded cities along its banks and to coastal cities near the river's mouth at the Bay of Bengal. In the late medieval period India exported cholera through its trading ports to Africa, the Middle East, Russia, Europe, and the British Isles; eventually cholera originating in India also reached North and South America.

Every few years smallpox raged during the spring months, until the annual monsoon rains that began in June abated the contagion. The disease was especially common in Bengal, in northeastern India, and in the region surrounding the vast delta of the Ganges. With no vaccines or knowledge of microbes, the people of India believed cholera, smallpox, and other disease epidemics were the malevolent actions of

the gods. They countered smallpox, for example, by propitiating the goddess Sitala, believed to be the cause and the cure for the disease. Medieval India also had a more scientific approach to smallpox, inoculating healthy people with small amounts of pus taken from the skin lesions of victims. This practice, which dates to the first millennium B.C.E., was also discovered in China well before the medieval period and in later centuries spread to the British Isles and Europe.

China suffered frequent epidemics of smallpox, malaria, and bubonic plague. Although China had the most advanced medical science in Asia, microbes and the nature of parasitic disease were still unknown. By Chinese medical theory epidemic diseases could be caused by external or internal factors. Cold winds in winter and warmer winds in spring each supposedly caused certain diseases. *Wenbing* was the name given to feverish illnesses, while *shanghan* were those brought by the cold.

Smallpox was known as *luchuang*, “barbarian boils,” because according to common belief it was inflicted on China by the Mongol and Manchu barbarians with whom the emperor’s armies frequently clashed along the empire’s long northern frontier. There was a drastic population decline in northern China during the Yuan Dynasty, which was established by the Mongols in the late 13th century. Historians believe this decline may have been the result of epidemic diseases brought by the conquerors. Epidemic disease also arrived via the Silk Route and with travelers returning from India and Southeast Asia. Malaria was common in the subtropical regions of the south, where the mosquito population was high and warmer temperatures allowed the disease to spread rapidly.

The population of China was vulnerable to epidemic disease for many reasons. Frequent famines, chronic malnutrition, and the high incidence of childhood diseases all weakened the body’s immune system. When rice was husked and its outer shell removed, essential thiamine and vitamin B were lost, deficiencies that left the body vulnerable to beriberi, a disease that was common in all Asian rice-growing societies. China had many parasitic diseases caused by poor sanitation; the annual flooding of rice paddies provided vast breeding grounds for malaria-carrying mosquitoes. The use of human waste as fertilizer spread bacterial diseases such as cholera, and the migration of poor rural peasants spread epidemics from the countryside to the cities. Doctors resorted to purging and acupuncture to effect cures, while many villages appeased local ghosts and spirits who were thought to bring disease epidemics.

In the 13th century, as Chinese and Mongolian armies battled along their border, agriculture and trade were disrupted in the region, causing frequent famine and disease outbreaks. The Chinese discovered at some point that ani-

mals, including mosquitoes and rodents, played a role in transmitting certain diseases to humans. Government authorities in Hunan Province, which had a reputation as a center of bubonic plague, controlled the hunting and trapping of marmots and banned the use of rodent fur for any purpose in an attempt to prevent the spread of plague.

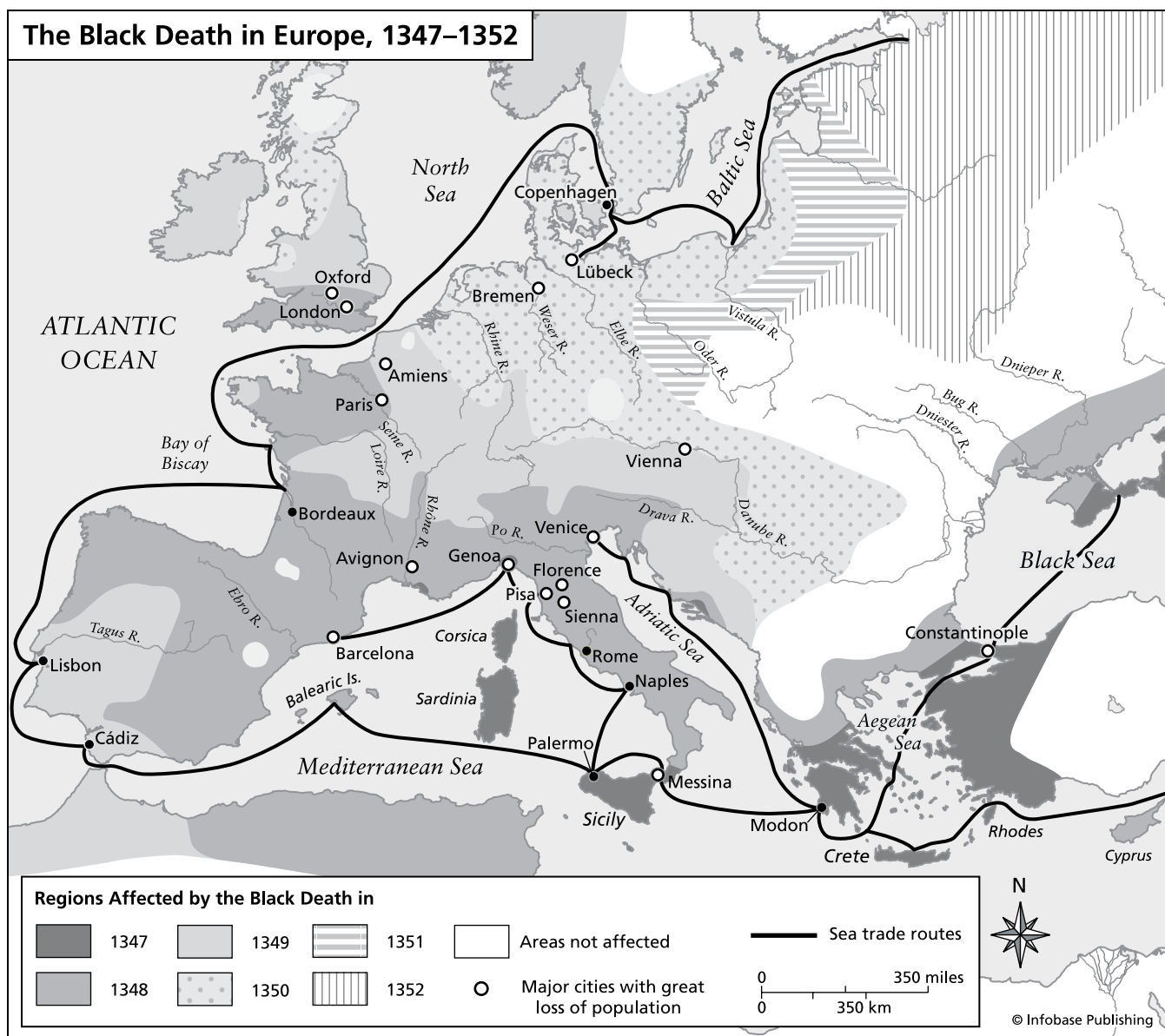
By one theory, the Black Death plague that ravaged Europe in the 14th century had its origins in central Asia, where the plague bacillus, *Yersinia pestis*, is endemic among ground rodents. From central Asia the plague traveled along the busy caravan routes that linked the Mediterranean, the Black Sea trading ports, and East Asia. During a siege of the Genoese port of Caffa, in the Crimea, the plague was used as a weapon by the Mongols, who catapulted plague-ridden corpses over the walls. In the meantime the bubonic plague also spread to northern India, where entire towns with their surrounding farming communities were depopulated. By the end of the medieval period European missions of exploration and trade were returning a variety of disease plagues to Asia, including cholera, diphtheria, and scarlet fever.

The islands of the western Pacific, the continent of Australia, and distant Polynesia were all spared the worst of Asia’s epidemic diseases. Isolation and distance allowed people living in these regions to escape the great plagues of smallpox and other illnesses that flourished in Asia’s crowded cities and spread along busy roads and maritime trade routes. Pacific islanders, however, did suffer from endemic diseases, including malaria, the bacterium-caused skin disease yaws, and beriberi, a disease of the nervous system caused by a vitamin deficiency. Patients were isolated as much as possible, and those suffering contagious diseases rarely came into contact with outsiders. Anyone suffering a contagious illness would probably not have survived the long seagoing journeys that were necessary to colonize distant islands of Micronesia, Hawaii, or the Easter Island group. By the same token, Polynesians developed little resistance to many of the illnesses carried by European explorers at a later time and, as a result, suffered a very high rate of mortality when outsiders began arriving after the 15th century.

EUROPE

BY JEAN SHEPHERD HAMM

In the Middle Ages people lived with constant danger from diseases. Among these diseases, the Black Death, an outbreak of bubonic plague that ravaged Europe from 1347 to 1352, was part of the world’s greatest pandemic and the one most associated with medieval Europe. As much as one-third of the continent’s population died during those years. However, other outbreaks of plague and epidemics of smallpox, dysen-



The medieval plague known as the Black Death spread along trade routes from Asia into Europe in the 14th century; as much as one-third of the continent's population died during 1347–52.

tery, leprosy, malaria, measles, scarlet fever, and tuberculosis also killed many thousands throughout the medieval period. By the end of that era the feudal social structure had crumbled, in large part because of drastic population losses.

Epidemics usually result from the rapid spread of harmful bacteria or viruses. Doctors during the medieval period possessed only limited knowledge of the human body and no knowledge of microorganisms and could do little to prevent epidemic outbreaks or save the lives of victims. Scientists still believed that the world was composed of four elements: water, fire, air, and earth. The human body was believed to be made

of four corresponding “humors”: phlegm, yellow bile, blood, and black bile. When the humors were balanced, all was well with the body. When one became ill, the humors were out of balance and must be brought back into equilibrium. Four treatments—moist, dry, hot, and cold—might be used. Patients received treatment in a limited number of other ways, the most prevalent being bleeding, either with leeches or by bloodletting. Doctors prescribed purgative drugs made from herbs, roots, and vegetables to cleanse the body of offending elements. In 1300 Pope Boniface VIII limited the study of anatomy by forbidding the dissection of corpses. At the

Medical College in Montpellier (France) a practical anatomy class held only once every two years consisted primarily of opening a cadaver's abdominal cavity for viewing.

Under the orders of the French king Philip VI, the medical faculty of the University of Paris researched the cause of the Black Death. In 1348 they announced their findings: The plague was the result of a conjunction of the planets Saturn, Jupiter, and Mars in March 1345 that caused hot, moist vapors to rise from the earth. Some church authorities saw the plague as divine retribution for man's wickedness. Both theories seemed plausible to the medieval mind.

Modern medicine distinguishes three types of plague: bubonic, septicemic, and pneumonic. Probably all three contributed to the Black Death and other plague epidemics of the Middle Ages. The bubonic form of plague results from infection with the bacterium *Yersinia pestis* carried by fleas. The fleas contract the bacterium from rats and other small animals they bite and transmit it to humans they subsequently bite. Within two to five days the victim may develop a fever, chills, seizures, headaches, and buboes, dark swellings often in the armpits, groin, or neck. In medieval times as many as four out of five victims died within days of the appearance of the buboes. Doctors sometimes opened the buboes after noticing that patients whose buboes burst spontaneously and secreted a dark, foul-smelling fluid seemed more likely to recover.

Septicemic plague results when *Yersinia pestis* directly enters the bloodstream. This can occur either at the site of the fleabite or by direct contact with the infected blood of an animal or human victim. There are no buboes with this type of plague, making it harder to diagnose. As the disease spreads to internal organs, the victim is stricken with fever, chills, abdominal pain, and bleeding into the skin and organs. These patients often died with dark splotches on their skin.

The first sign of pneumonic plague is also fever as the body fights infection in the lungs. The victim will then begin to cough up blood. Either bubonic or septicemic plague can lead to this strain, which is then spread by sneezing and coughing. Medieval people began to believe that, in addition to rats, "bad air" caused the disease. Reports of catastrophes in the East, especially volcanoes and earthquakes, encouraged the belief that a foul atmosphere was carrying disease through Europe.

At least one wave of what was probably bubonic plague had struck parts of Europe long before the Black Death. In 542 C.E. plague was reported in Constantinople (today's Istanbul, Turkey), possibly brought there aboard trading ships from Asia or Africa. It was known as the Justinian Plague, since Justinian was the Roman emperor and Constantinople was the capital of the Eastern (Byzantine) Roman Empire.

OUTBREAK IN FLORENCE

The *Decameron* (first edition completed 1352) of Giovanni Boccaccio (1313–75) was a milestone in medieval literature and helped establish the Florentine dialect as the precursor of modern Italian. Many of the 100 stories, some traditional and some of Boccaccio's invention, were reworked by Chaucer (ca. 1342–1400) in *The Canterbury Tales*, a work of literature of equal importance in shaping the development of English. The stories are held together by a larger frame narrative inspired by Boccaccio's own experiences in Florence at the time the city was ravaged by the Black Death in 1348. The individual stories are told as entertainment by members of a group of aristocrats who fled the outbreak of plague in the city to a villa in the countryside.

Boccaccio begins by describing the outbreak of plague in Florence. The city officials had been warned that the pestilence was raging in other cities and took precautions. These were of two types: infected persons were denied entrance to the city, and stricter measures of public hygiene were imposed; at the same time, penitential processions throughout the city were organized by the church. As to the disease itself, Boccaccio describes the buboes characteristic of the plague as occurring first in the armpits or groin. These tumors are, in fact, swollen lymph nodes, and he accurately describes their spread throughout the body as the entire lymphatic system is attacked. But not knowing the true character of the disease, he speaks as though the buboes are the disease itself and characterizes their spread as though they were a plant propagating itself. He notes the high mortality of the plague and notices that contagion is not limited to person-to-person contact but is even spread by touching the clothes of the dead. He attributes this to some magical quality being attached to the objects, little knowing that the actual disease vector is fleas. Boccaccio observes the utter helplessness of physicians in the face of the pestilence but ascribes it to the fact that in Florence most people practicing medicine had not received legitimate medical training.

From that great trade center the disease spread quickly to the European lands along the Mediterranean. It is impossible to know exactly how far the epidemic reached or how many people were affected, but the Roman historian Procopius claimed



The seal of the Hospital of Saint Mary Magdalene, one of five houses for leprosy patients in London; ca. 1500 (© Museum of London)

that as many as 10,000 people a day died in Constantinople at the height of the outbreak, and modern scholars estimate that as many as 20 million may have died in Mediterranean Europe as a whole during the Justinian Plague. The disease recurred several times over the next 60 years, with millions more fatalities.

The Black Death may also have reached Europe via Constantinople, although information is scarce. According to one story, three galleys with traders returning from the Crimea arrived in Genoa in January 1347. When the Genoese discovered that sailors aboard had the plague, they drove the ships out of port, but it was too late to stop the rats from coming ashore. The galleys then sailed for France, carrying the plague with them to their new ports of call. In December 1347 half the cardinals in the papal city of Avignon died. The disease then spread throughout Europe, with England's first reported case occurring in the Dorset port of Melcombe Regis in September 1348.

Irrational reactions to the Black Death began with the church's insistence that the plague had been sent as pun-

ishment for evil. The superstitious and gullible, making up much of the populace, unable to see any other explanation, easily accepted their sins as the reason for the horrors. The cult known as Flagellants turned their religious fervor into action against themselves in an effort to be cleansed from sin and plague. Groups traveled the roads for 33 days at a time, scourging themselves and loudly praying for forgiveness. Although the Flagellants were a small movement, Pope Clement VI became concerned about their fervor and their apparent independence from the church's authority. In October 1349 he ordered prelates to suppress any Flagellant demonstrations, and the movement waned.

In their hysteria people began to fix blame on others. Women were accused of witchcraft and inflicting the plague on innocent victims. In Spain, Arabs were blamed for spreading the disease. No group, however, suffered more than the Jews. In the south of France in 1348, Jews were accused of poisoning the water, and many were killed. Later that year Jews in Neustadt, Germany, were tortured until they confessed to contaminating wells. In October and November, Jews were burnt at the stake, shut into buildings that were then set afire, and massacred by other means throughout Germany. Pope Clement VI tried to halt the persecution through several decrees and by threatening excommunication of participants in the killings. He rationally pointed out that Jews were dying of the plague in equal proportion to gentiles, but his pleas were not effective. One of the worst of the massacres occurred in July 1349 when Flagellants entered the city of Frankfurt and incited the killing of 600 Jews.

With little aid from the church or science, the medieval populace reacted to the unexplainable catastrophe of the Black Death with fear and hysteria. As they watched their family members and neighbors die, their irrationality grew. The general population did understand something of a connection between the plague and large concentrations of people in towns and ports, ships arriving from other lands, and rats coming off the ships. They also seemed to understand that infection could spread through contact with a victim or with the victim's belongings. One medieval tale tells of four men who robbed a warehouse and stole, among other things, a fleece under which they slept that night. All four died the next day. Another story relates how a walled town in the Crimea was besieged by enemies during an outbreak of the plague. The soldiers catapulted corpses of plague victims over the walls into the town, hoping to kill their enemies by infecting them as well.

Many individuals abandoned their own families as soon as they learned of the plague. Others tried measures such as secluding themselves and their loved ones in their homes and trying to block the harmful atmosphere from entering. They

did not, however, keep the rats and fleas from their homes. Doctors often advised the burning of scented wood such as juniper or ash and using flowers, herbs, and vinegar and rosewater to counteract the corrupted atmosphere. These precautions also helped to mask the smell of dead bodies that permeated the air.

The immediate and most obvious effect of the Black Death was a sharp decrease in the population, particularly among the poor. The resulting shortage of labor enabled many workers to bargain for better wages. For the first time, a land surplus allowed farmers to obtain their own small plots. The scarcity of trained stonemasons and carpenters not only affected wages but also led to a simplification of architectural style.

Native languages gained importance because there were fewer educated scholars using Latin. Books written in native languages, such as Geoffrey Chaucer's *Canterbury Tales*, increased rapidly in number in the hundred years following the plague. A general increase in education followed as more schools were established and more people became literate. Advanced education also thrived. Thirty new universities founded between 1351 and 1500 included medical training, and relaxation of church rules allowed concentrated study of human anatomy and disease.

Nationalism developed after 1350 as borders and native languages became more fixed. Cities and nations took measures to curb further epidemics within their borders. Ports now strictly enforced quarantines when ships arrived with ill crews. Goods traveling by land were held in one place until dangers of plague were past. All these changes reflect the secular mentality that was establishing itself in the 15th century. Individuals became less concerned with the afterlife and more with present life, materialism, and worldliness—tilling fertile ground where the Renaissance could flourish.

THE ISLAMIC WORLD

BY DAVID TSCHANZ

Of all man's enemies, infectious diseases have singly and together killed, maimed, and crippled billions from the beginning of time to the present day. Smallpox holds the distinction of being the greatest serial killer in history. Plague, then called the Black Death, killed up to half the population of the Middle East and Europe in two years. Influenza slew millions, and even in the 20th century struck dead 25 million in six months while World War I raged. In addition to these dreaded scourges, epidemics of less exotic, but no less fatal disease marched across the medieval Islamic world, slaying tens of millions year after year. Measles, scarlet fever, typhoid, whooping cough, diphtheria, mumps, malaria, dysentery, in-

fluenza—the list goes on of invisible killers that mowed down communities like grass beneath the scythe.

Epidemiologists, people who study the occurrence of disease in populations, refer to three basic types of disease occurrence. *Endemic* means that a disease is present in a population and maintained in the population without much change. It is, if you will, the normal background noise. An *epidemic* is an occurrence of a disease at a rate substantially above the normal level. It also may be the occurrence of a new disease. *Pandemics* are worldwide occurrences of a disease. Normally they are associated with a high rate of illness and death. Famous pandemics have included the Black Death of the mid-14th century and the 1918 influenza pandemic.

Medicine was a central part of medieval Islamic culture. Disease and health were of importance to rich and poor alike, as indeed they are in every civilization. Responding to circumstances of time and place, Islamic physicians and scholars developed a rich medical literature exploring and synthesizing the theory and practice of medicine. Islamic medicine was built on tradition, chiefly the theoretical and practical knowledge developed in Greece and Rome. For Islamic scholars, Galen (129–ca. 199 C.E.) and Hippocrates (fifth century B.C.E.) were preeminent authorities. Islamic scholars translated their voluminous writings from Greek into Arabic and then produced new medical knowledge based on those texts. In order to make the Greek tradition more accessible, understandable, and teachable, Islamic scholars ordered and made more systematic the vast and sometimes inconsistent Greco-Roman medical knowledge by writing encyclopedias and summaries.

While there are few, if any, accurate accounts of epidemics throughout most of the medieval Islamic world, epidemics are thought to have been widespread. One clue was the establishment by the Abbasid caliph Harun al-Rashid (r. 786–809) of a separate department of health, which used to run several government dispensaries staffed by talented physicians. In the reign of another Abbasid caliph, al-Muqtadir Billah (r. 1046–81), the medical department registered phenomenal progress. His talented minister Ali ibn Isa took a lively interest in public welfare activities. Sinan ibn Thabit ibn Qurra, an eminent physician, was named the inspector-general of health. The outbreak of large-scale epidemics in the Abbasid domains necessitated the expansion of the health department. A number of new hospitals were opened, and a separate hospital was attached to each jail.

While never actually identifying bacteria, Muslim physicians were aware of the nature of contagion, the idea of infectious and noninfectious disease, and the existence of the immune system. They also laid the foundations for the eventual development of bacteriology and microbiology. Their

finding of contagious disease, in particular, is considered revolutionary and is one of the most important discoveries in medicine. Early ideas on contagion can be traced back to several Hadiths, or sayings, attributed to the prophet Muhammad in the seventh century, who is said to have understood the contagious nature of leprosy, mange, and sexually transmitted disease. A similar grasp that there were contagions was shown by the early physician ar-Razi (known to the Western world as Rhazes; ca. 865–between 923 and 935). In order to find the most hygienic place to build a hospital, ar-Razi carried out an experiment in which he hung pieces of meat throughout Baghdad and observed where the meat decomposed least quickly.

Ar-Razi also wrote the *al-Hawi* (Comprehensive Book of Medicine). In this book he recorded clinical cases and distinguished between smallpox and measles. By time of Ibn Sina in the 11th century, the pathological basis of contagion was well enough understood that hospitals had separate wards for specific illnesses, such that people with contagious diseases could be kept away from other patients who did not have a contagious disease.

In his *Al-qanun fi al-tibb* (Canon of Medicine, 1020), Ibn Sina (known to the West as Avicenna; ca. 980–1037) discussed the contagious nature of infectious diseases such as phthisis and tuberculosis, the distribution of diseases by water and soil, and the existence of specific sexually transmitted diseases. Ibn Sina argued that infection resulted when a bodily secretion is contaminated by foul foreign earthly bodies before being infected. This is interpreted by some as the first descriptions of bacteria and viral organisms. Such may not be the case, especially since he did not view these organisms as primary causes of disease and was merely inferring their existence; in the absence of microscope, he would not have been able to see them. Ibn Sina was sufficiently convinced that there were contagious diseases, though, that he introduced quarantining as a means of limiting the spread of contagious diseases.

The single most devastating pandemic to strike the medieval Islamic world was that brought about by *Yersinia pestis*, the bacterium that causes plague. More commonly known as the Black Death, this pandemic shook the entire medieval world—from Scapa Flow in Scotland to Aden in Yemen and from Mongolia to Timbuktu. The Arabs were the first to report it, coming across the steppe from central Asia, the region that Ibn al-Wardi, a contemporary observer (and later victim) of the Black Death in Syria, called the “land of darkness.” Other Arab observers, like their western European counterparts, attested to its origins in the “East.” In the account of al-Maqrizi, it started in Mongol territory “in the year 742” (1341–42) and “news of this arrived from the land of the Uz-

beks . . . and it spread throughout the Mongol lands . . . and then it spread throughout the Eastern countries.”

As it spread to western Europe, the disease also entered the region from southern Russia. By autumn 1347 the plague had reached Alexandria in Egypt, probably through trade with Constantinople and other ports on the Black Sea. During 1348 the disease traveled eastward to Gaza and north along the eastern coast to cities in present-day Lebanon, Syria, and Palestine, including Asqalan, Acre, Jerusalem, Sidon, Damascus, Homs, and Aleppo. In years 1348 to 1349 the disease reached Antioch. The city’s residents fled to the north, most of them dying during the journey, but the infection had been spread to the people of Asia Minor. The 1348 outbreak in Gaza left an estimated 10,000 people dead, while Aleppo recorded a death rate of 500 a day during the same year. In Damascus, at the disease’s peak in September and October 1348, 1,000 deaths were recorded every day, with the overall mortality rate estimated at between 25 and 38 percent. The famed traveler Ibn Battuta was passing through the city at the time and was overwhelmed by what he saw. People fasted and prayed for days. While the prayers continued, Syria lost 400,000 people by the time the epidemic subsided in March 1349. Other methods were tried for quelling the epidemic, according to Ibn Battuta: People were encouraged to get fresh air, sprinkle their houses with rosewater and vinegar and eat pickled onions and fresh fruit, among other remedies. The disease spread unabated. Two months later the death toll in Cairo was exceeding 7,500 people daily. It is estimated that up to half the population of the great Mamluk city was wiped out in a single season.

Mecca became infected in 1349, and Muslim pilgrims may then have helped spread the disease through the Islamic world either to or from the holy city. During the same year records show the city of Mosul suffered a massive epidemic, and the city of Baghdad experienced a second round of the disease. In 1351 Yemen had an outbreak of the plague, which coincided with the return of King Mujahid from imprisonment in Cairo. His party may have brought the disease with them from Egypt. Returning to North Africa in 1350–51, Ibn Battuta discovered that Marrakech and Tunis, which had suffered 1,000 deaths a day, lay prostrate from the disease. The effects of the plague, he wrote, were everywhere. When the Black Death reached al-Andalus in the 14th century, the Muslim physician Ibn al-Khatib (1313–74), wrote a treatise on the plague, in which he stated that contagion had been established by “experience, investigation, the evidence of the senses and trustworthy reports,” going on to say that “he who establishes contact with the afflicted gets the disease, whereas he who is not in contact remains safe.”

In Christian Europe people believed that the plague was punishment from God for the sins of all Christians. Islamic

theology held different views about the plague. Muslims agreed with Christians that the disease was the work of God, but they did not necessarily view it as a punishment. Muslims preserved their belief in a compassionate and merciful God, and thus they believed that death from the plague was an offer of martyrdom from God. They formed three basic tenets for coping with the plague: (1) The plague was a mercy and a martyrdom from God for the faithful Muslim and a punishment for the infidel. (2) A Muslim should neither enter nor flee a plague-stricken land. (3) There was no contagion of the plague because diseases came directly from God.

Muslim doctors and scientists often had a difficult time in reconciling these tenets, particularly the third one, with growing evidence that a contagion indeed existed. Moreover, doctors often felt obliged to try to treat people infected with the plague in any way they could, which conflicted with the Islamic theological view that the disease had been sent by God and therefore must simply be endured. Theologians also encountered problems when the plague hit the holy city of Mecca in 1349, probably as the result of pilgrimage traffic during the Hajj. The Prophet had promised that no disease would ever come to either Mecca or Medina. Some Muslims explained the plague's presence in Mecca as the result of unbelievers living there, while others rejoiced in the miracle that it never spread to Medina.

The precise demographic impact of the disease in the Middle East is very difficult to calculate. The plague struck various countries in the Middle East during the pandemic, leading to serious depopulation and permanent change in both economic and social structures. Mortality rates were particularly high in rural areas, including significant areas of Palestine and Syria. Many surviving rural people fled, leaving their fields and crops, and entire rural provinces are recorded as being totally depopulated. Surviving records in some cities

reveal an overwhelming number of deaths. There was a particularly devastating effect both militarily and economically. The rapid spread of the plague through armies affected the outcome of several minor wars throughout the Islamic world. Even the strong Mamluk army in Egypt was sufficiently devastated by the plague that the decline in its military capabilities was a significant factor in its demise and eventual defeat by the Ottoman Empire in the early 16th century.

Economically, the scarcity of goods caused by the labor shortage resulted in higher prices, while many foreign goods were not available at all because of deaths among foreign merchants. A decline in artistic creativity also followed the Black Death, as many artisans and architects died. The legacy of the continuous shroud of death during this period is demonstrated by many Persian miniatures of the time, which often depicted scenes of death and mourning. The great Arab sociologist and historian Ibn Khaldun probably said it best when he wrote: "Civilization both in the East and the West was visited by a destructive plague which devastated nations and caused populations to vanish. It swallowed up many of the good things of civilization and wiped them out. . . Cities and building were laid waste, roads and way signs were obliterated, settlements and mansions became empty, dynasties and tribes grew weak. The entire inhabited world changed."

See also AGRICULTURE; ALCHEMY AND MAGIC; BORDERS AND FRONTIERS; CITIES; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; DEATH AND BURIAL PRACTICES; ECONOMY; EXPLORATION; FOOD AND DIET; HEALTH AND DISEASE; HUNTING, FISHING, AND GATHERING; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NATURAL DISASTERS; RELIGION AND COSMOLOGY; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE.

Africa

≈ Procopius: "The Plague, 542," excerpt from History of the Wars (ca. 545–53) ≈

During these times there was a pestilence, by which the whole human race came near to being annihilated. Now in the case of all other scourges sent from heaven some explanation of a cause might be given by daring men, such as the many theories propounded by those who are clever in these matters; for they love to conjure up causes which are absolutely incomprehensible to

man, and to fabricate outlandish theories of natural philosophy knowing well that they are saying nothing sound but considering it sufficient for them, if they completely deceive by their argument some of those whom they meet and persuade them to their view. But for this calamity it is quite impossible either to express in words or to conceive in thought any explanation,

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except indeed to refer it to God. For it did not come in a part of the world nor upon certain men, nor did it confine itself to any season of the year, so that from such circumstances it might be possible to find subtle explanations of a cause, but it embraced the entire world, and blighted the lives of all men, though differing from one another in the most marked degree, respecting neither sex nor age.

For much as men differ with regard to places in which they live, or in the law of their daily life, or in natural bent, or in active pursuits, or in whatever else man differs from man, in the case of this disease alone the difference availed naught. And it attacked some in the summer season, others in the winter, and still others at the other times of the year. Now let each one express his own judgment concerning the matter, both sophist and astrologer, but as for me, I shall proceed to tell where this disease originated and the manner in which it destroyed men.

It started from the Egyptians who dwell in Pelusium. Then it divided and moved in one direction towards

Alexandria and the rest of Egypt, and in the other direction it came to Palestine on the borders of Egypt; and from there it spread over the whole world, always moving forward and travelling at times favorable to it. For it seemed to move by fixed arrangement, and to tarry for a specified time in each country, casting its blight slightly upon none, but spreading in either direction right out to the ends of the world, as if fearing lest some corner of the earth might escape it. For it left neither island nor cave nor mountain ridge which had human inhabitants; and if it had passed by any land, either not affecting the men there or touching them in indifferent fashion, still at a later time it came back; then those who dwelt round about this land, whom formerly it had afflicted most sorely, it did not touch at all, but it did not remove from the place in question until it had given up its just and proper tale of dead, so as to correspond exactly to the number destroyed at the earlier time among those who dwelt round about. And this disease always took its start from the coast, and from there went up to the interior.

From: H. B. Dewing, trans., *Procopius: History of the Wars*, vol. 1 (Cambridge, Mass.: Harvard University Press, 1914).

Europe

≈ Jacob von Königshofen: "The Cremation of Strasbourg Jewry, Saint Valentine's Day, February 14, 1349" ≈

ABOUT THE GREAT PLAGUE AND THE BURNING OF THE JEWS

In the year 1349 there occurred the greatest epidemic that ever happened. Death went from one end of the earth to the other, on that side and this side of the sea, and it was greater among the Saracens than among the Christians. In some lands everyone died so that no one was left. Ships were also found on the sea laden with wares; the crew had all died and no one guided the ship. The Bishop of Marseilles and priests and monks and more than half of all the people there died with them. In other kingdoms and cities so many people perished that it would be horrible to describe. The pope at Avignon stopped all sessions of court, locked himself in a room, allowed no one to approach him and had a

fire burning before him all the time. And from what this epidemic came, all wise teachers and physicians could only say that it was God's will. And as the plague was now here, so was it in other places, and lasted more than a whole year. This epidemic also came to Strasbourg in the summer of the above mentioned year, and it is estimated that about sixteen thousand people died.

In the matter of this plague the Jews throughout the world were reviled and accused in all lands of having caused it through the poison which they are said to have put into the water and the wells—that is what they were accused of—and for this reason the Jews were burnt all the way from the Mediterranean into Germany, but not in Avignon, for the pope protected them there.

Nevertheless they tortured a number of Jews in Berne and Zofingen [Switzerland] who then admitted that they had put poison into many wells, and they also found the poison in the wells. Thereupon they burnt the Jews in many towns and wrote of this affair to Strasbourg, Freiburg, and Basel in order that they too should burn their Jews. But the leaders in these three cities in whose hands the government lay did not believe that anything ought to be done to the Jews. However in Basel the citizens marched to the city-hall and compelled the council to take an oath that they would burn the Jews, and that they would allow no Jew to enter the city for the next two hundred years. Thereupon the Jews were arrested in all these places and a conference was arranged to meet at Benfeld Alsace, February 8, 1349. The Bishop of Strasbourg [Berthold II], all the feudal lords of Alsace, and representatives of the three above mentioned cities came there. The deputies of the city of Strasbourg were asked what they were going to do with their Jews. They answered and said that they knew no evil of them. Then they asked the Strasbourgers why they had closed the wells and put away the buckets, and there was a great indignation and clamor against the deputies from Strasbourg. So finally the Bishop and the lords and the Imperial Cities agreed to do away with the Jews. The result was that they were burnt in many cities, and wherever they were expelled they were caught by the peasants and stabbed to death or drowned.

On Saturday—that was St. Valentine's Day—they burnt the Jews on a wooden platform in their cemetery. There were about two thousand people of them. Those who

wanted to baptize themselves were spared. [Some say that about a thousand accepted baptism.] Many small children were taken out of the fire and baptized against the will of their fathers and mothers. And everything that was owed to the Jews was cancelled, and the Jews had to surrender all pledges and notes that they had taken for debts. The council, however, took the cash that the Jews possessed and divided it among the working-men proportionately. The money was indeed the thing that killed the Jews. If they had been poor and if the feudal lords had not been in debt to them, they would not have been burnt. After this wealth was divided among the artisans some gave their share to the Cathedral or to the Church on the advice of their confessors.

Thus were the Jews burnt at Strasbourg, and in the same year in all the cities of the Rhine, whether Free Cities or Imperial Cities or cities belonging to the lords. In some towns they burnt the Jews after a trial, in others, without a trial. In some cities the Jews themselves set fire to their houses and cremated themselves.

It was decided in Strasbourg that no Jew should enter the city for a hundred years, but before twenty years had passed, the council and magistrates agreed that they ought to admit the Jews again into the city for twenty years. And so the Jews came back again to Strasbourg the year 1368 after the birth of our Lord.

From: Jacob Marcus, *The Jew in the Medieval World: A Sourcebook, 315–1791* (New York: Jewish Publication Society, 1938).

The Islamic World

~ Ibn Battuta: Excerpt from Travels in Asia and Africa (1325–54) ~

THE PLAGUE OF 1348

One of the celebrated sanctuaries at Damascus is the Mosque of the Footprints (al-Aqdam), which lies two miles south of the city, alongside the main highway which leads to the Hijaz, Jerusalem, and Egypt. It is a large mosque, very blessed, richly endowed, and very

highly venerated by the Damascenes. The footprints from which it derives its name are certain footprints impressed upon a rock there, which are said to be the mark of Moses' foot. In this mosque there is a small chamber containing a stone with the following inscription "A certain pious man saw in his sleep the

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Chosen One [Muhammad], who said to him 'Here is the grave of my brother Moses.'"

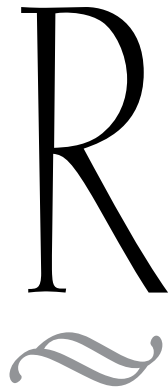
I saw a remarkable instance of the veneration in which the Damascenes hold this mosque during the great pestilence on my return journey through Damascus, in the latter part of July 1348. The viceroy Arghun Shah ordered a crier to proclaim through Damascus that all the people should fast for three days and that no one should cook anything eatable in the market during the daytime. For most of the people there eat no food but what has been prepared in the market. So the people fasted for three successive days, the last of which was a Thursday, then they assembled in the Great Mosque, amirs, sharifs, qadis, theologians, and all the other classes of the people, until the place was filled to overflowing, and there they spent the Thursday night in prayers and litanies. After the dawn prayer next

morning they all went out together on foot, holding Korans in their hands, and the amirs barefooted. The procession was joined by the entire population of the town, men and women, small and large; the Jews came with their Book of the Law and the Christians with their Gospel, all of them with their women and children. The whole concourse, weeping and supplicating and seeking the favour of God through His Books and His Prophets, made their way to the Mosque of the Footprints, and there they remained in supplication and invocation until near midday. They then returned to the city and held the Friday service, and God lightened their affliction; for the number of deaths in a single day at Damascus did not attain two thousand, while in Cairo and Old Cairo it reached the figure of twenty-four thousand a day.

From: Ibn Battuta, *Travels in Asia and Africa 1325–1354*, trans and ed. H. A. R. Gibb (London: Broadway House, 1929).

FURTHER READING

- Suzanne Austin Alchon, "The Great Killers in Precolumbian America: A Hemispheric Perspective," *Latin American Population History Bulletin* 27 (Fall 1997). Available online. URL: <http://www.hist.umn.edu/~rmccaa/laphb/27fall97/laphb27a.htm>. Downloaded on October 31, 2007.
- Alfred Jay Bollet, *Plagues and Poxes: The Impact of Human History on Epidemic Disease* (New York: Demos Medical Publishing, 2004).
- Jane E. Buikstra, "Diseases of the Precolumbian Americas." In *The Cambridge World History of Human Disease*, ed. Kenneth F. Kiple (New York: Cambridge University Press, 1993).
- Joseph P. Byrne, *The Black Death* (New York: Greenwood Press, 2004).
- Sheila Campbell, Bert Hall, and David Klausner, eds. *Health, Disease and Healing in Medieval Culture* (Houndsmills, U.K.: Macmillan, 1992).
- Eric de Rosny, *Healers in the Night*, trans. Robert R. Barr (Maryknoll, N.Y.: Orbis Books, 1985).
- Jared Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: W. W. Norton, 1999).
- Michael W. Dols, *The Black Death in the Middle East* (Princeton, N.J.: Princeton University Press, 1977).
- Steve Feierman and John M. Janzen, *The Social Basis of Health and Healing in Africa* (Berkeley: University of California Press, 1992).
- Charles M. Good, *Ethnomedical Systems in Africa* (New York: Guilford Press, 1987).
- J. N. Hays, *The Burdens of Disease: Epidemics and Human Response in Western History* (Camden, N.J.: Rutgers University Press, 1998).
- Kenneth F. Kiple, ed., *The Cambridge World History of Human Disease* (Cambridge, U.K.: Cambridge University Press, 1993).
- Peter E. Pormann and Emilie Savage-Smith, *Medieval Islamic Medicine* (Washington, D.C.: Georgetown University Press, 2007).
- Roy Porter, *The Cambridge Illustrated History of Medicine* (New York: Cambridge University Press, 1996).
- M. R. Smallman-Raynor and A. D. Cliff, *War Epidemics: An Historical Geography of Infectious Diseases in Military Conflict and Civil Strife, 1850–2000* (Oxford, U.K.: Oxford University Press, 2004).
- Manfred Ullmann, *Islamic Medicine* (Edinburgh, U.K.: Edinburgh University Press, 1978).
- John W. Verano, "Prehistoric Disease and Demography in the Andes." In *Disease and Demography in the Americas*, ed. John W. Verano (Washington, D.C.: Smithsonian Institution Press, 1992).
- Sheldon J. Watts, *Epidemics and History: Disease, Power, and Imperialism* (New Haven, Conn.: Yale University Press, 1997).
- Hans Zinsser, *Rats, Lice and History* (New Brunswick, N.J.: Aldine-Transaction, 2007).



► religion and cosmology

INTRODUCTION

Since prehistoric times one of the most profound experiences of human life has been religion. The very word *religion* (from the Latin *religio*) means the “ties that bind together the divine and the human” into a single community. The mediation of religious thoughts, words, and actions between the self and the world helps orient people within a disorderly and inchoate world. Religion turns the experience of living within an impersonal and alien cosmos into a comprehensible relationship of “I and thou” by constructing the universe in a series of analogies based on human life. The knowledge of one’s own particular religious tradition helps provide a sense of identity.

In ancient and medieval times almost everyone lived by farming. That way of life imposed a certain regular order on life. Certain work had to be done at certain times. Work was to be done in the traditional way as learned from one’s elders. The work required neighbors to labor together at the time of planting and harvest. It was necessary also to have the cooperation of the world itself, to work according to its rhythms to ensure the success of the year’s production of food. The fact that rain falling from the sky made crops grow in the furrows of the earth inevitably suggested the action of human reproduction, so the sky and the earth had to be called upon to wed and bring forth food. It was only right that some of the crop be given back by way of thanks to the superior

persons, conceived of as gods or spirits, that had helped to produce it. This is why plants and animals were always sacrificed to the divine.

To get along in a family or village, one had to give what was owed to each person and not to give offense. The care and respect due to family members did not end at death but rather continued with the living, so it would follow that some kind of life persisted after death. The world all around was filled with life and people; it would follow that the world above in heaven and the world below in the underworld would be the same. One communicated and cooperated with fellow human beings through ordinary words and work, but one communicated with the greater society of gods and spirits with the special language of prayers and with the special actions of ritual. If one used the right prayers and the right rituals handed down from the tradition of the ancestors, one would have a successful and happy life. This is the character of the meaning that religion traditionally provided to human existence.

Throughout the Middle Ages many people continued to live this way of life with a traditional practice of religion neatly integrated into their life as agriculturalists. The main purpose of religion was to send the smell of sacrifice to heaven so that the rain would fall on the fields and ensure the cycle of human life. These simple beliefs could be elaborated to a remarkable degree. For examples, the Aztec of Mesoamerica believed that the universe would come to an end if an altar in the center of their capital was not daily washed with the sacrifice of human

blood. Or again, it is easy to imagine that if one suffers misfortune, it is because of the envy or malice of another person and that the person actually brought the bad luck about by carrying out purposefully wrong ritual, that is, witchcraft. Such beliefs led to the execution of tens of thousands of people in Europe beginning at the end of the Middle Ages.

But in late antiquity and the Middle Ages an entirely new kind of religion appeared that often found itself at odds, and even at war, with traditional religion. These new religions had a transformative relationship with tradition. It is perhaps not accidental that they came about or flourished in urban cultures where the lives of many people were cut off from the older traditions of the countryside. They were created by individuals who were religious virtuosos and conceived of an entirely new relationship between the human and the divine: men such as Gautama Buddha, Confucius, Jesus, Yochanan ben Zakai (the founder of Rabbinic Judaism), and Muhammad.

The new faiths were or quickly came to be centered not on the performance of ritual (though ritual was by no means abandoned) but on a body of sacred texts. Study and learning became sacred activities. Because they were not tied to any particular people or place, they were free to be accepted by anyone; in fact, adherents often set out with a missionary zeal to convert the entire world because of a sense that other religions were fundamentally mistaken and that their new truth had to become paramount in the world. These new religions often denied the existence of traditional gods and spirits or dispensed with them as irrelevant. In Buddhism it is not quite possible to talk about divinity in any traditional sense, while the three Abrahamic religions insist that one and only one god, the creator and ruler of the universe, exists.

While the new religions sometimes developed rituals to govern human interaction with nature (demanded because most people were still farmers), their emphasis was on the development of individual human potential through education and leading a disciplined life. Their highest goal was to transform human existence to something approaching the divine through asceticism, meditation, and mystical union with divinity, although this highest level could be approached by only a few of any religion's followers. Amazingly (from the point of view of traditional ways of life), Christianity and Buddhism actually called upon their most perfect practitioners to abandon the family as a way of life and live in segregated communities as monks and nuns, effectively creating an entirely new model of human existence.

The Middle Ages saw the spread of these new religions over most of Eurasia and North Africa. This made a profound break with the religious past. The character of these new phenomena as faiths (something believed) as opposed to religion (something done) helped determine much of the character of

medieval life. It also laid the foundation for greater breaks with tradition after the Middle Ages.

AFRICA

BY KIRK H. BEETZ

African religion includes many beliefs, some that are shared in common by many African cultures and others that are unique to a particular people in a particular place. Indeed, individual villages often would have their own creation stories, their own spiritual guardians, and their own spiritual destiny. Africans led very imaginative spiritual lives. In the development of a religious theme or myth, variations, abridgements, and radical changes occurred sometimes over only a few generations. People who lived in rain forests formed beliefs about the origins of humanity that varied from the beliefs of people who lived on open plains with scarcely a tree to be seen. Some saw Creation as arising out of water. Others viewed Creation as arising from the earth. Still others saw Creation as being delivered out of the sky. African systems of belief depended on people's interpretation of their environments and on their notions of what ought to be expected of them as social beings.

God

Almost every indigenous African religion revered a creator god who was a personal, palpable entity. He was usually male, although he often worked in partnership with a female. In general, Africans believed that he created the world, often by making sounds that became physical reality, sometimes by remaking matter—for example, turning water into land. God may never have been an exclusive deity in medieval African faiths; all seem to have him accompanied by other, lesser gods who often took care of earthly matters while the Creator refrained from intervening, except for special problems. In fact, the Creator might have used an intermediary to form the earth. For example, in the Yoruban story of Creation, a supreme deity, Olodumare, has the idea to create the earth, but he sends one of his subordinates, Obatala, to do the actual work. He gives Obatala a gourd that contains a piece of earth, which is the means of divine creation, as well as a hen and a pigeon. From these Obatala creates the earth out of the waters of the cosmos and gives it trees and other kinds of life. Then Obatala is told to create humans to populate the earth, but he finds and drinks some palm wine, perhaps left by Esu, Olodumare's messenger and a trickster. Obatala becomes drunk and makes deformed people. Olodumare sends the god Oduduwa to check on Obatala, and it is Oduduwa who takes the gourd and uses its creative power to make human beings in his own way.

This outline of the Yoruban Creation story may seem simple, but in its fullness it is subtle and complex. For instance, the earth is like the gourd, which when it floats on water is only half submerged; the earth, too, is divided, with the upper half being the world of the living and the lower half being the world of human spirits. Further, even though Obatala and Oduduwa seem to do most of the work, Olodumare is considered the Creator because he provides the life force: The humans fashioned by Oduduwa become alive only when Olodumare breathes the life force into them. For many African religions, the Supreme Being was manifested in the vitality of life; he supplied the life force that gave vigor to people, plants, and animals.

God could be like Olodumare: remote and probably not even human in appearance. When he caught human beings wiping food off of their faces with the sky, he pulled up the sky to take it out of reach of humans, and in the process, he took himself out of reach of humans. Nevertheless, many supreme beings were, at least for a time, on intimate terms with human beings. For instance, the Dinka believed that God created the first man and the first woman, named Garang and Abuk. He gave them grains of millet to grow at the pace of planting one seed per day, providing enough food to feed Garang and Abuk for one day at a time. One day Abuk was especially hungry, and she tried to plant two millet seeds. When she tried to strike the ground with her hoe to plant the second seed, she hit God on the toe. Miffed by this action, he ascended into heaven and cut the rope that connected heaven to earth, ending his physical day-to-day contact with human beings. Abuk was not necessarily a bad person because as an ancestor, she watched over women and their daily lives, and she presided over the making of millet beer.

ANCESTORS

To characterize African beliefs as ancestor worship would not be entirely accurate. Some Africans did indeed worship their ancestors, and sometimes historical figures became gods in some African religions, but in many cases ancestors were venerated but not worshipped. They were honored for their knowledge and what they could contribute to the lives of the living. In most cases, the existence of ancestral spirits was treated matter of factly as a part of everyday life. Beliefs about what happens to people when they die and where they exist in the afterlife varied among cultures, but in general Africans believed that the supernatural world was always present and that the spirits of their ancestors lived among them, even though these spirits were not visible to the living. Some religions went further, believing that the world of spirits not only was inhabited by deceased ancestors but also had spirits that were yet unborn. This idea had a certain grandeur, portraying

the lives of people as part of a broad universe that stretched from Creation into an indefinite future with human beings interacting with past, present, and future in their daily lives.

The roles of ancestors varied among African cultures, but in general ancestors were interested in human affairs and often participated in rituals, dances, and even everyday matters, such as family squabbles. Many western African cultures believed that ancestors were dependent on the living for their continued existence in the next world. It was the duty of the living to remember the dead. In some cases, the ancestors continued to exist just as long as their descendants spoke their names once in awhile. Others had their spiritual energy boosted through sacrifices of domesticated animals or by ritualized celebrations. Many secret societies existed in part to give renewed vitality to their ancestors by organizing dances, drumming, or feasts. Secret societies were secret not because they were hidden but because their rituals were private affairs for members only.

The making and wearing of masks were often important parts of keeping ancestral spirits alert and powerful, and some homes had masks that were used exclusively by society members. When someone donned such a mask and then danced, he or she could draw ancestors into the mask; a single mask might represent one ancestor but often could draw into itself several ancestors. Sometimes the ancestors would take possession of the mask's wearer and speak through the wearer. This connection was important during times of crisis, when the ancestors needed to be consulted about how to manage the crisis; the ancestors might give advice about how to fight off the effects of an evil magician, how to cure an illness, or whether to modify a local law.

Ancestors were often active in people's lives. If a man suffered misfortune, he and others would understand what the immediate cause may have been: monkeys raiding a crop, a kiln breaking apart, or a treacherously slippery rock causing him to fall. However, most Africans believed that there were secondary reasons for misfortune, and people wanted to know who made the monkeys come to the man's field, who wanted the kiln to break, or who put the slippery rock where the man would tread. The man would have to consult a priest or a priestess who had the training necessary for identifying the cause of the misfortune. Often the priest or the priestess would feed poison to a chicken; the answer depended on whether the chicken lived or died. The answer frequently suggested that the man had violated social rules of conduct: He may have been cruel to a daughter or too eager to accumulate material wealth rather than social goodwill, or he may have failed to mention the name of an ancestor as he should, and his ancestors therefore caused his misfortune. Showing kindness to the daughter, being more giving and less greedy, or

mentioning the ancestor often could cause the ancestors to forgive him and even give him good fortune in the future. Thus, ancestors not only mingled with the living but also enforced social behavior and worked to have the living behave well toward each other.

It was possible for ancestors to become gods, and several figures in African religions are believed by anthropologists and historians to have been actual people. Many cultures of western and central Africa have founding myths that tell of a person with special knowledge who migrates from another land but founds a new culture, to which he or she brings special metalworking skills, special grains for farming, or better ways for organizing a village community. Anthropologists often regard such stories as having elements of truth, perhaps representing an actual migration that over generations became a story of heroes who make life better in new lands. During the medieval era the ability to work with iron was important enough that most founding stories include an ancient leader who brings tools and metalworking skills to his new people. Indeed, blacksmiths were often regarded as spiritually superior people. They were consulted on public policy and spiritual questions because they were more connected to the supernatural world than were practitioners of other crafts.

An example of someone who was probably a real figure who became a god is Sango, the fourth king of Oyo, in modern-day Nigeria. Many African rulers were believed to be powerful magicians, and Sango seems to have been a wizard, because he would breathe fire and smoke from his mouth. He was also a cruel tyrant. Several stories exist to account for his deification, but all suggest that something bad happens to him and that he disappears from society. He experiments with a new spell that could draw down lightning from the sky. When he tries out the spell, he causes lightning to strike his home, killing most of his wives and children. One version says that this incident is an accident and that he hangs himself in grief. In another version he murders his wives, and his own people cast him out of their society, forcing him to live in the wilderness. In each telling of his story, he eventually ascends to heaven, becoming the god of lightning and the sun, who would bring clouds and tornadoes to the earth. He acquires servants: Oshumare is the rainbow, who brings water to Sango; Afeke is the wind.

EDUCATION IN RELIGION

The beliefs in a spirit world of ancestors and of gods linked to human beings, perhaps by historical events, suggest not only that African beliefs were complex but also that they were systematic. Imagination was important to African religious practices, but it worked within the parameters of a coherent

universe in which the dead, the living, and those yet to live played roles. To offer guidance in relationships between the living and the spirits were people with magical powers, usually priests and priestesses, although leaders of secret societies, magicians, and blacksmiths could be spiritual guides.

The spiritual education of children usually began at the onset of puberty. Initiation rites involved rituals and study. Children usually were taken to a sacred spot where only people of their gender were allowed, and there they were taught the basics of the Creation, the founding deities of their culture, and the spiritual patrons of their local community. Among the San of southern Africa, the sacred places for initiation were areas of stones, often outcrops, where the lore of their religion had been painted on the rock faces. Often the educational process involved adding new paintings to illustrate ideas or events in a story while the lore was being taught. The rock paintings of the San are very ancient, perhaps the earliest dating to 27,000 B.C.E. These paintings indicate how durable the San religious beliefs may have been and suggest that in Africa teaching religion was fundamental to the initiation into adulthood: The learning process was intended to connect the children to their ancestors and to give them an awesome sense of being part of a very ancient lineage that connected them to the Creator. Boys and girls were expected to leave initiation rites knowing that they bore a profound responsibility to honor those who had gone before them by living upright lives.

Out of the many young people of a culture only a small number would become spiritual leaders. In some initiation rites children wore masks and seemingly would be taken over by the spirits of their ancestors, but such an event did not make them special spiritual leaders because everyone was supposed to have such experiences. Indeed, many community dances involved people connecting themselves to their ancestors through their movements. In some cultures people inherited spiritual callings, as blacksmiths did, with their lore of ritual passed from parent to child. In general, priesthood was a job for which someone trained. Sometimes a priest or a priestess would choose a young person to join the priesthood. Sometimes a sign revealed a youngster's aptitude for spiritual leadership; for example, a child might display healing powers or might talk to animals.

A person training for the priesthood had to exhibit commitment to the calling. For instance, in some central African cultures a priest or a priestess was forbidden ever to lie, was expected never to show anger, and was required to show respect to his or her elders by bending the right knee and touching the ground with the right hand. Such behavior clearly identified a holy person to others, and the priest's or priestess's respectful behavior would be returned by others.

Priests and priestesses had many duties, including caring for the sick and the injured, counseling the sad or the bereaved, forecasting the future, identifying evil magic, and conducting sacred rituals. Thus, the education process took years of hard work. A student had to learn the lore of plants, identifying those that helped heal wounds, those that when eaten cured a stomachache, and so on. Predicting the future was especially important in farming communities; the student had to learn to read the weather—to know what certain kinds of clouds meant at certain times of the year and what wind from a particular direction meant, especially if the wind were warm or cool. Such knowledge would enable the priest or priestess to warn of impending storms or to know when harvesting crops quickly was urgent because bad weather might destroy them. The quality of priests and priestesses varied as much as human personalities vary, and some seem to have abused their power. However, most seem to have had a commitment to their duties, and they eased the suffering of the sick and often helped resolve conflicts before they came to violence.

MAGIC

In medieval Africa people rarely made a distinction between religion and magic. The two were believed to be part of a supernatural continuum in which all aspects of spiritual life were connected. Wearing amulets to ward off evil, drinking potions to gain special powers, and even creating poisons to kill people were all supernatural acts that could come from both priests and magicians. There was a strong sense of good and evil. Visitors from the Near East to the sub-African nations of Mali and Ethiopia noted that the local people had strong feelings about justice in which the guilty were rarely forgiven but the innocent were seldom molested. Much of this commitment to justice came from customs of community in which every community member was bound to all the other community members by ancestry, crafts, and an unseen web of mutual favors in which being owed favors for good, generous behavior was more important than material wealth.

Misfortune could be caused by people practicing evil magic. This evil was often in the eye of the beholder: A magician in one village could be a hero for protecting the village's interests by casting spells that harmed a rival village, but in the rival village the magician would be considered a practitioner of evil arts that were forbidden to good people. A good magician, priest, or priestess might be employed to counteract the evil spells with good spells. Potions, enchantments, ancestors, and even deities could be called into the conflict, with the magician with the greater power winning. If evil spells won, for instance, by causing a blight on crops, it was understood that the local practitioner of magic was just not as skilled as the evil practitioner.

ANIMISM

Basic animism holds that the universe is full of spirits who are mostly indifferent to earth and humanity. Dealing with them is always dangerous because human beings mean little to them. Animism holds that anything can have its own spirit, from rocks to plants to animals. A visitor to an East African city-state in the 12th century noted that the local people believed that everything had its own spirit. However, the details of animistic beliefs of the region are vague.

Different cultures had their own variations on animism, suggesting that for many Africans, an animistic religion had preceded their religions of ancestor worship and of paying homage to gods. For instance, in some African societies woodworkers had supernatural powers because they carved masks and wooden images of the dead or of deities that were inhabited by the actual spirits of the dead or the gods during religious rituals. Finding wood suitable for such purposes meant that one had to locate a tree with the right spiritual qualities, something the woodworker was trained to do. Smelters of metal would talk to the spirits in the metal. Animals often had spiritual duties, especially acting as messengers for gods or as spirits aiding magicians. Even though Muslim and Christian missionaries often regarded such animistic beliefs as mere superstition, they were unable to stop converts from still talking to plants, animals, and inanimate objects, just as they were unable to shake Africans of their belief that their ancestors were present in their lives. Many Muslims found this situation to be advantageous; their ability to read and write meant that they had spiritual power, and Africans would often consult Muslims as they would consult a traditional African priest. This practice was one way in which Muslims won converts.

An example of animistic belief comes from the Kyama of Benin. It reflects a common occurrence in the medieval kingdoms of western and central Africa: disputes between brothers over the right to be king. There is a long and complex story about King Ozolua, who has two sons. The legal heir is Esigie, a physically weak but highly intelligent man. The other son, Aruan, is physically strong but not as intelligent as his brother. King Ozolua favors the quiet and pleasant Aruan, but in contests between the brothers Esigie always wins. In spite of the law, King Ozolua gives Aruan the symbols of kingship: a magic sword and a special necklace. When the king dies, Esigie steals the king's corpse and buries it in the town of Benin, even though the king had wished to be buried in the town of Udo. Aruan charges a slave with preparing a place for him in the next life, and the slave creates a huge lake where Aruan can go. When Aruan goes to war against his brother, he tells his servants that if they hear him ring a bell he has fastened

to hairs on his chest, they will know that he is dead and can throw all his wives, slaves, and possessions into the lake. As he rides to battle, the bell falls from his chest hairs, and his servants hear it ring and obey his orders. In grief, Aruan drowns himself in the lake. Esigie of Benin becomes the ruler of the kingdom. Aruan's spirit inhabits the lake, and every five days, once a week in his culture, he emerges from the lake and wanders Udo. The elements in this story are animistic because the story tells of the origin of a lake spirit.

CHRISTIANITY AND JUDAISM

Medieval Nubians were probably the descendants of the ancient Nubians who had been the principal residents of the upper reaches of the Nile since ancient times and people who migrated into Nubia in the late third and early fourth centuries, intermarrying with the local people. Much of the history of their lands during the medieval era is still unknown, although archaeologists have found some documents from the era as well as many impressive stone buildings, suggesting that for a long time the people of the medieval Nubian kingdoms prospered.

In about 540 two separate missions were sent from Constantinople to the Nubian kingdoms, representing two different schools of Christian thought. Empress Theodora (ca. 500–48) sponsored a Monophysite mission. The Monophysites believed that Christ had a single divine nature. Although the Council of Chalcedon declared the Monophysite belief heretical in 451, the Coptic church of Egypt and some Syrians adhered to the Monophysite view. Emperor Justinian I (r. 527–65) sent a mission that represented the Eastern Orthodox point of view, opposing the Monophysites. In a ploy of the sort that gave Byzantine intrigue its notoriety, Empress Theodora persuaded the Byzantine governor of Egypt to delay Justinian's mission while hers was allowed passage into the Nubia in 543, beginning the conversion of Nubians to Christianity.

Among the changes Christianity brought was the adoption of Greek as an official language. Greek was still in use in the late 12th century, more than 500 years after the fall of Egypt to Muslim armies. During the 10th century the Nubian language was used in religious documents, in a modified version of the Coptic alphabet. By the ninth century Christianity in Nubia was apparently unified under an eparch, a term derived from provincial officials of the Byzantine Empire and in Nubia given to a bishop of the Coptic Church.

The societies of the Nubian kingdoms took on many of the trappings of a Near Eastern state, with fortresses in the Byzantine style and armies clad in chain-mail armor astride fine Arabian horses. It seems that at least the capitals of the kingdoms were cosmopolitan and included people of vari-

ous beliefs, including Muslims, who lived in their own sections of town. Church and state were separate in the Nubian kingdoms, but political leaders liked to display their faith by constructing churches, many of which survive, albeit often in ruins. In general, a church would be rectangular with interior columns and a curved apse at one end with an altar before it. The churches were decorated with paintings that resembled those of Byzantine churches. They may show that the Byzantine influence remained strong among the Nubians, or they may indicate continuing contact with Byzantine artists. Some city churches and monasteries were built with stone, but more often mud brick was used. Most of these sites have yet to be studied by archaeologists, and some archaeologists hope to find written records preserved in some of them.

Much more is known of the practices of Christians in Ethiopia. Although their main church was the Orthodox Tewahedo Church, which was a Monophysite church, Ethiopia also had a minority of Christians who followed the teachings of the Eastern Orthodox Church of the Byzantine Empire. The kingdom of Ethiopia derived from the ancient kingdom of Axum, which had a mixed culture of the peoples of Yemen and of eastern Africa. During the medieval era Ethiopians believed that their dominant religious faith had once been Judaism. In about 341 Syrian Christians converted King Ezana of Axum to Christianity, and King Ezana made Christianity the state religion. In 346 one of those Syrians, Frumentius, was appointed bishop of Axum by the patriarch of Alexandria. This act began the tradition of having bishops appointed by the patriarch of Alexandria.

These bishops rarely had much power. On occasion they tried to wrest some control of the church for themselves, but in general, the power to appoint church officials belonged to the king. After the seat of government moved from the city of Axum into the Ethiopian highlands, there were two principal dynasties. One was the Solomonid Dynasty, whose monarch claimed direct descent from the Queen of Sheba (believed to be Makeda, r. ca. 1005–ca. 955 B.C.E.) and King Solomon of Israel. The other was the Zagwe Dynasty, which claimed that its monarchs descended from Moses. Although its greatest monarch, King Lalibela (fl. 1200), built some of Ethiopia's most impressive churches and was regarded as a good king, most Ethiopians believed the Zagwe Dynasty to be usurpers of Ethiopia's proper dynasty, the Solomonid Dynasty, which was restored in 1270.

During both dynasties the Christian church was tied to the government. Kings and nobles displayed their loyalty to the church by giving it expensive gifts and by building churches and monasteries. The people of Ethiopia were profoundly religious and honored those kings who were generous to religious institutions. Christianity gave Ethiopians a strong

sense of national identity that persisted through Muslim invasions. Their founding story tells of how the Queen of Sheba, who lived in what is now Yemen, journeys to Jerusalem and there is seduced by King Solomon. Their son is Menelik, who refuses Solomon's wish that he be Solomon's successor. When he leaves Jerusalem for home, Menelik and some friends steal the Ark of the Covenant and carry it through Egypt to Ethiopia, where it remains in the monastery Mariam Tsion (Mary of Zion). Menelik becomes king, and the kings of Axum and the Solomonid kings of Ethiopia are his descendants.

The medieval Ethiopian church retained many aspects of Judaism, such as following some of the dietary laws. The official Old Testament varies from that of other Christian churches in the order of its contents, and in the case of the three books of Maccabees, the actual content of the text is unique to Ethiopia. Priests and monks were treated with reverence by the laity, and in general, they worked to deserve the reverence. The clerics were often the best-educated people in Ethiopia, and they took care to preserve books, devoting much time to copying decaying books onto fresh pages. Their knowledge of law made them invaluable in the national justice system, and judges were often monks. Further, churchmen were part of the imperial government, giving advice to the king and helping shape national policy.

Not all Ethiopians converted to Christianity. Many people in southern Ethiopia remained animists throughout the medieval era. In northwestern Ethiopia many people remained Jews, known as Felashas. They adhered to the Jewish faith as practiced before Ethiopia became isolated by being surrounded by Islamic communities. Elsewhere Jews migrated south across the Sahara from North Africa, not so much to escape persecution as to find work. There were large kingdoms, such as Mali, and many smaller ones, and Jews with skills in crafts were welcome in those lands.

THE AMERICAS

BY KEITH JORDAN

NORTH AMERICA

Mississippian cultures of the eastern United States (ca. 900–ca. 1600) did not use writing, and much information in the form of oral tradition disappeared in the wake of epidemics introduced by Spanish explorers in the 16th century. Therefore, knowledge of Mississippian beliefs is fragmentary and based to some degree on speculation. The primary sources derive from archaeological finds—the remains of temples, artworks portraying supernatural beings, and burial sites—interpreted using the surviving beliefs of historic Native American peoples. Some later Native American groups, such

as the Dhegiha Sioux of the Great Plains and the Mushkoogens and Cherokee of the Southeast, seem to represent the actual descendants of some Mississippian chiefdoms. Others may be more distantly related but possess myths and rituals that were probably widespread in North America in Mississippian times. However, reading ancient art and architecture from the perspective of later peoples necessarily entails guesswork.

Like many Native Americans, the Mississippian peoples viewed the earth as a floating disk or turtle divided into four quarters by the four cardinal directions: north, south, east, and west. The world inhabited by ordinary humans and animals was the middle zone of a three-level universe. Above the earth was the sky realm, home of the sun and moon. The Thunderers, spirits in falcon form who brought storms, also inhabited the sky realm; lightning flashed from their eyes, and the beating of their wings created the wind. This upper world was characterized by order and associated with chiefs, rulership, and human life. Beneath the earth lay the watery underworld, a dangerous place of chaos, monsters, darkness, and death but paradoxically the source of the fertility of crops and game animals as well. Its inhabitants included the *piasa*, or horned serpent, a creature combining the features of snakes, panthers, and deer. The same creature was sometimes portrayed with wings in the sky realm, and the Mississippians may have believed that the underworld rotated over the earth in the evening to form the night sky. The horned serpent was locked in perpetual conflict with the Thunderers and other sky beings, including the planet Venus as the morning star. Ritual practitioners could enlist the aid of one or both of these realms in magical practices.

The three levels of the universe were connected by a vertical axis that passed through the center of the earth. This axis was pictured as a tree, often a cedar, spanning the worlds, and in the night sky it took the form of the Milky Way, the path of souls to the afterlife. Caves and rivers were viewed as portals to the underworld.

In myths preserved by later Native Americans, the morning star became a male hero known variously as Red Horn (for his long red hair), Red Man, and He Who Wears Human Heads as Earrings, among other titles. He was the model and patron for Mississippian chiefs, who wore shell earrings in the form of long-nosed human faces to imitate the hero's mythical ornaments. In later legends Red Horn and his companions play a stickball game with underworld beings—bears or giants—and defeat them. The heroes then kill the beings, and Red Horn marries a surviving enemy woman. Later, the beings return from the dead to defeat and kill Red Horn, but he is avenged by his sons, the Thunderers

or Thunder Boys, who destroy the beings and resurrect their father. In Mississippian art Red Horn is portrayed in numerous images of a warrior with bird wings and the eye markings of the peregrine falcon, a fierce predator. He carries a war club and the severed head of an enemy. Chiefs impersonated this heroic character in rituals and were buried in bird costumes, as evidenced by findings at the Cahokia archaeological site in Illinois and the Etowah site in Georgia. The legend seems to date to the beginning of Mississippian civilization; the image of a man with human heads as earrings appeared in paintings in a Missouri cave around 950 C.E.

Besides his identity as Venus, Red Horn also had solar connections, and the sun was another powerful deity. In Mississippian art the sun is represented by a cross enclosed by a circle, though this sign may also signify the earth. Later southeastern Indians kept sacred fires of four logs arranged in a cross pattern burning in town shrines to represent the sun on earth. These were not allowed to go out for fear of catastrophe, except when they were ritually renewed in an annual ceremony. Some later southeastern natives believed their chiefs to be descended from the sun god, and the Mississippian rulers may have shared this belief.

At Cahokia a mother or earth goddess similar to the later southeastern Corn Maiden or Corn Mother is depicted on stone sculptures. Later Mississippian chiefdoms seem to have neglected this female divinity in favor of Red Horn and other aggressive male figures. In general, the chiefs favored ancestor and warrior cults, while their farming subjects were more concerned with fertility rituals.

By the time Hernando de Soto (ca. 1496–1542) entered the Southeast, the Mississippian chiefdoms he encountered had specialized priests who owed their status to their extensive learning of sacred lore and long training, rather than to trance experiences like shamans, though the latter were present in southeastern Native American societies as well. Both chiefs and priests performed public rituals, and priests tended the sacred fires and the relics of deceased chiefs. Each chiefly town had a temple dedicated to the chief's ancestors, built atop a platform mound and reached by ramps or steps. Stored there were the bones of dead chiefs, which were venerated as sacred by their descendants, as well as images of the ancestors, ritual equipment, and the sacred fire. Periodically the temple was destroyed and the chiefly relics buried. Then the mound was enlarged and a new shrine constructed.

SOUTHWEST

As with Mississippian religion, an understanding of the beliefs and practices of the Anasazi culture depends on archaeological findings, interpreted through knowledge of the religions of the historical descendants of the Anasazi, known as the

Pueblo peoples. Pueblo peoples in more recent times conducted many rituals in kivas—round or square subterranean chambers built of stone or adobe. The Anasazi were building these structures as early as 1,200 years ago, and presumably they served the same religious purpose then. In modern Pueblo kivas a hole, or *sipapu*, sunk into the floor represents the opening through which the mythic ancestors of humans emerged to settle the earth after journeying through successive levels of the underworld. The same feature appeared in Anasazi kivas and presumably had a similar meaning.

Our knowledge of the Anasazi religion during the period when the Chaco culture dominated the Southwest (ca. 900–ca. 1100) is particularly fragmentary. Chaco Canyon, in the northwestern region of modern-day New Mexico, seems to have been a pilgrimage center attracting visitors from all over the Anasazi world. As an agricultural people living in a precarious desert environment and as ancestors of the Pueblos, the Chacoans probably practiced rituals aimed at promoting agricultural fertility. Chaco sites contain huge circular complexes, called Great Kivas, some with underground passages permitting priests or dancers to make dramatic appearances during rituals. It seems likely that a priesthood that developed into a ruling class governed Chaco.

The kachina religion practiced by the historical Pueblo descendants of the Anasazi seems to have originated around the turn of the 14th century. Pueblo kachinas first appear on painted pottery and rock art from the western Pueblo area in northern Arizona around 1275 to 1350 and in Pueblo murals possibly around 1375 to 1400. Although the kachina religion took its complete form in the Pueblo area, many of its deities and symbols came ultimately from Mesoamerica. Kachina-like images, including figures resembling the Mexican Feathered Serpent and Tlaloc, show up in the rock art of the Mogollon culture in southern New Mexico two centuries earlier. In historic Pueblo belief kachinas were rain spirits, departed ancestors, or messengers between human spirits. They could manifest as rain clouds or as humanlike beings represented in masked dances and in dolls given to children as ritual gifts and as a form of religious instruction. As rain spirits, their primary role was to ensure a sufficient yearly harvest for each community. There were many individual kachinas—more than 400 among the modern-day Hopi, for example. The kachina cult still serves some Pueblo communities as a means of promoting social cohesion and group identity, and in the early 20th century they still served as a means of social control. Families with hereditary rights to the ceremonies and costumes were influential in enforcing social norms.

Kachinas similar to those impersonated by Pueblo dancers today are recognizable in Anasazi kiva murals 600 years

old as well as symbols connected with the Pueblo kachina cult. A stepped-mountain design called the *tableta* represents clouds and human breath. Possible depictions of later Hopi mythic beings appear in 15th-century Anasazi kiva paintings at Awatovi in present-day Arizona. These include Squash Maiden, an agricultural spirit, and Kokopelli, a trickster and fertility spirit portrayed as a hump-backed flute player. In kiva murals from the same period at Pottery Mound and Kuaua in modern-day New Mexico, lightning, raindrops, rainbows, and plants feature prominently, underlining the importance of rain in Anasazi religion. Male and female ritual specialists are illustrated, carrying staffs and prayer sticks like those still used by the Pueblos.

MESOAMERICA

At the time of the Spanish conquest (1519–21) the Aztec and related peoples in the highlands of central Mexico shared a basic system of cosmology and ritual practices, with some local variations. Unlike the paucity of information on cultures in North America and the Southwest, in Aztec Mexico detailed written accounts by 16th-century Spanish conquistadors and missionaries like Diego Durán and Bernardino de Sahagún and their native informants have been found describing the beliefs and practices of the conquered peoples and fleshing out the picture derived from archaeology. Still, care must be taken in interpreting these sources. Because most were intended to justify conquest and forced conversions to Christianity, they are heavily biased against the native religion. The primary goal of even the most detailed records was not understanding but eradicating Aztec beliefs and bringing the Aztec into the Catholic fold.

The records also feature misunderstandings created by differences between indigenous and European concepts of the sacred. For example, the Spanish, with their knowledge of the classical Greeks and Romans, assumed that the supernatural beings venerated by the Aztec were a pantheon of distinct gods, each with its own distinct role, personality, and image. In fact, the Aztec conceived of their deities as cosmic forces that could overlap and exchange identities among each other, forming a mythology far less rigid than that of the classical Greeks or Romans. Some modern scholars have even denied that the Aztec believed in separate “gods” at all.

Like the Mississippians, the Aztec divided the universe into three basic levels: the underworld; this world, or the middle level; and the upper world of the sky. The upper world was further subdivided into 13 heavens, with the highest presided over by the creator gods, and the underworld into nine levels. The cosmos was divided into four quadrants based on the four cardinal directions, with a central vertical axis connecting the three worlds. Like the Mississippian peoples, the



Head of a deity; tuffa stone, Aztec culture, Mexico, 1100–1400 (Los Angeles County Museum of Art, The Phil Berg Collection, Photograph © 2006 Museum Associates/LACMA [M.71.73.180])

Aztec represented this central axis as a gigantic tree, but it was also symbolized by mountains. In addition, mountains were viewed as the hollow repositories of water and plenty and as entrances to the realm of the rain god. For the Aztec the center of the world and juncture of the levels was the great pyramid temple at the center of their capital city, Tenochtitlán. Each cardinal direction had its own symbolic color and significance. East, placed at the top of Aztec maps, was positive, the direction of the rising sun, while west, where the sun sets into the underworld, had negative connotations.

After death most people went to Mictlan, a dreary place of decay located in the north—in the underworld. More positive placement in the afterlife was not the result of moral virtue in life but the manner of death. Those who died of drowning, by being struck by lightning, or from water-related diseases went to Tlalocan, the paradise of the rain god. Warriors killed in battle accompanied the sun in its journey across the sky and returned to earth as hummingbirds or butterflies. Women who died in childbirth, seen as analogous to fallen warriors, assisted the sun in its nightly descent.

The present universe, called by the calendrical name Four Earthquake, was only the most recent in a series of successive creations followed by world destructions. The first world, Four Jaguar, had been populated by giant humans who

were devoured by jaguars when it came to an end. The second world, Four Wind, was destroyed by winds, and surviving humans became monkeys. The third world, Four Rain, perished in storms of fiery rain, while the fourth world, Four Water, was inundated by a great flood. The present universe would ultimately be destroyed by catastrophic earthquakes, and star demons would descend on the earth to devour humans. The Aztec hoped to delay this end by keeping the gods and cosmos well nourished with the blood of human sacrifices. These offerings were part of a reciprocal arrangement between gods and humans. At the beginning of Four Earthquake, the god Quetzalcoatl, the Feathered Serpent, created the current race of humans from the bones of past people, corn, and his own blood. A diseased and disfigured god, Nanahuatzin, sacrificed himself in fire to become the present sun, and many other gods immolated themselves to set the sun in motion across the sky. Quetzalcoatl and his rival, Tezcatlipoca, created the earth by dismembering a crocodile-like monster. Plants grew from her to benefit humans, but she demanded their blood. Humans were obliged to return all of these divine favors with blood sacrifices of their own.

Aztec pyramid-temples symbolized the mountain axis of the universe and the mythic mountain of plenty from the interior of which Quetzalcoatl stole maize to benefit humans. The Great Temple at Tenochtitlán represented another mythical mountain, Coatepec or Snake Hill, from the story of their chief god, Huitzilopochtli. According to the myth, Huitzilopochtli's mother, the earth goddess Coatlicue, became pregnant miraculously when a ball of feathers descended on her. Her 400 sons and her daughter, Coyolxauquihi, were scandalized by their mother's pregnancy and planned to kill her. Atop Snake Hill, Huitzilopochtli was born as a fully armed adult warrior and slew his attacking siblings, casting their dismembered bodies to the bottom of the hill. Aztec sacrifice at the Great Temple recreated this myth and symbolized the Aztec's triumph over their enemies when sacrificed captives were dismembered and tossed down the stairs. The Great Temple contained two sanctuaries. One, painted red, was dedicated to Huitzilopochtli. The other, decorated in blue, belonged to the rain god, Tlaloc. The temple symbolically united the opposites of the universe: fire and water, life and death, the war cult of the ruling class and the fertility cult of the common farmer. Indeed, the division of the universe into pairs of opposing but complementary forces—male and female, underworld and upper world, dark and light—was a major theme of Mesoamerican religion and art.

A full-time priesthood, with its own schools and internal hierarchy, served Aztec temples. Theoretically the Aztec ruler, or *tlatoani*, was also the chief priest. Priests performed human and animal sacrifices and officiated at other public

ceremonies. They performed penance by drawing blood with thorns and lived celibate, austere lives. Some priests specialized in divination, telling the fortunes of new babies and prospective marriage partners by their dates of birth in the Aztec ritual calendar, using folded books of bark paper or deer hide for consultation. Such beliefs were taken so seriously that some parents waited until a few days after birth to give a new child its calendar-based name to avoid the dire fate predicted by its actual date of birth.

Human sacrifice was quite common in the Aztec world—2,000 victims died at the rededication of the Great Temple by the ruler Ahuitzotl—and served political as well as religious functions. Most sacrificial victims were war captives who had their hearts torn out atop the pyramid-temples. In some cases parts of the body were cooked and eaten by the captors of the victim, and the skull was placed on a skull rack for public display. Besides pleasing the gods, these bloody theatrics must have intimidated opponents and potentially rebellious vassals. A few special captives of great physical beauty might be treated as impersonators of specific deities and live lives of luxury as earthly deities before finally being sacrificed. The Aztec sacrificed children to propitiate the rain god, Tlaloc; their tears were supposed to bring rain.

Our understanding of Mayan religion is increasing because of the great advances made in deciphering Mayan hieroglyphs over the past few decades. In addition to archaeological finds and inscriptions from the Classic Period (ca. 250–850 C.E.), we have a remarkable mythic epic, the *Popol Vuh*, preserved by the Quiche Maya people of Guatemala until the 16th century and translated into Spanish. The surviving version of this saga seems to represent a portion of a much older and longer set of stories, some of which we can reconstruct through scenes painted on classic Mayan vases and the accompanying texts.

Like the Aztec, the Maya inhabited a three-level universe, with underworld, middle world, and sky or upper world connected by a vertical axis in the form of the World Tree, which held up the sky in the north. The Maya identified this tree with a local species, the ceiba. In the night sky the central axis took the form of the Milky Way, which for the Maya, as for the Mississippians, was the path followed by souls leaving the world at death and entering at birth. Shamans and kings could travel to the upper and lower worlds along the central axis through trance states induced by bloodletting and the use of hallucinogens. Because the king's ritual duty was to mediate between the supernatural worlds and his people to maintain the well-being of his kingdom, Mayan rulers were symbolically equated with the World Tree.

As in the Aztec religion, the underworld of the Maya, called Xibalba, had nine levels. It was a watery chaos, dark,

foul smelling, and full of disease. Caves were portals to Xibalba. In temple architecture they are represented in entrances shaped like monstrous mouths. The Mayan rulers entering these temples to commune with gods and ancestors on behalf of their subjects thus symbolically entered the land of the dead. Architecturally, sunken ball courts also symbolized the entry to the underworld. Xibalba rotated above the earth during the evening to become the night sky, while the sun god traveled through the underworld. The sun and stars traveled across the sky along the body of a great serpent. The earth was a floating square, disk, or reptile divided by the four cardinal directions, and as with the Aztec, east and west were associated with birth and death, respectively

Like the Aztec, the Maya believed that their world was only the last of a series of creations. In earlier efforts the gods created humans from animals, then from mud, and then from wood. These failed experiments lacked understanding, displeased their makers, and were wiped out in catastrophes. Modern humans were created from maize but initially were too smart for their makers' liking so were given limits on their understanding. The present world began in August 3114 B.C.E., the date used as the start of the Maya's Long Count calendar. Its creation seems to be the consequence of events described in the *Popol Vuh* and in earlier classic art. In the original version of the story, the Maize God and his brother disturbed the Lords of Death, the rulers of Xibalba, with their playing of the Mesoamerican ritual ball game. They were challenged to a game against the Lords of Death, defeated through trickery, and executed. The Xibalbans hung the Maize God's head on a tree in the underworld. When the daughter of one of the underworld rulers approached the tree, the head spit on her and magically impregnated her. Fleeing the wrath of her father, the underworld princess gave birth to the hero twins Hunahpu and Xbalanque.

After many exploits the twins, who shared their father's fondness for the ball game, also irritated the rulers of Xibalba by their playing and were summoned to the underworld to play against the Lords of Death. Through their guile and the aid of animal allies, the twins overcame the tricks and traps of the Lords of Death. As a ruse they allowed themselves to be killed and then resurrected in the guise of traveling magicians. Under this appearance they enthralled the underworld lords with an amazing trick—killing and then bringing each other back to life. Impressed by the trick, the Lords of Death begged the twins to demonstrate it on them. The twins obliged by killing them but did not resurrect them. Having defeated their father's killers, they then magically raised him from the dead. The newly resurrected Maize God created the present universe by raising the World Tree, separating earth and sky from the waters of primordial chaos.

Although at the time of the Spanish conquest the Maya had a separate priestly class, during the Classic Period the king was the chief ritual specialist. Mayan kings are portrayed on classic monuments drawing blood from their tongues and genitals in rituals aimed at making contact with royal ancestors. These rites were thought to open up portals between worlds represented in art as Vision Serpents, supernatural snakes from whose jaws emerge figures of ancestors and gods. The blood loss may have induced altered states of consciousness producing visions of these beings. Hallucinogens—some depicted as being delivered through enemas—may have facilitated such experiences. These rites took place in the small enclosed spaces of the temples atop stepped pyramids. Additionally rulers sacrificed war captives, usually by decapitation, to summon gods and ancestors and performed rituals to mark the end of many periods within the Mayan calendar. Kings are often depicted with green jade costumes and features linking them to the Maize God. As the Maize God had been killed by the Lords of Death and resurrected, and the new corn sprang forth from the seed, so the Mayan lords hoped to be reborn as gods after their descent to the underworld at death.

THE ANDES

The Moche of the north coast of Peru (ca. 200—ca. 800 C.E.) are known only from archaeological evidence, but that is sufficient to show that their rulers presided over the violent sacrifice of victims procured through ritualized combats. Scenes painted on decorated pottery and murals show a ritual called the Sacrifice Ceremony by archaeologists. Prisoners of war have their throats slit, and the blood is presented by a figure in a bird costume, dubbed the Bird or Owl Priest, to a richly clad man, the Warrior Priest. A female ritual specialist, the Priestess, also figures in the narrative. Royal burials from the sites of Sipán and Huaca de la Cruz show that Moche elites actually dressed in these costumes, presumably in life as well as to their graves, and the ceremony was doubtless a real ritual practiced at Moche sacred sites. Whether by donning these outfits the Moche lords also impersonated deities remains uncertain. Other scenes depict the sacrifice of humans atop mountains. Remains of such practices survive at Cerro Blanco, where young warriors were clubbed to death and their bodies cast from heights to (unsuccessfully) end a period of serious flooding and weather disturbance.

Besides elite ritual leaders, some curers or shamans may have practiced their trades on the lower rungs of the Moche social system. Ceramic vessels show male and female healers like the modern native Peruvian *curanderos* carrying medicinal plants. Such healers may have experienced a more drastic version of a modern malpractice suit if they failed a patient; a

scene of a figure impaled on stakes near a king's burial site is interpreted by some archaeologists as a punishment for failing to cure the monarch, though he may simply be a victim dispatched to assist the king in the next life. We do not know much about the divinities venerated by the Moche, though supernatural beings with jaguar, reptile, and other animal features appear in their art. A repeated pattern that archaeologists call the Confrontation Scene shows an armed hero about to battle a mythic monster, perhaps an image of the conflict between order and chaos.

Our knowledge of Inca religion relies, as for the Aztec, on a combination of archaeological material and the writings of conquistadors and missionaries after the Spanish invasion of Peru in 1532. The conquerors' writings are subject to the same biases and distortion, and require the same caution in reading, as are those on Aztec religion. Like other Native Americans, the Inca divided the universe into upper world, middle world, and underworld and viewed the Milky Way as a world axis. Inca cosmology, however, places a somewhat greater emphasis on the duality of complementary opposites in the cosmos, reflected in dual social structures and dualities in the realms of nature such as the Andes and the coast, the earth and sky, and the sun and moon.

The supreme god of the Inca Empire was *Inti*, the sun god, and the Incan rulers were viewed as his descendants, sons of the sun. According to Incan legend, the first emperor and his family were created by *Inti* at *Tiwanaku* in Bolivia, where the gods themselves were born. The Inca dedicated their capital city, *Cuzco*, to *Inti*, and his temple there was covered with sheets of gold. As offerings to the sun they sacrificed llamas (frequently) and humans (less frequently) and burned luxurious textiles considered highly valuable because of the intensive labor that went into their creation. Miniature gold and silver images of humans, plants, animals, and even natural phenomena were kept in the temple as symbolic representations of the empire offered to the deity.

Like the Aztec city of *Tenochtitlán*, *Cuzco* was not just a political center but the actual axis or navel of the world. A series of imaginary lines, called *ceques*, radiated out from this central hub of the universe, dividing the empire into distinct ritual zones. The *ceques* could also be traced by pilgrims and priests over the landscape by reference to geographic features viewed as sacred. Called *huacas*, these features could be natural, human made, or an integration of both, connoting objects charged with spiritual force. Unusual rock formations, trees, springs, and mountains could all be *huacas*, as could deity images and the mummies of venerated ancestors. In the vicinity of *Cuzco* were 328 *huacas*, and many more were scattered throughout the empire. Human sacrifice of children aimed at promoting the integrity of the empire and the ruler's

health took place at sacred areas as distant as islands off the Ecuadorian coast and 13,000-foot Andean peaks in Argentina, all linked by radiating spiritual paths. The remains of some of these sacrifices, frozen by the mountain climate, have survived intact to be discovered by archaeologists.

As a vast empire of many conquered groups, the Inca realm was home to many diverse religious traditions. *Inti* and the creator god, *Viracocha*, were popular deities in the Andean highlands, while on the desert north coast, where the sun was less well regarded, moon and sea goddesses were favored by the *Chimú* and other conquered peoples. Predominated on the south coast were *Pachamama*, the earth goddess, and *Pachacamac*, god of earthquakes. At a site of the same name, *Pachacamac* had his own oracle whom pilgrims consulted before it was struck dumb by the arrival of the Spanish in 1532. To keep their subjects in line, the Inca removed god images and other *huacas* to *Cuzco*, to be held hostage in case of potential rebellion.

Rivaling the gods and other *huacas* as objects of worship were human ancestors. The Inca kept the mummies of important family members above ground or in open tombs for continued contact and consultation by their descendants. Mummies of royalty and their attendants could acquire sufficient power to threaten the influence of the living monarch, a situation the last Inca emperor, *Atahualpa*, took measures to correct.

ASIA AND THE PACIFIC

BY KENNETH HALL

Asia's medieval religions evolved from local animism (worship of spirits associated with the natural order) and ancestor worship into new faiths that addressed a single universal divine. Like the Christian monotheistic tradition of the Trinity (God the Father, Son, and Holy Spirit), the universal divine in Asian religions might have more than one form of existence or even many forms. Indian religions such as Hinduism and Buddhism focus on humanity's desire for a life after death. In contrast, Chinese religions consider humanity's place in the world, whether in relation to the realm of nature (Daoism) or in celebrating human relationships as they are essential to an orderly and productive society (Confucianism).

ANIMISM

Traditional Asian and Pacific island animism, widely practiced during the medieval era, was based on local belief in spirits that populate the realm of nature and the realm of humanity. These spirits were revealed in dreams, trances, and a variety of supernatural experiences, including human encounters in this world with ghosts or other spiritual pres-

ences. Agricultural cults that had developed from earliest times assigned a special role to the spirits of the soil, plants, and weather as well as local guardian spirits associated with sacred rocks, trees, or sources of water. Local agricultural productivity was believed to result from a partnership between humanity and the spiritual forces of the natural realm. Ancestor cults honored the spirits of deceased relatives who occupied a parallel realm to that of humans.

Animists believed that spirits could flow from one realm of existence to another in ways that humans could not. Humanity occupied a middle realm, while below the earth were domains of both benevolent fertility spirits and dangerous forces of evil. Although the negative forces could never be eliminated, animistic rituals tried to neutralize their ability to do harm. In contrast, generally positive forces occupied the celestial realms above earth and needed to be acknowledged in rituals to encourage their favor.

A chief or priest served as the intermediary between the earth deity and ancestors, on the one hand, and the human community on the other. This intermediary performed rituals, sacrificial offerings of food, animals, and at times even humans (slaves or war captives) to assure the fertility of livestock and crops and the general good fortune of the community. Prosperity was not seen as the product of human labor, but as the work of the gods. Economic productivity was the consequence of healthy relationships between human producers and supernatural forces.

In Japan the belief system known as Shinto united the local cults and their spirits into a hierarchical order with a single deity at the top, the sun goddess. In China the realm of the natural spirits was the basis of Daoism, and ancestral spirit worship was embraced by Confucianism. East Asian Confucian states such as China, Korea, and Vietnam promoted the cult of the Mandate of Heaven, which made the emperor the supreme intermediary between the ancestral divine and humanity. However, local folk religions remained potent despite official sanctions and attempts to consolidate local deities into a state-approved religion. China's urban leaders dismissed folk religion as the superstition of the countryside, but they incorporated local guardian deities into their dynastic rituals as subordinates to the celestial divine worshiped by China's emperors.

In India medieval-era Hinduism continued to evolve as a blend of preexisting local animistic worship of female fertility spirits with Vedic religious tradition that focused on the spiritual realm of the male ancestors and was favored by northern India's ruling elites. (The word *Vedic* comes from the Vedas, which were stories, poems, and proverbs transmitted orally for a thousand or more years before being written down in the 300s B.C.E.) The stone *linga*, or male phallus, was



Vishnu with consorts; stone, India, Pala or Sena Dynasty, 12th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1927-7)

portrayed united with the female vulva as the object of ritual celebrations in animistic India. It was equivalent to a post, tree, or stone in which the earth deity and ancestors were believed to materialize. Medieval-era Hinduism universalized these local divinities, as the *linga* became symbolic of the deity Siva, whose specialty was assuring agricultural fertility and human health.

COSMOLOGY

As early Asian societies formed into hunting and gathering cultures, they composed oral myths to honor their legendary ancestral heroes and the spirits of nature, to whom they believed they owed their livelihood. Myths provided practical explanations and solutions to everyday needs. Commonly Asian myths became the basis of medieval-era cosmologies, which explained that humans came into existence by the actions of a god, gods, or a divine source that established a continuing bond between the earthbound world of humanity and the supernatural world of the divine. This outlook established a hierarchy in which humans existed below the gods and other supernatural beings, but above animals and plants.

The realm of the spirits was acknowledged in regular private and public rituals. These local spirit cults might be formalized into a universal animistic rural tradition as in Japanese Shinto; more commonly they were incorporated into Hinduism, Buddhism, Daoism, and Confucianism as subordinates of the universal celestial divine. What had begun as oral traditions were eventually compiled and written down by clerics associated with the medieval-era courts, but these were continually supplemented by new folktales.

As with other Asian societies, early Japanese rural populations associated their folk deities with the forces of nature, which could either help or harm human beings. Japanese cosmology began with the divine brother and sister Izanagi and Izanami, who created the Japanese islands and gave birth to the sun goddess Amaterasu, the guardian deity of the Japanese people (which is why Japan is the “Land of the Rising Sun”). The sun goddess hid in a cave to escape early human violence. Her withdrawal temporarily stopped the sunlight and jeopardized human civilization until she was lured out of hiding. The cave’s entrance was covered with a jeweled necklace and a mirror to reflect her image, and its doors were held open by a large rope to prevent her from returning to her cave. The necklace and the mirror became the sacred objects of her worship in the Shinto tradition, and a Shinto shrine is built around an altar that is framed by a large rope, which symbolically holds the altar’s doors open to prevent the local guardian spirits (*kami*) from returning to their “cave.”

Chinese cosmology highlighted the Jade Emperor, the ruler of heaven and earth and of the other high divinities in Chinese folk religion. The legendary exploits of the Three August Ones and the Five Emperors were associated with events that made Chinese society and culture possible. The Three August Ones included the creator of humankind and the inventors of fire and farming. The Five Emperors were wise and morally perfect sages who continued this evolution. One of them was the legendary Duke of Yu, who dredged the rivers to control the flooding of the Yellow River and thus made

possible not only the settlement and cultivation of the north China floodplain but also the rise of dynastic government.

Asian creation myths told how humanity came to be. In one Chinese tale Pan Gu was the first living thing. He emerged from a giant cosmic egg that contained the opposite forces of yin and yang. Yin (energy that supposedly is soft, dark, receptive, and “female”) and yang (energy that supposedly is hard, bright, active, and “male”) fell from the egg. Yin formed the earth and yang the sky. Pan Gu himself became the source of the third element of the trinity of earth, sky, and humankind.

In Japan’s origin cosmology, as related above, earth and sky were deities of different sexes, male being sky and female being earth, who together eventually produced human offspring. Also, the Japanese creative energy source that allowed human existence was not celestial, but the sea: The god Izanagi and goddess Izanami stirred the waters of the sea to produce land that they later made into the Japanese islands, which they populated them with their many children, including the sun goddess Amaterasu, from whom descended the emperors of Japan.

In the original Indian creation myth contained in the Vedas, which in their original oral form dated to roughly 1400 B.C.E., the celestial divine force Varuna’s sacrificed body parts were the source of human existence. By medieval times Hindu and Buddhist clerics based their teachings on the Indian Upanishads (oral origins ca. 800 B.C.E.). They attributed creativity to a force contained within a cosmic egg, Brahman, which continued to exist as the source of cycles of rebirth in the Hindu and Buddhist religious traditions.

TRANSCULTURALISM, CREATION, AND GENDER

Asia’s major medieval-era faiths, Confucianism, Hinduism, and Buddhism, were notable for their transcultural appeal. As they spread to new locations, they took with them aspects of their Indian and Chinese homelands, including these cultures’ preconceptions of how society should function. Although these creeds claimed to be universal and inclusive, the medieval-era states that adopted them were generally tolerant of preexisting local religious beliefs. Most Hindu, Confucian, and Buddhist rulers allowed the practice of other faiths as long as all their subjects acknowledged the supremacy of the state’s chief divinity.

Each of these religions, as well as Japanese Shinto and Chinese Daoism, acknowledged that both good and evil play important roles in the universe. These faiths sought to neutralize the negative rather than totally isolating or eliminating it. Asian religions universally taught that humans were born and remained basically good, not with a tendency toward evil. At the same time, they held that humankind was

especially vulnerable to societal disorder and to individual deviance from rules of moral conduct taught by elders or social superiors such as priests, sages, and government officials. Those who strayed, however, could be redeemed through proper education, charitable acts, and redirected personal efforts, including piety and meditation.

Although they generally advocated a dominant social role for males, Asian religions embraced animistic beliefs that characterized women as having great spiritual power related to their status as a source of fertility. Japan traditionally thought of women as more complex than men, occupying the dual roles of potential mother goddess and she-devil. In Japanese oral mythology women were widely characterized as foxes and were thought capable of magically transforming themselves into any human or animal form.

In India's Gupta era (ca. 320–ca. 550) new religious texts modified earlier notions of male divinity that were based in a male-dominant war society. In medieval-era Indian religious tradition the female divine was approached either as a maternal intermediary, similar to the way the Virgin Mary and female saints are in the Catholic tradition, or as the female counterpart or wife of the distant and omnipotent male Absolute Divine. The Hindu and Buddhist religious traditions both developed the theme of male and female divine partnership. Neither male nor female divine could exist without the other, forming a celestial bond like that between a human husband and wife. Hindus and Buddhists considered the sacred bond between spouses foundational to society's success. In eastern Asia this more equal approach to gender was instrumental in gaining converts among those dissatisfied with Chinese Confucianism's inherent favoritism toward males.

THE SPREAD OF BUDDHISM

Buddhism had begun as a sixth-century B.C.E. reform movement against the rigid rules and caste hierarchy of developing Hindu India. Buddhism accepted the basic teachings of earlier Hindu scriptures regarding ritual and social order and the explanation of life and death. The Upanishads explained that a divine essence was the source of all existence and that human souls were created from this essence. Humans were expected to behave in morally pure ways, and if they did not—if they sinned—then they were subject to reincarnation. Reincarnation is rebirth in another human or animal form in the next lifetime, and countless deaths and rebirths occurred until the individual soul was cleansed of sin. Purity finally led to salvation, which allowed the soul to become one with the divine.

Buddhism, based in the teachings of the Buddha, the historical Gautama Siddhartha (b. 563 B.C.E.), rejected the

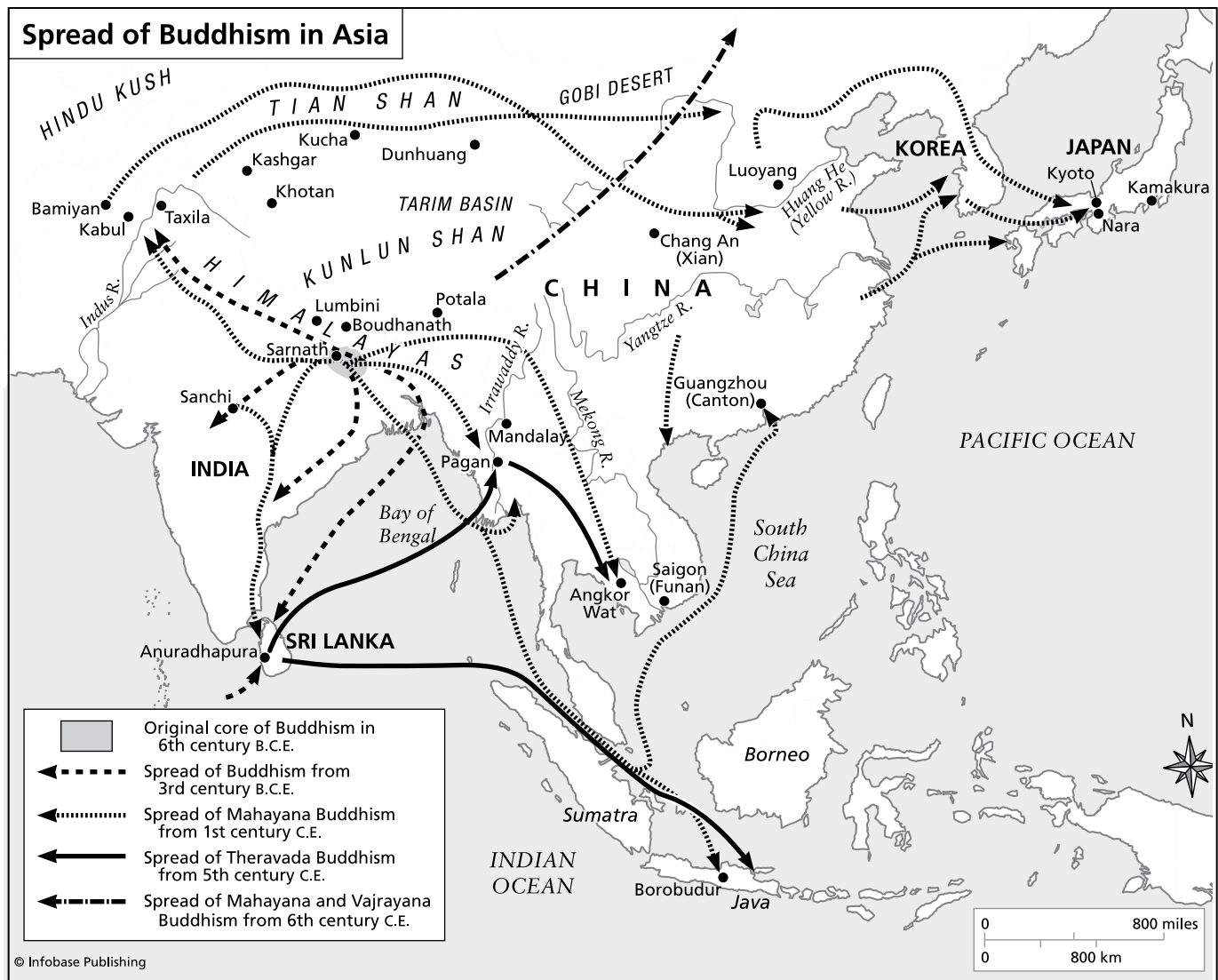
notion that only those who held elite positions in society or only males could gain salvation. Buddhism taught that moral thoughts and moral actions were sufficient in themselves. Buddhists criticized the Hindu scriptural emphasis on rituals and detached meditation as also being elitist and beyond the means of hard-working commoners. In the Buddhist "Middle Way," the key to salvation was rejection of self-serving material desires in favor of being a better member of society.

Through the initiative of enterprising monks, Buddhism spread in China following the fall of the Han Dynasty in 220 C.E. Much like the West following the fall of Rome, China entered an era of despair after four centuries of relative peace and stability. Like the West's acceptance of Christianity as a religious answer in difficult times, the Chinese turned to Buddhism as a logical solution to their troubles. Chinese found Buddhism appealing because it reinforced both the Confucian stress on living a moral life and Daoist respect for the simplicity and ultimate reality of the natural realm.

Above all, Buddhism provided details on life after death in ways the previous Chinese religions did not. By the seventh century China's rulers had accepted Buddhism as an official Chinese religion, albeit mainly as a source of rituals and philosophy appropriate to birth, death, and the afterlife, while Confucianism's humanistic creed remained at the base of everyday earthbound existence. Similarly, Buddhism's ability to fit with prior animistic religious practices and its doctrine of ethnic and gender equity allowed it spread to Southeast Asia, Korea, and Japan, where it was a central force in the founding of the Japanese imperial state.

In contrast to the early southern Asian literary tradition, which addressed religious issues, China's Confucian literary tradition was concerned with secular existence, and especially addressed the necessary conditions for successful governance. Early Confucian tradition dictated that Chinese literary expression conform to rigid standards and have some secular value.

Under the Tang (618–907) and Song (960–1279) dynasties Chinese literary expression flowered in a wide range of Neo-Confucian writings that attempted to blend the Confucian and Buddhist traditions. Buddhism advocated literary creativity as an appropriate exploration of the human mind, an idea that reinforced the traditional Confucian expectation of human self-discipline. The perfected individual might then be a more productive member of society. Scholars, popular writers, and poets debated whether there should be a limit on government leadership. They stressed the need to believe once again in the moral capacities of humanity, and thus argued for a less regimented society as the means to inspire human creativity.



Buddhism spread throughout much of Asia during the medieval period from its original center in northeastern India.

Medieval-era Chinese and Indian religious texts became the basis of oral recitations, theatrical performances, paintings, and temple and court iconography. The variety of these presentations engaged audiences in China, India, and neighboring Asian lands. Indirectly they provided lessons in Chinese and Indian history and ethics and allowed their diverse spectators to formulate a set of shared values. These values were essential to the creation of a sense of belonging to a common Asian community.

THE HINDU AND BUDDHIST TRADITIONS IN INDIA

Hinduism embodied the diversity of religious folk traditions in its pantheon of divinities, goddesses, holy men, and saints, as well as in local ancestor worship. The Indian caste system

defined who may and may not worship the highest divine. The system was based on an occupational hierarchy and reinforced by complex rules of ritual purity and pollution. Elaborately defined appropriate or inappropriate behavior was associated with each social rank, and only those who were ritually pure were allowed to offer sacrifices to the divine.

Under the caste system some occupations were more spiritually polluting than others. The purest occupation—and thus the one occupying the highest caste—was that of the Brahmin priest. Brahmins were greatly concerned with ritual purity. For example, they ate only certain foods (vegetarianism was preferred) prepared in carefully prescribed ways. They also limited their contact with anyone whose behavior, diet, or personal hygiene threatened their capacity to interact with the absolutely pure divine. A high-caste Hindu's daily

life was ideally spent engaging in required social behavior, observing rites of purification, and performing the sacraments of the life cycle: reading sacred scriptures and visiting temples to worship the divine.

The Hindu and Buddhist traditions offered alternative paths to spiritual well-being for those who were unable to achieve the highest levels of purity. These included worshipping local cults of particular deities or following a holy man or guru known for exemplary sanctity or supernatural powers. Devotional gift-giving and personal prayers and meditation were available to all, regardless of ritual status. Rather than reject the Hindu tradition, those of lower caste might also fulfill the social requirements and expected behavior of the upper castes—by not eating polluting foods and avoiding other socially unacceptable behavior, and especially practicing better hygiene. Such acts demonstrated that one was ritually purer than one's occupational position in the social order suggested.

The Buddhist concept of proper behavior related to merit accumulated through good deeds. Merit making was a way to ensure good fortune in this world and the potential of a life after death that would free an individual from the endless round of death and reincarnation. The Hindu-Buddhist doctrine of karma, or appropriate behavior, taught that correct actions brought positive results, while unwholesome deeds resulted in failure. Thus, everything that happened to an individual, good or bad, was tied to some action the person had performed previously, whether in this life or in an earlier one. The doctrine of karma attempted to explain one's fate as a consequence of one's past deeds, but it made no predictions about specific occurrences or when they might take place. Many Hindus and Buddhists turned to astrologers to determine future events in hopes of averting or minimizing misfortune.

CHINESE RELIGION

Neither the Chinese nor the Japanese typically thought of themselves as members of a single church. They compartmentalized their religions according to need. The worshipper went to a temple or shrine of the divinity he or she believed to have the most potential to secure the desired results. And in China, largely because of government suppression of organized religion by Confucian bureaucrats during the Tang Dynasty, there was no binding tie between the worshipper and a priest.

Chinese religion was ultimately based in the family, and families combined elements of Daoism, Buddhism, and Confucianism in their daily lives. There was limited acknowledgment of Buddhist or Confucian gods in family ritual, which consisted of lighting three sticks of incense in the morning

and evening, one outside the back door for wandering ghosts, one in the kitchen for the fireplace god, and one in the main hall for the ancestors. The fireplace god was especially important, since he was likely to report inappropriate behavior to his superior gods.

Properly worshipped ancestors were the family's benevolent protectors. Ghosts, on the other hand, were those deceased who had no descendants to acknowledge them. The Chinese believed that, at death, three souls departed the human body: One soul stayed in the grave and was like a stranger; another traveled to the Otherworld to be judged as a member of the wider universe or condemned to the realm of demons; the third stayed with the ancestral shrine and remained a family relative.

Chinese families kept ancestral tablets made of stone, metal, or wood on ancestral altars, with accompanying urns for incense sticks and food offerings. The ancestral tablets held the names of the male ancestors and their wives. These family ancestors were respected in the home and in community or family-clan temples and gravesites. The Chinese believed that



Bronze Buddhist altarpiece; China, Sui Dynasty, ca. 587 (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1914-21a-h)

deceased ancestors who were not properly worshipped might become potentially harmful ghosts rather than benevolent and loyal ancestors.

RELIGION AND SECULAR ORDER

The ideas of Indian religion and Chinese Confucianism were critical to the founding of Asian states, which emerged out of tribal societies. The medieval-era Indian ideal was the *mandala* state, a conceptual “heaven on earth” in which regional political authority centered on a sacred royal court, a court’s sacred temple complex, or a network of strategic temples sponsored by a monarch and his court elite. The monarch, as the focal center of the realm or as the chief patron of the realm’s temples, held power through his role as the gods’ delegated authority on earth; he might even be regarded as himself a divine being who had temporarily taken human form. A major debate in medieval Indian religious texts was whether the ruler should lead by moral example, with his subjects modeling their lives after his as a means of achieving their own salvation, or should rule by threat of force and direct physical action when necessary to maintain societal order. The greatest threat in the Indian and Chinese systems was the potential autonomy of the state’s temples and temple networks, and the popular empowerment of priests as the moral alternative to a ruler’s secular government. Chinese Confucian tradition resolved this dilemma by clearly distinguishing the state as a secular institution. The Confucian state centered on its urban capital, which was primarily an administrative rather than a ritual center. Professional bureaucrats who had passed civil service examinations filled the state’s offices, and priests could not hold bureaucratic appointments. The Chinese emperor was the topmost administrator of his secular realm.

This tradition of secular government was somewhat confused by the notion that the emperor served under the Mandate of Heaven. This concept in some ways resembles the European theory of the divine right of kings. In theory, an emperor received the mandate from the divinity as an assurance of divine favor and as divine acknowledgment of his capacity to rule successfully. If, however, the emperor became corrupt or ineffective, the mandate could be withdrawn and granted to another. The emperor was thus empowered by the divine but was also a human being ruling over a civil society in which the actions and decisions of humans determined the course of their existence on earth. A failed ruler who no longer held the mandate could be overthrown by public rebellion—which was regarded as a sure sign that the mandate had been withdrawn. In contrast, the Indian notion of kingship held that the monarch could be replaced only by direct divine intervention. Like Indian philosophers of government, how-

ever, Confucians disagreed whether the emperor should lead by moral example or by aggressively direct action.

The Chinese Confucian, Daoist, and Buddhist religious synthesis was adopted in neighboring Korea, Japan, and Vietnam with modifications reflecting local cultural values. The Indian Hindu-Buddhist tradition influenced Sri Lankan and Southeast Asian notions of social behavior and ritual hierarchy, but without inspiring local acceptance of the Indian caste system. In maritime Southeast Asia and in central Asia, initial acceptance of Indian Hindu-Buddhism was often superseded by conversions to Islam from the 11th century onward, but again with a mixture of local traditions with the newly adopted faith.

PACIFIC BASIN RELIGION

Pacific island populations shared with Asians a foundational animistic religious outlook, which they appear still to have held at the time of European arrival. Sea creatures, birds, and the heavens were vital spiritual forces. Islanders highlighted the role that ocean creatures played in protecting and guiding the voyagers who settled the far-flung Pacific islands in epic sea crossings that began in ancient times but were still occurring well into the medieval era. Polynesian religious tradition celebrated a divine brother and sister, Ru and Hina, who navigated the world’s seas to locate new islands appropriate for settlement. Hina remained as the moon, to guide voyagers across the ocean. The Maori acknowledged the legendary adventurer Kupe, who led a 10th-century Polynesian expedition to uninhabited New Zealand in double outrigger canoes from the Maori homeland, believed to be the Society Islands of the south-central Pacific. A subsequent 12th-century Maori migration led by the legendary chief Whatonga and his grandfather Tai, were said to be the New Zealanders’ forefathers.

Polynesians believed that humans and every other aspect of nature were descended from a Sky Father and an Earth Mother. In the beginning there was only darkness, Te Ponui, Te Poroa—the Great Night, the Long Night. Then the moon and the sun appeared and the heavens made light, and the Sky Father and Earth Mother began to live together, but their children still lived in darkness because their father dominated their mother. Their fierce son Tumatauenga (the god of war) urged his siblings to kill their parents, but their wise son Tane Mahuta (god of the forest) persuaded them to separate their father and mother instead. They eventually succeeded in doing so, thanks especially to the assistance of Rongo (god of cultivated foods) and Tangaroa (god of the sea), and thus night was distinguished from day. Tane Mahuta then fashioned a female divine from clay and through her created more gods.

The forest god's son Maui was responsible for New Zealand's creation: Maui "fished it up" from the sea. As a consequence, whenever Maoris cut down trees, they thank Tane Mahuta, the god of the forest, who they believe will continue to protect them from Hinenui-t-Po, the goddess of death.

EUROPE

BY KATHRYN DICKASON AND BRADLEY SKEEN

Medieval Europe was heir to the religious tradition of the Christian Roman Empire. During the Middle Ages the unity of the church crumbled away along with the political unity of the state, giving rise to the separate Eastern Orthodox and Catholic traditions. A small Jewish population was also present in Christian Europe.

As Christianity spread throughout the Roman Empire in the first three centuries C.E., the Christians in each city formed a single congregation that met together for church services and acted jointly for charity and other common purposes. As the number of Christians increased, large cities gained more than a single congregation. A bishop became the leader of all the congregations in a city. Leadership above that level was jointly administered by all (or at least a majority) of the bishops meeting in a council. After the emperor Constantine established Christianity as the official religion of the Roman Empire (313 C.E.), the emperor became the head of the church, with the right to appoint bishops. Four bishops became first among equals and were called patriarchs: those of Rome and Constantinople as the political capitals of the empire and those of the great cities of Alexandria and Antioch. They exercised a degree of influence over other bishops in their own local areas.

At the beginning of the Middle Ages the Western Roman Empire collapsed, though the Germanic successor kingdoms continued to be Christian. For this reason, the bishop of Rome wielded increasing authority over the western church as the last remaining international authority. Because of the growing split in language and culture between the Greek East and Latin West, the western church became increasingly independent. The bishops of Rome, traditionally called "pope" because the See of Rome had, according to church tradition, been founded by Peter, the senior disciple of Jesus, reasserted traditional claims to be the single paramount leader of the Christian world at the same time that contact between East and West reached its lowest level. In 1054 the Great Schism finally separated the two halves of the church. The pope and the patriarch of Constantinople agreed to disagree over the matter of church authority, recognizing the vast cultural and political gulf that separated the western European monarchies from the Byzantine Empire. Officially, however, the cause of

the dispute was the language of the creed expressing the common beliefs of all Christians, which had been promulgated in 325 C.E. by the Council of Nicaea. In the original Greek text of the section describing the Trinity, the Holy Spirit is said to proceed from God the Father. The Latin translation inserted the famous phrase *filioque*, indicting that the Holy Spirit proceeds from the Father and the Son, an irreconcilable difference.

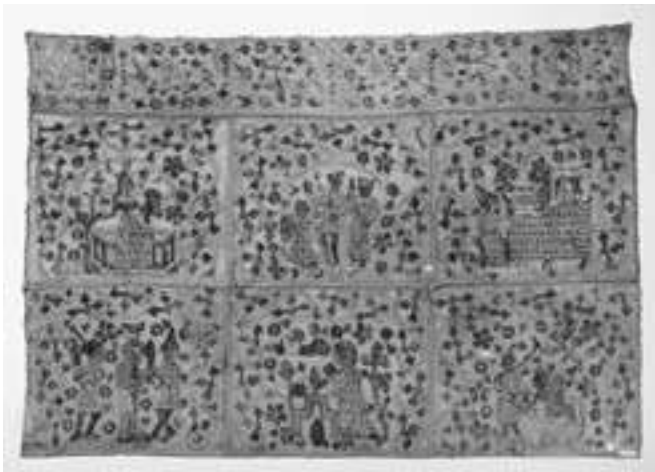
THE ORTHODOX CHURCH

Throughout the history of the Byzantine or Eastern Orthodox Church, doctrines were established by councils of bishops summoned by the emperors. Such councils were usually called in response to new theological ideas advanced by individual church leaders. The councils defined orthodoxy by rejecting unacceptable doctrines as heresies. Doctrinal disputes generally concerned the precise relationship between the human and divine elements represented in the person of Jesus. The Seventh Ecumenical Council in Nicaea in 787, however, resolved a major controversy in the Orthodox Church by permitting the veneration of icons (images of the saints), which many Christians of that time had wanted to interpret as idolatry.

During the Middle Ages the Orthodox Church was responsible for missionary work in eastern Europe and converted the newly arrived Slavic peoples to Orthodox Christianity. This was largely accomplished through the foundations of monasteries beyond the frontiers of the Byzantine Empire, which became centers of proselytizing activity. Monasteries in Russia became places of refuge at the time of the Mongol conquests of eastern Europe by 1242. By the end of the Middle Ages in the 15th century, the bishop of Moscow assumed a more important role as an independent patriarch, and his position was enhanced still further as the Mongols were gradually driven from Russia and after the conquest of Constantinople by the Ottoman Turks in 1453. Nevertheless, the patriarch of Constantinople remains to this day the leading figure in the Orthodox Church.

DOCTRINE AND THE CHURCH

Christianity is a monotheistic religion that grew out of the Jewish tradition. Jesus represents the central figure of the faith as well as God incarnate, as foretold by the prophets of the Hebrew Bible, or Old Testament. Christians conceive of the deity as a trinity (God the Father, Son, and Holy Spirit) that paradoxically composes a single divine entity. Christians interpret the life, death, and Resurrection of Jesus as revelations that justify his being the ruler and savior not only of his disciples but also of the world. They assert that his suffering and death were necessary to redeem the sin of humankind.



Altar frontal; polychrome silk and natural linen embroidery on natural linen, Germany, ca. 1380 (Los Angeles County Museum of Art, Purchased with funds provided by the Pierre Dupart Fund for Medieval Art and the Costume Council Fund, Photograph © 2006 Museum Associates/LACMA [M.79.48])

In their zealous attempts to spread the Christian faith, Jesus' followers attracted adherents in the East during the first century. Overtly critical of the Romans, many early Christians were tortured and persecuted. But as the Roman Empire declined, toleration grew. The Roman emperor Constantine (306–37) proclaimed Christian toleration in the Edict of Milan in 313. Following the First Council of Nicaea, Christianity became an official religion. The council, held in 325, was the first gathering of Christian bishops and resulted in the creation and ratification of a doctrine of beliefs and formalized rituals with which to practice the faith. Constantine's contributions were effective in universalizing Christianity throughout the empire. When Roman dominion weakened and eventually fell, the church assumed authority.

CHRISTIAN SOCIETY

In medieval Europe religion permeated the culture to such an extent that it was inextricable from most secular spheres. The term *Christendom* denotes this collectively molded ideology of society. All who belonged to the state of Christendom believed in Christ as their savior and founder. Church membership presented a ubiquitous activity in medieval life. As a highly communal form of worship, medieval Christianity was a unifying force of paramount importance.

Although the influx of Germanic peoples into the western territories in the early Middle Ages resulted in a relatively heterogeneous society, the newcomers were soon attracted to Christianity's ties to Roman civilization. Further, prominent Christian leaders waged "holy wars" to Christianize communities that showed resistance. Bolstered by the theo-

logical writings of Augustine (354–430), the church became instrumental in educating and reforming the world. As an earthly manifestation of the Holy Spirit, dedication to liturgical ceremonies was an indispensable means of attaining salvation. Thus it was not too long before Europe was overwhelmingly Christian.

In general, religious life in the Middle Ages can be viewed through two lenses. From the perspective of ordained clergy, piety was an eternal process of self-perfection that required intense devotion and a separation from the secular world. Because clerics were among the most learned people of their time (monks monopolized scholarship until universities were established in the 13th century), only the nobility had the means to attain ordination. On the other hand the laity (which included peasants as well as secular rulers) was involved in politics, guilds, and domestic spheres. They did not engage in the same devotional rigor as the clergy, but they did adhere to similar moral codes and participated in liturgical rituals. The church's influence over society was so penetrating that both the elite and popular cultures became unified through faith.

MONASTICISM

The term *monasticism* comes from the Greek word *monos*, meaning "alone." Medieval monks embraced solitude by withdrawing from society to pursue a spiritual life. They believed that the quest to find God demanded a renunciation of the world, which marked the first step toward asceticism, or an austere life devoid of worldly pleasures. In the third and fourth centuries the first monks escaped the sins of earthly existence by wandering the deserts of Egypt, Syria, Judea, and Alexandria. Several narratives of the so-called desert fathers were recorded by scribes and served as sources of inspiration for devotees in the West.

The Italian abbot Saint Benedict (ca. 480–ca. 547) allegedly composed a rule for monks that outlines the standard pattern of monastic observance. *The Rule of Saint Benedict* defines a monastic community as a single group of religious men cohabiting in a monastery, the official residence for religious men. According to the rule, each monastery must have one abbot, who functions as a paternalistic figure and a pastoral counselor for the novices (it being not uncommon for a member of the elite to give away a young child to God's service). The monastery must be an autonomous, self-sufficient house in which monks perform manual labor as well as ecclesiastical duties. The general ethos of the abbey should resemble one of docility rather than pride. Essential routines should include prayer, work, and study, all intended to shelter the monks from the dangerous sensuality of the world. During the Middle Ages more extreme ascetics inflicted punish-

ments on their bodies, such as self-flagellation and fasting, to imitate the suffering of Christ. Monasteries were often placed in remote areas, suggesting silence and frugality. When they were not in the chapel, monks often were reading in the library or hand-copying manuscripts in the scriptorium. All monks studied Latin because the Vulgate, which is the Latin version of the Bible, was the only translation acceptable to the Catholic Church.

Because monasteries could be expensive to build and operate, they depended on wealthy patrons. The motives of these benefactors may have been a mixture of politics and piety. They believed that their endowments would safeguard their souls and those of their relatives in heaven. Moreover, the monks acted as intercessors for the military elite by praying for them during holy wars. The intricate details of the penance, or accounting for sins, in the Middle Ages perhaps explain the eagerness of political leaders to found and fund monasteries.

It is difficult indeed for the modern reader to imagine the extreme devotion and mental stamina required to execute the routine prayers, liturgical rituals, and long periods of reflection that constituted a medieval monk's life. Novices commonly suffered beatings meant to enforce such discipline, and silence in the church, refectory (or dining area), and dormitory was strictly imposed.

In 1095 Pope Urban II initiated the First Crusade in an effort to reaffirm papal authority by a series of military expeditions to Jerusalem. Because the Saracens (a common medieval term for Muslims) resisted Christianity, many medieval discourses demonized them, condemning them as the enemies of faith. The knights who participated in the holy wars against Islam were motivated by a guaranteed salvation. Although they were militant, they viewed themselves in the service of the church and therefore equated death in war to martyrdom. Presumably the knights were also bound to the vows of poverty, chastity, and obedience, as were the clerics. But knighthood provided the ideal means of salvation for laymen not suited for cloistered life.

LAY PIETY

The Latinized literate culture in the Middle Ages, though it was exclusive, nevertheless made Christianity uniform. Virtually all laity attended Mass and partook in selected rituals. As a rite of initiation, baptism—a ceremonial immersion in water—signifies the consecration of the subject as a follower of Christ. The Eucharist, or Holy Communion, was another common ritual in which the laity could participate. Medieval Christians believed in transubstantiation, the mystical process in which bread and wine become the body and blood of Christ at the moment the devotee ingests them. Priests per-

formed the sacrament of marriage for lay couples, because marriage was considered a consecrated act and visible sign of grace. All Christians were familiar with the Catholic penitential system, which served as a means for practitioners to atone for their sins. It was customary to confess one's sins in confidence to a priest, who would absolve most transgressions after a period of contrition.

Despite the laity's preoccupation with the church, most went to Mass as spectators and listeners. Illiterate Christians depended on what they could discern from religious artworks (many of which depicted biblical stories) and comprehend from the priest's sermons. The splendid Romanesque and Gothic cathedrals of the Middle Ages provided the laity with a glimpse of God's kingdom that facilitated devotion and inspired piety.

SAINTHOOD AND MAGIC

During late antiquity devout Christians lost their lives by confessing their faith to the Romans. In the Middle Ages these early martyrs were venerated for their heroic piety and canonized as saints. After the period of persecution ebbed, new criteria for sainthood developed. Such traits included the ability to perform miracles, heal the sick, or follow extreme asceticism. Biographies of saints became very popular and were just one aspect of the extreme attention paid to saints in the Middle Ages, more than in any other era. Early church leaders became apprehensive about the magical and idolatrous elements associated with saint worship, but the church ultimately sanctioned the cult of saints so long as it remained subordinate to devotion to Christ. Ecclesiastics had to approve sainthood through the canonization process, which could be a lengthy ordeal.

The church's eagerness to collect relics, or the remains of a saint (usually bones, hair, or nails), that people believed had supernatural properties further encouraged the magical aspect of medieval Christianity. The search for relics inspired many pilgrimages to Rome, considered the city of martyrs. The most important pilgrimage a Christian could make was to Jerusalem in search of relics of Christ, such as fragments from the crown of thorns or wood from the cross. Benedictions and baptisms protected Christians from the devil and maladies, and priests performed exorcisms to liberate demon-possessed persons from the evil spirits living within them. Most historians agree that superstition was more prominent among peasants in rural communities, because they were more prone to worshipping forces of nature. But the religious beliefs of most illiterate people were based on the notion that they could access the divine through material objects. Evidence from legal records reveals that women occasionally were accused of witchcraft. Despite this kind of

paranoia, however, the church was lenient toward the magical facets of religion, recognizing that Catholicism lends itself to a popular culture of saints and relics that foster devotion. It is plausible that magic improved the laity's psychological well-being, because many people believed that holy objects could promote healing and salvation.

REFORMS AND REVIVALS

As uniform as the Middle Ages may seem, some periods of discontinuity did occur. During the 11th century Pope Gregory VII (ca. 1020–85) launched a major reform movement within clerical circles. The Gregorian Reform required all clerics to practice celibacy and attempted to eliminate simony, the buying of ecclesiastical positions. Ultimately, Gregory aimed to free the church from lay rule over clergy. By doing this he established an authoritative papal theocracy in Christendom.

Other waves of monastic reform followed in the 13th and 14th centuries. An anticlerical sentiment began to develop in response to the church's corrupt practice of selling indulgences, or accepting money in exchange for absolving sins. Critics also denounced the moral and spiritual decay they saw as resulting from religious laxity. As a response to the decadence of the age, mysticism (in this context, establishing a personal relationship with God) became popular. Another change within the church was the development of a new order of clerics called the mendicant friars. Unlike monks, mendicant friars were neither secluded nor cloistered but would nomadically preach and minister to people, surviving only by the charitable alms for which they begged. The mendicants aimed to prove that a person could lead a holy existence in the world.

HERESY AND THE INQUISITION

Although the clergy had some toleration for the laity's affinity for magic, they were vehemently opposed to beliefs they considered heretical, or contradictory to church tenets. One of the most infamous dissenting movements was the Cathar heresy. The religion of the Cathars, also known as the Albigensians, proposed that there were two gods: the good god dwelled in the spiritual world and the evil god created the physical world. To purify themselves (*Cathar* deriving from the Greek word for "pure"), the Cathars tried to avoid creations of the evil divinity. Extreme Cathars rejected procreation because it would perpetuate the cycle of carnality. The heretics also rejected sacraments, which directly threatened the authority of the church.

To quell subversion, church leaders created a judicial institution known as the Inquisition, an ecclesiastical tribunal designed to investigate dubious religiosity. As the Cathar heresy expanded in many regions of France, inquisitors (those

affiliated with the Catholic Church to judge heresy) observed and questioned the dissenters. A person found guilty of heresy was usually burned at the stake. Although the Inquisition usually connotes cruelty and injustice, it should be viewed in its medieval context. The purpose of the papacy was to maintain the uniformity of Christendom. In pursuit of that goal the church tried and judged many people unfairly.

JUDAISM

Judaism was an ancient Near Eastern religion based on a collection of texts known as the Hebrew Bible (Old Testament). It was the national religion of the Jewish people, who originally lived in the southern Levant around the city of Jerusalem. Judaism was exceptional in the ancient world in being monotheistic, denying the existence of the gods worshipped by their neighbors. Jesus was a Jew, and Christianity, the religion based on his teaching, emerged from a basis within Judaism.

In antiquity the center of Jewish life had been the temple in Jerusalem. Before its destruction in 70 C.E. during the Roman repression of a Jewish revolt, the temple had been the sole site at which the full range of rituals of the Jewish religion could be carried out. However, most of the Jewish population, even of the Roman province of Palestine in which the temple was located, could not make frequent trips to Jerusalem, and still less could the vast numbers of Jews already living abroad throughout the Roman Empire. There was also a large Jewish community in Babylonia in the Sasanian Empire. The religious life of these communities, cut off from the temple, centered on the synagogue or meeting house where Torah (scripture) was read on the Sabbath under the direction of a rabbi. After the destruction of the temple and the exclusion of Jews from Palestine (a Roman edict that was never strictly enforced), the rabbis created a new form of their traditional religion that is called Rabbinic Judaism. If the Torah had once served as a guide to the religious life, Jewish spirituality now became focused on the study and interpretation of the Torah itself, as though the book were a substitute for the temple. Judaism became, like Christianity and Islam, a religion of the book.

In late antiquity Jewish religious energies were focused on commenting on and interpreting the Torah, clarifying the ways in which its rules and regulations could be applied to the lives of Jews in the new circumstances of isolated Jewish communities living in Christian and Islamic nations without the temple. The first commentary produced was the Mishna (ca. 200 C.E.), followed by the massive Babylonian Talmud (*Talmud bavlī*), which was completed by the rabbinic academy in Babylon probably just before 500, with additional editing taking another two centuries. This final document was

propagated throughout all the Jewish communities in the world and became an integral part of the Jewish scriptural tradition. Jewish religious life in the European cities centered on the study of Torah and its commentaries (a vast literature besides the Talmud). There was also a living tradition of legal decisions (*halakha*), as Jews encountered new circumstances, rendered by rabbis on the basis of tradition.

Jews in the Byzantine Empire were officially required to convert to Christianity, but the imperial government made little headway in this area. While Jews were heavily taxed and interfered with (the use of Hebrew in synagogue service, for instance, was outlawed) by the government, in general, they did not face the level of persecution they would find in western Europe. Besides the Jewish population that had been present in the Greek cities of the Crimean Peninsula (in modern-day Ukraine), many Jews immigrated to this region to avoid occasional persecution in the Byzantine Empire. Many worked as traders with the steppe nomads who controlled the terminus of the Silk Road at that time, the Khazars. Around the year 800 the Khazars converted to Judaism, perhaps in an attempt to remain neutral between Christian and Islamic neighbors, but by 969 they had been conquered by the Orthodox kingdom of Kiev Rus, and all trace of their Jewish religion vanished.

Jewish communities in Europe faced constant persecution from Christian communities that perceived them as alien and idolatrous and as having been responsible for the execution of Jesus. Popular preaching and pietistic movements enraged public opinion to the extent that numerous Jews were lynched each year during Easter week across Europe, although murders of Jews could and did occur at any time. Jews were forced to wear special marks on their clothing and to live in segregated sections of their cities (called ghettos), though this measure was originally embraced by Jews, who vainly hoped it would protect them from Christian violence. City officials frequently seized Jewish holy books, either to destroy or censor them on the suspicion that they contained anti-Christian passages. Christian monarchs occasionally would either expel Jews from their territories or demand huge special taxes to avoid doing so.

The Rhineland in Germany was an important Jewish center in the Middle Ages, where, for instance, the Jewish mystical doctrine of the kabbalah was created, based on earlier traditions by the Hasidic movement (not to be confused with later Polish Hasidism) founded by the rabbi Judah the Pious (d. ca. 1225). Kabbalistic theology interpreted Jewish tradition in the light of the same ancient Neoplatonic philosophy that was the basis of Christian theology. For instance, while the ancient Jewish doctrine that the Messiah would come at the end of time to save the Jewish people was far

from denied by kabbalists; they also taught that the Messiah was nevertheless living embodied in the Jewish community, mediating the divine grace that sustained Judaism in a hostile, fallen world.

WOMEN AND RELIGION

It is difficult to discern the true experiences of medieval religious women because of the paucity of sources, most of which were composed by male clerics. Medieval Christianity formulated an interesting paradox regarding women. Many theologians perceived women as impure temptresses modeled after Eve. But medieval misogyny was somewhat tempered by widespread devotion to the Virgin Mary within both elite and popular medieval culture. Several medieval women became saints, but it was perhaps more challenging for women to validate their sanctity in an antifeminist age.

As counterparts the monks, noble women could enter convents to become nuns. Nunneries were sometimes havens for aristocratic daughters who avoided undesirable marriages by becoming brides of Christ and brought large dowries with them. Even more so than the monasteries, the convents imposed strict rules of seclusion and silence. Double monasteries, where a house of men and a house of women were built within close vicinity, were also prevalent, because women (who could not perform ecclesiastical functions) needed men to administer the sacraments and Latin liturgies.

In the 12th and 13th centuries a new form of lay piety swept the Low Countries. The Beguines were groups of religious women who were not required to take vows but could practice their faith in the community of a sisterhood. This movement became popular among nonaristocratic, uneducated women whose families could not afford dowries. Initially the Beguines enjoyed much autonomy, but suspicions of heresy eventually brought about their decline. Some women opted to join heretical movements because they tended to grant women a level of prominence unprecedented in the church.

The mystical traditions of the later Middle Ages influenced female spirituality in fascinating ways. Some religious women modeled their religiosity after the idea of a mystical marriage. Christ was the bridegroom, and the female devotee was the bride. These unions emphasized the humanity of Christ and were conducive to female spirituality. In such traditions women could accentuate their femininity to bring them closer to God. Such mystical experiences offered a counter to the intellectual monopoly of men.

COSMOLOGY

Cosmology can be defined as a set of theories about the origin and general structure of the universe that informs the worldview of a community during a specific period. The medieval

conception of the world was both theocentric (centered on God) and anthropocentric (centered on humankind). Intellectuals of the Middle Ages employed both theological dogma and scientific reasoning to verify cosmological theories. Understanding origins of the universe and the role of people in it provided a framework for explaining and rationalizing both natural and supernatural phenomena. Thus cosmology not only inspired the cultivation of knowledge but also infused into medieval self-awareness the notion that life does have a reason and purpose.

Many of the cosmological theories developed in the Middle Ages were based on principles from classical philosophers. Although medieval ecclesiastics held an ambivalent attitude toward pagan authors, they could not overlook the rich intellectualism of classical thinkers. One dominant school of thought was Neoplatonism, a type of religious philosophy that adhered to somewhat nuanced interpretations of the ideas of Plato (ca. 428–ca. 348 B.C.E.). The notion of two realities—a mundane existence and a spiritual realm—particularly interested medieval Christians. They developed this dichotomy further and interpreted it as the spiritual versus the corporeal world indicated in the Gospels. Medieval Christians believed that one's lifetime on earth was ephemeral, often miserable, and devoid of truly intrinsic value. However, if one led a pious life, it was possible for the soul to be transferred to heaven after death. Conversely, a sinner was expected to be punished indefinitely. The realm of purgatory was reserved for souls trapped between heaven and hell and forced to withstand a period of trials and suffering before being allowed to enter paradise. The afterlife was not represented as a form of reincarnation but as the eternal soul's transmigration after being divinely judged. Theories of hell, purgatory, and heaven pervaded medieval literature, most notably the work of the Italian poet Dante Alighieri, and were central to the medieval mentality.

Like Greek scientists and philosophers, medieval cosmologists theorized that the structure of the universe consisted of planets (understood as celestial spheres) and the heavens. The basic model of the cosmos consisted of concentric spheres revolving around the earth. According to the medieval paradigm, the universe comprised seven planets and a firmament formed by a sphere of fixed stars. The seven planets were Mercury, Venus, Mars, Jupiter, Saturn, the moon, and the sun (considered the most important celestial body). The firmament was transparent, crystalline ether surrounding the planets. The heavens were beyond the firmament and thought to be immobile homogeneous light. In contrast, the earth was heavy and immobile. The firmament rotated around the earth every 24 hours, while the planets had varying orbital times. Beyond the finite universe lay an

infinite realm inhabited by God. Medieval philosophers reasoned that the power causing the orbital movements came from outside the firmament, from the first mover, identified as God.

Scholars codified cosmological knowledge by means of pictures, diagrams, and geometric figures. Medieval people were not as concerned with celestial events (such as novae) but with structure and meaning. A very significant realization of the universe is found in *Commentary on the Dream of Scipio*, written by the Roman philosopher Macrobius (fl. 395–423). In the dream the Roman general Scipio ascends to the heavens and from this vantage point observes the structure of the universe and revolving spheres of planets. Because the text was accompanied by several illustrations, the commentary was studied by medieval thinkers wanting to properly render the cosmos in their own texts. To make cosmology understandable for illiterate parishioners, priests used metaphors like the egg, likening the sky to the shell, the air to the membrane, water to the albumin, and the earth to the yolk. This portrayal was easily grasped and in accord with the widely held notion of the four elements (earth, water, air, and fire) outlined by Aristotle (384–22 B.C.E.).

Contrary to popular belief, medieval thinkers accepted a spherical shape of the earth. Of the three known continents—Africa, Asia, and Europe—Asia was the most important because it contained Eden, Mount Sinai, and the Holy Land. For both its religious and material importance, Jerusalem was considered the center of the earth. Creatures of ether (angels, cherubim, and seraphim) were ranked above humankind. This inferiority imbued humans not only with humility but also with hope, because even reformed sinners could strive toward redemption. Further, some scholars speculated about an undiscovered fourth continent inhabited by creatures called Antipodes. However, theologians condemned that theory because it lacked a scriptural basis. Nevertheless, the existence of monsters and “fabulous races” abound in bestiaries, travel narratives, and romances, and theologians came to justify the reality of such creatures by arguing that even monsters had a place and purpose in God's creation and cosmic system.

In the 12th and 13th centuries more cosmological sources became available to Europeans. Medieval philosophers regarded Latin translations of Ptolemy's and Aristotle's works on astronomy as highly as the mathematical and metaphysical concepts of the ancient thinkers. During this period certain Muslim accounts of astronomy also spread to the West, along with Stoic doctrines, which attempt to explain how celestial spheres influence a person's fate. Partly because of this increase in source materials, astronomy became very popular in the late Middle Ages.

Although medieval cosmology is largely based on classical philosophy, it would be an oversimplification to regard the Greco-Roman tradition as its sole predecessor. In addition to the ancient philosophers, Jewish thought also shaped medieval conceptions of the world, especially in relation to theology. Theologians developed allegorical and metaphorical interpretations of the Creation described in the Old Testament, which colored their perspective of the cosmos. Christian theologians adopted Greek theories of structure but modified the Jewish notions of origin. Medieval philosophers rejected the pagan perspective of time as eternal and cyclical, favoring instead the linear understanding found in Jewish thought. This Judeo-Hellenistic understanding combines Jewish scriptural foundations with a Greek scientific rationale. Christian doctrine added the possibility of an eternal redemption through Christ following the apocalypse.

THE ISLAMIC WORLD

BY ANDREW RIPPIN

FOUNDATIONS

The religion of Islam is the defining element of the Islamic world. The presence of people who practice Islam—Muslims—provides a basic characteristic of the area ranging across North Africa, through the Middle East, and reaching India during the medieval period. Emerging from the western side of the Arabian Peninsula in an area known during the early seventh century as the Hejaz, with focal points established in the two cities of Mecca and Medina, Islam has at its foundation the scripture known as the Koran and the founder-prophet of the religion Muhammad (570–632). The core message of Islam revolves around the existence of the one God, called Allah in Arabic, and the absolute denial of any other divine being who could rival him. God is the eternal, all-powerful, and all-merciful creator of the world who has all aspects of his creation firmly within his control. The oneness of God was contrary to the pagan practices of Arabia at the time, which were based on a belief in many gods, each controlling a specific aspect of the world. Islam also contrasts with Christianity, especially with its belief in the divinity of Jesus, considered the Son of God, and to Judaism, whose followers have been accused of making Ezra into a god alongside the one true God. The reason behind the revelation of Islam, therefore, is understood to have been to correct these misbeliefs and make God the sole focus of worship.

In terms of its fundamental principles, the religion of Islam follows directly in the line of Judaism and Christianity, accepting the basic precepts of those religions and seeing its role as one of completing the line of prophecy that God initi-

ated through those faiths. Muhammad is the final prophet sent to humanity by God, and the final rendition of the message that God has sent to humanity throughout the ages is in the Koran. That message focuses on salvation history: that God created the world and populated it with human beings (Adam and Eve being the first humans) and sends prophets periodically to guide humans in the way to worship, live, and behave. Many of the prophets named in the Koran are familiar from the biblical tradition: Noah, Abraham, Isaac, Ishmael, Moses, Aaron, David, Solomon, Job, Jonah, Ezra, Zechariah, John the Baptist, and Jesus are among them, although the Islamic tradition does not limit the prophets to those named in scripture. Tradition holds that as many as 124,000 prophets have existed during the course of human history, making the message of God available in the world at all times.

The law, which is enunciated in the Koran, covers many aspects of personal behavior and human interactions—marriage, divorce, inheritance, commerce, diet—as well as interaction with God through appropriate ritual activities. By following the law humans can benefit from the rewards that God has planned for the afterlife, which will come after the last day of the existence of the world as we know it. On that last day a judgment of the deeds done by every individual during life will take place. People whose deeds weigh in the balance to the side of good will be rewarded with an eternal existence in paradise. Those whose deeds push the balance to the side of evil will suffer for eternity in the fires of hell.

EMERGENCE

Out of these fundamentals emerged the Arab Empire in the mid-seventh century, an empire that became the vehicle for the rise of Islam as the religion of the state and of almost all the people living within its boundaries. The establishment of the Arab Empire is sometimes attributed to the fervor among early converts to spreading Islam, although the character of Islam in this early period is historically unclear and it appears to have taken some time before the link between Islam and the state became fully enunciated. When Muhammad died in 632, the Arabs controlled no territory outside Arabia. In 633 armies entered Iraq, and in 634 the conquest of Syria began, with the battle of Yarmouk in 636 decisively imposing a defeat on the Byzantine army. Damascus, Antioch, Jerusalem, and finally the whole Syrian area came under Arab control by 638. At the same time, Iraq was being overcome, with the Sassanian army defeated in 637 and the garrison towns of Basra and Kufa in Iraq founded in 638. By 641 the Sassanian Empire was almost at its end, with most of Persia ready for the Arab armies to enter it. The conquest of Egypt began in 639 and was completed by 642. The armies made further westward gains, reaching Carthage by 647. By 661, armies had arrived

in Afghanistan, subsequently making their way into India. They also went into central Asia, with Bukhara being raided in 674 and Samarqand in 676; the area was not fully subdued until 711. The conquests in the west continued with the establishment of Kairouan in present-day Tunisia in 670 and Carthage finally falling in 693. The march of the armies continued westward to the Atlantic and then into Spain by 710; Toledo was captured in 712. Southern France was invaded in 725, but the battle of Tours in 732 put an end to the invasion of Europe.

Two significant pieces of historical evidence provide a sense of the place of Islam in the early empire. One is the building of the Dome of the Rock in Jerusalem. This distinctive and celebrated building was constructed during the rule of the caliph Abd al-Malik (r. 685–705), according to an inscription in the building dated from 691. In its style the Dome of the Rock draws on a tradition from the Byzantine world; within the Muslim world it is unique as being a religious building but not a place designed for worship. The magnificence of the Dome of the Rock emphasized the arrival of the Arab conquerors and their triumph over both the land and rival religions. Inside the building is an inscription that includes a series of passages found in the Koran. The inscription asserts the unity and power of God and declares that he has had no offspring; it states that Muhammad is God's messenger and that no mistakes are to be made in religion. It indicates that belief in the Trinity is false and that Jesus is a prophet like any other. Islam is declared to be the religion of God. By its strategic location in the sacred city of the rival faiths, its architecture, and the content of its inscription, the Dome of the Rock declares the triumph of Islam over Christianity.

Another indication of the rise of Islam is evident on coinage. Early coins produced under Arab rule were simple variations on preexisting Byzantine and Sassanian models. However, coins from the 690s (the eighth decade of the Islamic calendar) contain phrases like "There is no god but God alone" and "Muhammad is the messenger of God"; added to the latter is often "whom He sent with guidance and the religion of truth, that He might make it victorious over all religions." A development of coinage with Islamic slogans indicates the rise of an empire with a clear, although rudimentary, Islamic ideology as its unifying underpinning.

ESTABLISHMENT

Up to the 10th century the character of Islam and the civilization connected to it gained its defining characteristics and its central tenets. The process over those centuries was one marked by debate and conflict, much of it focusing on the aspects of authority in society.

During his lifetime Muhammad had been the acknowledged leader of the Muslim community in all its activities, ranging from religious practices to fighting battles. Any decision about what action should be taken was made by

THE SABIANS

In the Koran is established Islam's attitude toward "peoples of the book": other monotheists whose religions Muhammad considered efficacious to a degree and whom he permitted to live in Islamic society without conversion. These groups were called *dhimmi*, people under Islamic protection. They were tolerated, but they were always subject to paying higher taxes, bans on holding government office, and other disadvantages. They were often terribly exploited, since Muslims could enslave other Muslims, but they could not enslave *dhimmi*. These groups included Christians, Jews, Parsees (followers of the ancient Zoroastrian religion of Iran), and the elusive Sabians.

There is considerable uncertainty about who the Sabians were, and more than one group in the Middle Ages claimed this identity because of the relatively protected status it brought. It is most likely, however, that Mohammad used the term *Sabians* to mean the Mandaean, since the next generation of Islamic authors described the Sabians as practicing baptism. The Mandaean lived in southern Iraq, though their origin is now lost. They present themselves as followers of John the Baptist but claim that Moses and Jesus were false prophets. Their main religious ritual is baptism. They also have a body of scripture written in Aramaic and are monotheists. Their beliefs are similar to those of ancient Gnostic Christians, inasmuch as they see the world as ruled by evil, from which the soul can be delivered only by the saving knowledge transmitted by John.

The Mandaean community survived into modern times and before the first Gulf War there were perhaps 100,000 Mandaean living in the marshes of southern Iraq. Saddam Hussein started persecuting them because they had revolted in anticipation of American invasion. More recently, and despite their protected status in Islamic law, they have been the object of ethnic-cleansing campaigns by Islamic factions in Iraq and have been mostly killed or driven out of the country as refugees, so that only a few thousand remain in their homeland.



Folio from a Koran, sura 47, verses 9-15; ink and watercolor on parchment, North Africa, ninth century (Arthur M. Sackler Gallery, Smithsonian Institution, Purchase, S1997.42)

Muhammad. The role of the Prophet can be thought of as community formation. He started his religious mission as a lonely and isolated preacher in Mecca in 610; in 622 he moved his small band of followers to Medina (some 224 miles north of Mecca), in a migration known as the Hegira to create a community under his religious and political-military leadership. That community creation is symbolized in the later establishment of the Islamic calendar, consisting of 12 lunar months; year one in the calendar is the year in which the Hegira took place.

After Muhammad's death his community gathered to select a leader, someone deemed the best-qualified and most-respected person. Given the title caliph, the first person selected was Abu Bakr al-Siddiq, an early convert to Islam and an elder of the community. He ruled from 632 to 634. Umar ibn al-Khattab then took over for the period 634–44. Following him came Uthman ibn Affan, whose rule was disputed, especially by the followers of Ali ibn Abi Talib, the cousin and son-in-law of Muhammad. Uthman was assassinated in 656, and Ali took over, only to be assassinated in 661. The family of Uthman managed to gain power in the wake of Ali's death, establishing what became known as the Umayyad Dynasty, in which power passed along family lines. That situation

lasted until 750, when a new dynasty known as the Abbasids took over.

Various pieces of the empire broke off from central Abbasid control, which emanated from Baghdad. As a result, the area of Spain was ruled by the Umayyad Dynasty from 756 to 1031, and North Africa was controlled by the Fatimids from 909 to 1171. Centralized and effective Abbasid control became inconsequential after the conquest of Baghdad by the Mongols in 1258, and the dynasty finally came to an end in 1517 when the Ottomans conquered Syria and Egypt. The actual institution of the caliphate was abolished by Mustafa Kemal Atatürk and the Turkish National Assembly in 1924.

The nature of the authority wielded by the caliphs was subject to variation and dispute. Sometimes the caliphs aspired to follow the path set by Muhammad, assuming total control over matters related to religious doctrine as well as the army and a state administrative bureaucracy. However, especially during the ninth century during the period of the Caliph al-Mamun (r. 813–33), the power of the scholarly class—those who devoted themselves to studying and enunciating the principles of Islam—became more prominent in resisting the power of the caliph to dictate in matters related to religion. Some of the accounts of this debate focus on specific

areas of religious dogma: whether the Koran was “created” in time or was “uncreated”—that is, existed from eternity—and whether humans had free will or were predestined to their roles in life (the latter being a favorite dogma of the Umayyad caliphs, who saw it as supporting their right to rule).

LAW

The schools that emerged to systematize and develop Islamic law also displayed some of that tension over authority. As the result of ongoing debates during the eighth through the 10th centuries, four recognized schools of law emerged, known as Shafii, Maliki, Hanafi, and Hanbali. These schools agreed on the four fundamental sources from which the law should be derived: the Koran; the Sunna, which is the example of Muhammad as documented in the traditional literature; a controlled process of reasoning called analogy; and consensus, which in theory was the consensus of the community but in practice was the consensus of the scholars responsible for knowing and interpreting the law and rendering legal judgments on the basis of that knowledge. Each school’s reasoning processes were different, and despite some minor variations among the schools, their scholarly outputs were deemed equally probable expressions of the will of God.

Adherence to one of these schools of law served as the defining element of the majority form of the religion known as Sunni Islam in the medieval period. Variations in the law among the schools also reflected the influence of local traditions as the law developed. One of the powers of the state involved creation of an apparatus to enforce and adjudicate the application of Islamic law. The judicial system derived its authority from the caliph, and judges were often appointed by the ruler. Muslims thoroughly immersed in the study of the law often perceived a situation of conflict if they accepted a position of authority. Another branch of the faith, Shiite Islam, focused its source of authority in Ali ibn Abi Talib (the fourth caliph after Muhammad) and his descendants (known as the imams). Although different social structures emerged as a result of this understanding—a religious hierarchy developed, for example—in practical terms the life of Shiite Muslims varied only slightly from that of their Sunni counterparts.

FIVE PILLARS

For the average Muslim during the medieval period, the ongoing debates over law probably did not have a significant impact on daily life. The rule of the land was simply assumed to be that of Islam; the rhythms of the Muslim religious life punctuated everyday life, and individuals were stimulated and motivated by the development of detailed narratives emanating from the pious imagination. Central to Muslim daily life were the five

pillars of Islam, the ritual activities initiated by Muhammad and set forth in the Koran in varying detail. The prescriptions were formalized by later generations into a set of activities that establish Muslim identity on the popular level.

The first pillar is the ritual reciting of the *shahada*, the witness of faith. In Arabic and with meaningful intention, the Muslim declares, “I testify that there is no god but God and Muhammad is the messenger of God.” The *shahada* marks the conversion of the individual to Islam and is a declaration of faith employed often, especially in ritual prayer.

Prayer, or *salat*, the next pillar, is to be performed five times a day—at dawn, midday, late afternoon, sunset, and night. A muezzin recites the call to prayer to remind everyone that the appropriate time has arrived. Prayer is preceded by a purification ritual involving washing with water (or sand if water is unavailable). The prayer itself follows a set pattern of actions and statements. This is the central form of regular worship in Islam, but it requires no clergy for its successful performance. Prayer can be performed in any clean place (often with a prayer rug to ensure the cleanliness of the space) and may be done alone or with others. If it is done in the company of other Muslims, one person serves as the prayer leader, or imam, to keep the pace of the actions uniform.

Mosques were built to accommodate the needs of Muslims performing prayer, producing a distinctive architectural marker of the presence of Islam. The prayer ritual requires that the mosque be oriented internally toward Mecca, and typically a mosque has a minaret from which the muezzin performs the call to prayer. The minaret certainly became the most obvious symbol of the presence of Islam and frequently was a manifestation of an assertion of piety on the part of the person who commissioned its construction. Communal prayer is to be done at gatherings on Fridays at midday. An imam leads the communal prayer, and a *khatib* (who can be the same person as the imam) delivers a sermon, which is usually a set piece of pious prose but can be a political message that requires circulation. Literacy and the respect of the community are the only requirements to be a *khatib*.

The third pillar is *zakat*, or charity, which the Muslim must give in set proportions to designated groups of people in need. Crops grown in a field along with grapes and dates were liable to *zakat* of 10 percent on each crop, to be paid at harvest time. Gold, silver, and merchandise were levied at 2.5 percent of the amount held each year. Charity could be paid directly to the recipients, but it was preferred that the tax be paid to the authorities in charge of its distribution. Those designated as recipients were defined in the Koran as “the poor, the needy, those working at collecting it, those whose hearts are being reconciled [to yours], for freeing of captives and debtors, and in striving along God’s way, and for the wayfarer.”

Fasting (*sawm* or *siyam*), the fourth pillar, takes place during Ramadan, the ninth month of the Muslim lunar calendar. The Muslim cannot eat or drink during daylight hours for the 30 days of that month. The fast ends with a major festival of the Muslim calendar that involves prayer and a feast. It is considered especially meritorious to read the entire Koran during the month of fasting.

Finally, every adult Muslim is expected to make a pilgrimage, or hajj, at least once in a lifetime if possible. The hajj is a journey to Mecca and incorporates various activities in and around that town. Many of the activities recall actions believed by Muslims to have been done by the patriarch Abraham when he, along with his son Ishmael, founded the Kaaba in the center of Mecca. A small stone building in the court of the Great Mosque, the Kaaba is the sacred center of Islam, and Muslims face in its direction during prayer (as indicated by the mihrab in a mosque). Pilgrims perform rituals at the Kaaba, including walking around the building seven times and touching of the black stone lodged in its corner.

STORIES

The Muslim imagination developed the religion in many ways during the medieval period. Aspects related to the hereafter were popular vehicles for elaboration, especially as they were incorporated into a traditional story about the night journey of Muhammad from Mecca to Jerusalem and his heavenly ascension, understood to have occurred in about the sixth year of his prophetic career. Known as *The Ascension of the Prophet*, these stories, both oral and written, emphasized the qualities of Muhammad as a prophet but also satisfied the popular need to know more about the life to come after the judgment day.

One example is the very popular work attributed to Ibn Abbas (d. 687) but probably dated from the 10th century. The story relates that one night Muhammad was taken on the back of a winged horse, called Buraq, from his home in Mecca to Jerusalem, where he ascended a ladder to the worlds above (which are described in the Koran as a canopy over the earth, structured like a tent). As he climbed up through the seven heavens, he met the prophets of the past—Adam, John, Jesus, Joseph, Enoch, Aaron, Moses, and Abraham—who were living in paradise. He was also given glimpses of the punishments of hell, featuring endlessly burning fires and various tortures appropriate to the particular crimes committed by people during their lives. These images are often understood to be the source of medieval European pictures of the afterlife, having been incorporated into the European imagination through such writers as Dante as a result of Arabic works on the topic being translated into Latin.

Stories of the prophets of the past were also subject to embellishment by popular preachers as vehicles for moral exhortation. Starting with the basic stories recounted in the Koran, preachers added details from the Bible and from medieval Jewish and Christian elaborations. Further elaborations emphasized Islamic tenets and the social and historical assumptions of the religion. In the most famous example of its type, the book by al-Thalabi (d. 1035), commonly referred to simply as *The Stories of the Prophets*, takes its readers into the world of the past through a narrative about God, the devil, and the prophets who deal with the common aspects of human nature. Starting with the creation of the world and ending with the year of the birth of Muhammad, 46 biographies are told, with the Koran forming the basic framework of all the stories.

SUFISM

The mystical side of Islam, Sufism, had a significant role in Islamic life in the medieval period. Often seen to be a vehicle by which the domination of the legal side of the religion was balanced, Sufism encouraged personal experience of the divine. Major early figures capture this experience in two descriptive ways. Al-Junayd (d. 910) is often credited with establishing a system of mystical speculation in Islam. He enunciated the doctrine of *fana*, the goal of the mystic in which one “dies in one’s self” and is “absorbed” into God. *Baqa*, the continuance, is the existence of the mystic after *fana*, when he or she lives in God. Along with this theory, al-Junayd emphasized the ethical responsibility of experienced mystics to return to community life and fulfill the obligations of Muslim life and to display to their contemporaries the impact of divine experience. A contemporary of al-Junayd, al-Hallaj (d. 922), was famously condemned to death for blasphemy. He proclaimed, “I am the Truth,” suggesting that individuals could recognize their own godlike nature through mystical experience. This was taken to mean that al-Hallaj felt himself to be divine. When the mystical experience overwhelms the individual self to the point that human existence has no meaning, that Sufi is termed *intoxicated*, compared with the *sober* mysticism of al-Junayd, in which life takes on its important ethical value.

The outcome of this emergence of significant mystics was the institutionalization of Sufi practice, with accomplished and experienced mystics becoming the models and masters of their followers. Traditions became established by which religious experiences, under the guidance of the master and his disciples, could be obtained. Out of this grew belief in the power of the masters to influence events in the world and in the hereafter. Practices emerged that involved the visiting of shrines devoted to individual saints to receive blessings and to pray for marvels or miracles. Such acts were deemed inap-

propriate innovations and were rejected by the more conservative elements of society because they were seen to impinge on the proper devotion to the one God. However, the legitimacy of the mystic quest was defended, in general quite successfully, by writers such as al-Ghazali (d. 1111). The power of the saints continued as a popular belief, and the perceived necessity for blessings for the safe birth of children and for general good fortune characterized the attitude of the populace as a whole.

See also ALCHEMY AND MAGIC; ARCHITECTURE; ART; ASTRONOMY; CALENDARS AND CLOCKS; CHILDREN; DEATH AND BURIAL PRACTICES; EDUCATION; EMPIRES AND DYNASTIES; FAMILY; FESTIVALS; FOOD AND DIET; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; LAWS AND LEGAL CODES; LITERATURE; MONEY AND COINAGE; OCCUPATIONS; SACRED SITES; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WAR AND CONQUEST; WRITING.

Asia and the Pacific

~ Excerpt from the Nihongi (ca. 720) ~

Of old, Heaven and Earth were not yet separated, and the In and Yo not yet divided. They formed a chaotic mass like an egg which was of obscurely defined limits and contained germs.

The purer and clearer part was thinly drawn out, and formed Heaven, while the heavier and grosser element settled down and became Earth.

The finer element easily became a united body, but the consolidation of the heavy and gross element was accomplished with difficulty.

Heaven was therefore formed first, and Earth was established subsequently.

After the creation of Heaven and earth, Divine Beings were produced between them.

Hence it is said that when the world began to be created, the soil of which lands were composed floated about in a manner which might be compared to the floating of a fish sporting on the surface of the water.

At this time a certain thing was produced between Heaven and Earth. It was in form like a reed-shoot. Now this became transformed into a God, and was called Kuni-toko-tachi no Mikoto.

Next there was Kuni no sa-tsuchi no Mikoto, and next Toyo-kumu-nu no Mikoto, in all three deities.

These were pure males spontaneously developed by the operation of the principle of Heaven.

The next Deities who came into being were Uhiji-ni no Mikoto and Suhiji-ni no Mikoto, also called Uhiji-ne no Mikoto and Suhiji-ne no Mikoto.

The next Deities which came into being were Oho-to nochi no Mikoto and Oho-to mahe no Mikoto.

The next Deities which came into being were Izanagi no Mikoto and Izanami no Mikoto.

These make eight Deities in all. Being formed by the mutual action of the Heavenly and Earthly principles, they were made male and female. From Kuni no toko-tachi no Mikoto to Izanagi no Mikoto and Izanami no Mikoto are called the seven generations of the age of the Gods. . . .

In one writing it is said,

After the sun and moon, the next child Izanagi no Mikoto and Izanami no Mikoto gave birth to was the leech-child. When this child had completed his third year, he was nevertheless still unable to stand upright. The reason why the leech-child was born was that in the beginning, when Izanagi no Mikoto and Izanami no Mikoto went round the pillar, the female Deity was the first to utter an exclamation of pleasure and the law of male and female was therefore broken.

They next gave birth to Sosa no wo no Mikoto. This God was of a wicked nature, and was always fond of wailing and wrath. Many of the people of the land died, and the green mountains withered. Therefore his parents addressed him, saying: "Supposing that you were to rule this country, much destruction of life would surely ensue. You must govern the far-distant Land Below."

Their next child was the bird-rock-camphor-wood boat of Heaven. They took this boat and, placing the leech-child in it, abandoned it to the current.

Their next child was Kagu-tsuchi.

Now Izanami no Mikoto was burnt by Kagu-tsuchi, so that she died. When she was lying down to die, she gave birth to the Earth-Goddess, Hani-yama-hime, and the Water-Goddess, Midzu-ha-no-me. Upon this Kagu-tsuchi took to wife Hani-yama-hime, and they had a child named Waka-musubi. On the crown of

this Deity's head were produced the silkworm and the mulberry tree, and in her navel the five kinds of grain.

From: W. G. Aston, trans., *Nihongi*
(London: Kegan, Paul, Trench, Trübner,
1896).

Europe

~ William of Saint Thierry: "A Description of Clairvaux" (ca. 1143) ~

At the first glance as you entered Clairvaux by descending the hill you could see that it was a temple of God; and the still, silent valley bespoke, in the modest simplicity of its buildings, the unfeigned humility of Christ's poor. Moreover, in this valley full of men, where no one was permitted to be idle, where one and all were occupied with their allotted tasks, a silence deep as that of night prevailed. The sounds of labor, or the chants of the brethren in the choral service, were the only exceptions. The orderliness of this silence, and the report that went forth concerning it struck such a reverence even into secular persons that they dreaded breaking it—I will not say by idle or wicked conversation, but even by proper remarks. The solitude, also, of the place—between dense forests in a narrow gorge of neighboring hills—in a certain sense recalled the cave of our father St. Benedict, so that while they strove to imitate his life, they also had some similarity to him in their habitation and loneliness. . . .

Although the monastery is situated in a valley, it has its foundations on the holy hills, whose gates the Lord loves more than all the dwellings of Jacob. Glorious things are spoken of it, because the glorious and wonderful God therein works great marvels. There the insane recover their reason, and although their outward man is worn away, inwardly they are born again. There the proud are humbled, the rich are made poor, and the poor have the Gospel preached to them, and the darkness of sinners is changed into light. A large multitude of blessed poor from the ends of the earth have there assembled, yet

have they one heart and one mind; justly, therefore, do all who dwell there rejoice with no empty joy. They have the certain hope of perennial joy, of their ascension heavenward already commenced. In Clairvaux, they have found Jacob's ladder, with angels upon it; some descending, who so provide for their bodies that they faint not on the way; others ascending, who so rule their souls that their bodies hereafter may be glorified with them.

For my part, the more attentively I watch them day by day, the more do I believe that they are perfect followers of Christ in all things. When they pray and speak to God in spirit and in truth, by their friendly and quiet speech to Him, as well as by their humbleness of demeanor, they are plainly seen to be God's companions and friends. When, on the other hand, they openly praise God with psalms, how pure and fervent are their minds, is shown by their posture of body in holy fear and reverence, while by their careful pronunciation and modulation of the psalms, is shown how sweet to their lips are the words of God—sweeter than honey to their mouths. As I watch them, therefore, singing without fatigue from before midnight to the dawn of day, with only a brief interval, they appear a little less than the angels, but much more than men. . . .

As regards their manual labor, so patiently and placidly, with such quiet countenances, in such sweet and holy order, do they perform all things, that although they exercise themselves at many works, they never seem moved or burdened in anything, whatever the labor may

(continued)

(continues)

be. Whence it is manifest that that Holy Spirit works in them who disposes of all things with sweetness, in whom they are refreshed, so that they rest even in their toil. Many of them, I hear, are bishops and earls, and many illustrious through their birth or knowledge; but now, by God's grace, all distinction of persons being dead among them, the greater anyone thought himself in the world, the more in this flock does he regard himself as less than the least. I see them in the garden with hoes, in the meadows with forks or rakes, in the fields with scythes, in the forest with axes. To judge from their outward appearance, their tools,

their bad and disordered clothes, they appear a race of fools, without speech or sense. But a true thought in my mind tells me that their life in Christ is hidden in the heavens. Among them I see Godfrey of Peronne, Raynald of Picardy, William of St. Omer, Walter de Lisle, all of whom I knew formerly in the old man, whereof I now see no trace, by God's favor. I knew them proud and puffed up; I see them walking humbly under the merciful hand of God.

From: Frederic Austin Ogg, ed., *A Source Book of Mediaeval History: Documents Illustrative of European Life and Institutions from the German Invasions to the Renaissance* (New York: American Book Company, 1935).

The Islamic World

~ Excerpt from the Sunna (seventh century) ~

When God created the creation he wrote a book, which is near him upon the sovereign throne; and what is written in it is this: "Verily my compassion overcometh my wrath."

Say not, if people do good to us, we will do good to them, and if people oppress us, we will oppress them: but resolve that if people do good to you, you will do good to them, and if they oppress you, oppress them not again.

God saith: Whoso does one good act, for him are ten rewards, and I also give more to whomsoever I will; and whoso does ill, its retaliation is equal to it, or else I forgive him; and he who seeketh to approach me one cubit, I will seek to approach him two fathoms; and he who walketh toward me, I will run toward him; and he who cometh before me with the earth full of sins, but joins no partner to me, I will come before him with an equal front of forgiveness. . . .

CONCERNING PRAYER

Angels come among you both night and day; then those of the night ascend to heaven, and God asks them how they left his creatures: they say, We left them at prayer, and we found them at prayer.

The rewards for the prayers which are performed by people assembled together are double of those which are said at home.

Ye must not say your prayers at the rising or the setting of the sun: so when a limb of the sun appeareth, leave your prayers until her whole orb is up: and when the sun begins to set, quit your prayers until the whole orb hath disappeared; for, verily she riseth between the two horns of the devil.

No neglect of duty is imputable during sleep; for neglect can only take place when one is awake: therefore, when any of you forget your prayers, say them when ye recollect.

When any one of you goeth to sleep, the devil ties three knots upon his neck; and saith over every knot, "The night is long, sleep." Therefore, if a servant awake and remember God, it openeth one knot; and if he perform the ablution, it openeth another; and if he say prayers, it openeth the other; and he riseth in the morning in gladness and purity: otherwise he riseth in a lethargic state.

When a Muslim performs the ablution, it washes from his face those faults which he may have cast his eyes upon; and when he washes his hands, it removes the

faults they may have committed, and when he washes his feet, it dispels the faults toward which they may have carried him: so that he will rise up in purity from the place of ablution.

OF CHARITY

When God created the earth it began to shake and tremble; then God created mountains, and put them upon the earth, and the land became firm and fixed; and the angels were astonished at the hardness of the hills, and said, "O God, is there anything of thy creation harder than hills?" and God said, "Yes, water is harder than the hills, because it breaketh them." Then the angel said, "O Lord, is there anything of thy creation harder than water?" He said, "Yes, wind overcometh water: it does agitate it and put it in motion." They said, "O our Lord! is there anything of thy creation harder than wind?" He said, "Yes, the children of Adam giving alms: those who give with their right hand, and conceal from their left, overcome all."

The liberal man is near the pleasure of God and is near paradise, which he shall enter into, and is near the hearts of men as a friend, and he is distant from hell; but the niggard is far from God's pleasure and from paradise, and far from the hearts of men, and near the fire; and verily a liberal ignorant man is more beloved by God than a niggardly worshiper.

A man's giving in alms one piece of silver in his lifetime is better for him than giving one hundred when about to die.

Think not that any good act is contemptible, though it be but your brother's coming to you with an open countenance and good humor. . . .

Feed the hungry, visit the sick, and free the captive if he be unjustly bound.

OF FASTING

A keeper of fasts, who does not abandon lying and slandering, God cares not about his leaving off eating and drinking.

Keep fast and eat also, stay awake at night and sleep also, because verily there is a duty on you to your body, not to labor overmuch, so that ye may not get ill and destroy yourselves; and verily there is a duty on you to your eyes, ye must sometimes sleep and give them rest; and verily there is a duty on you to your wife, and to your visitors and guests that come to see you; ye must talk to them; and nobody hath kept fast who fasted always; the fast of three days in every month is equal to constant fasting: then keep three days' fast in every month.

From: Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*, Vol. 6: *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Applied History Research Group, University of Calgary, "The Islamic World to 1600." Available online. URL: http://www.ucalgary.ca/applied_history/tutor/islam/index.html. Downloaded on August 15, 2007.
- Mahmoud M. Ayoub, *The Crisis of Muslim History: Religion and Politics in Early Islam* (Oxford, U.K.: Oneworld, 2003).
- Jonathan P. Berkey, *The Formation of Islam: Religion and Society in the Near East, 600–1800* (New York: Cambridge University Press, 2003).
- J. F. Bierlein, *Parallel Myths* (New York: Ballantine Wellspring, 1994).
- Norman Calder, Jawid Mojaddedi, and Andrew Rippin, eds. and trans., *Classical Islam: A Sourcebook of Religious Literature* (New York: Routledge, 2003).
- Norman F. Cantor, "The Advance of Ecclesiastical Leadership." In *The Civilization of the Middle Ages* (New York: Harper Perennial, 1994).
- Norman F. Cantor, "Varieties of Religious Experience." In *The Civilization of the Middle Ages* (New York: Harper Perennial, 1994).
- David Carrasco, *Religions of Mesoamerica* (San Francisco: Harper and Row, 1990).
- Mark Cohen, *Under Crescent and Cross: The Jews in the Middle Ages* (Princeton, N.J.: Princeton University Press, 1994).
- Eleanor Shipley Duckett, *The Gateway to the Middle Ages: Monasticism* (Ann Arbor: University of Michigan Press, 1988).
- Carl W. Ernst, *The Shambhala Guide to Sufism* (Boston: Shambhala, 1997).
- David Freidel, Linda Schele, and Joy Parker, *Maya Cosmos* (New York: William Morrow, 1993).
- Leonard B. Glick, *Abraham's Heirs: Jews and Christians in Medieval Europe* (Syracuse, NY: Syracuse University Press, 1999).
- Muhammad A. S. Abdel Haleem, *The Qur'an*, Oxford World's Classics (Oxford, U.K.: Oxford University Press, 2005).
- Anniina Jokinen, "Medieval Cosmology," *Luminarium*, April 7, 2002. Available online. URL: <http://www.luminarium.org/encyclopedia/medievalcosmology.htm>.
- Robert W. July, "Christians and Muslims in the Eastern Sudan." In his *History of the African People*, 5th ed. (Prospect Heights, Ill.: Waveland Press, 1998).

- Joseph M. Kitagawa, ed., *Religious Traditions of Asia* (New York: Macmillan, 1989).
- Jacques Le Geoff, "Christian Society." In *Medieval Civilization: 400–150*, trans. Julia Barrow (London: Blackwell, 1990).
- Joseph H. Lynch, *The Medieval Church: A Brief History* (New York: Longman, 1992).
- Eugene L. Mendonsa, "Art and Religion in West Africa," in his *West Africa: An Introduction to Its History, Civilization and Contemporary Situation* (Durham, N.C.: Carolina Academic Press, 2002).
- Mary Miller and Karl Taube, *The Gods and Symbols of Ancient Mexico and the Maya* (New York: Thames and Hudson, 1992).
- Kenneth W. Morgan, *Reaching for the Moon: On Asian Religious Paths* (Chambersburg, Pa.: Anima, 1990).
- Kay Read and Jason J. Gonzalez, *Mesoamerican Mythology: A Guide to the Gods, Heroes, Rituals, and Beliefs of Mexico and Central America* (Oxford, U.K.: Oxford University Press, 2000).
- Andrew Rippin, *Muslims: Their Religious Beliefs and Practices*, 3rd ed. (New York: Routledge, 2005).
- Karl Taube, *The Major Gods of Ancient Yucatán* (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 1992).
- Karl Taube, *Aztec and Maya Myths* (Austin: University of Texas Press, 1993).
- Dennis Tedlock, trans., *Popol Vuh: The Definitive Edition of the Mayan Book of the Dawn of Life and the Glories of Gods and Kings* (New York: Simon and Schuster, 1985).
- Gary Urton, *Inca Myths* (Austin: University of Texas Press, 1999).
- Timothy Ware, *The Orthodox Church* (London: Penguin, 1993).

► resistance and dissent

INTRODUCTION

Citizens of the secularized contemporary world ordinarily think of dissent in political terms. However, this was not the case in the Middle Ages. Religion almost always was administered by the same class or even the same individuals as the secular government, so it acted to reinforce the social order and discourage dissent. Opposition to the state and social order meant opposition to the divine forces that were believed to support them. Christianity, Islam, and Confucianism all held that the right to rule was derived from divine favor. The secular government was inextricably intertwined with the religious order. Thus, opposition to rulers and dissent against the social hierarchy could be seen not only as treason or revolt but also as heresy or opposition to the divine order. In societies ordered by religion, one cannot subject the will of god to the scrutiny of ordinary political questionings. But by the same token, voices in dissent against what they viewed as a corrupt state could represent the faults of the government as evidence that they had betrayed the divine mandate to rule, and groups in opposition could claim that rule had passed to them.

In a state governed by Confucian ideology, officials tended to think of themselves and the ruler they represented

as having the "Mandate of Heaven" and representing an ideal of virtue. Or, as a regime became corrupt over time, officials acted mainly on self-interest. In either case, dissent was not to be tolerated: Either reform was not needed and the dissenters were working against the interests of justice, or reform brought about through dissent would have challenged the position of corrupt officials. As a result, through cycles of reform and decline during the Middle Ages the Chinese government maintained an efficient policing of dissent that made sure that no change was possible other than the periodic restoration of Confucian norms of good government. Since the Confucian ideal of government was held to be perfect, legitimate reform could mean nothing but its restoration. Western Europe, governed by a Christian ideology, had the advantage that Christianity began as a moment of social protest. It was possible in a European context to believe that reform and change could prove beneficial and that they could begin with movements of protest. While many peasants' revolts based on the inequities of aristocratic government were indeed condemned and suppressed as heresy, other movements led to the foundation of new institutions, such as the Franciscan monastic order that made the church itself an instrument of reform. European rulers could make concessions in the so-called divine right of kings to popular rights and governance (as in the Magna Carta and the increasing independence of civic communes during the Middle Ages), because these reforms could be viewed as legitimate social goods. Such possibilities for reform, however, would produce a fundamental transformation of society only long after the Middle Ages, and it was hardly inevitable that they would do so.

One source of dissent common in the medieval world that should be especially considered was populations of slaves or conquered peoples governed under oppressive conditions. In the Islamic world, for instance, conquered Jews and Christians, *dhimmi*, were ruled so exploitatively and with such a humiliating display of power that they never offered a serious opposition to their rulers. On the other hand, the Islamic elite class revived the Roman economic system of working large agricultural plantations with slave labor. A number of African slaves on sugar plantations in and around Kuwait revolted in the ninth century and caused a social disturbance that rivaled the great slave revolts that plagued the Roman Republic. The economies of American states such as the Aztec and Mississippian monarchies were based on the exploitation of subject peoples. This led most likely, in the case of the Mississippians, to the destruction of their capital city of Cahokia in Illinois by a revolt. While the Aztec never suffered a major revolt, once the Spanish invaders threatened to undermine Aztec power, they found ready allies in the subject peoples of Mexico.

AFRICA

BY MICHAEL J. O'NEAL

In general, resistance and dissent are likely to emerge from a number of factors. The chief among them is that the ruling powers have lost the confidence and support of the people they govern. Sometimes the story of resistance and dissent in a particular culture is that there is none, or there is very little. When an empire was stable and could meet the needs of its people and when the people believed that the ruler held power legitimately, resistance and dissent were not likely to be widespread. Typically, this stability was the result of economic prosperity; people who have enough food and other goods are less likely to rise up in revolt.

A good example of this principle is the empire of Ghana, which emerged in about the eighth century and after reaching its peak around the turn of the millennium was absorbed by the kingdom of Mali in about 1240. Ghana (not to be confused with the modern-day nation of Ghana) flourished because of two primary resources: salt and gold. Also, the empire was part of the trans-Saharan trade routes. The result was that the kingdom enjoyed considerable prosperity. In this atmosphere, there was little dissent.

Similarly, the Hausa states on the Niger River enjoyed economic prosperity through trade and a wealth of natural resources, and during the medieval period relationships among these smaller kingdoms remained peaceful—though tensions and competition were growing and erupted into armed struggle later.

In contrast to these states was the kingdom of Benin, located in modern-day Nigeria. The founding of the kingdom in the 13th century is shrouded in mystery, but one theory is that the people had been ruled by the Ogiso, who ruled with cruelty. The people invited a Yoruban prince named Oranmiyan to invade, overthrow the Ogisos, and rescue them from Ogiso tyranny. Not all historians, however, agree with this theory.

Despite previous stability, beginning in about the 11th century Ghana began to decline. Its cities were becoming crowded, leading to competition for resources. Worse, the Sahara was expanding to the south into Ghanian territory. As a result, food supplies diminished. Under these conditions, the kingdom was severely weakened, making it susceptible to invasion, primarily by the Almoravids, who wanted to gain control of the trade routes. After a five-year war the Almoravids laid siege to the capital city beginning in 1067. The Ghanians, under the leadership of the generals Bassi and Tunka Manin, resisted the Almoravids for nearly 10 years until the kingdom finally succumbed in 1076.

One of the chief sources—if not the chief source—of information about resistance and dissent in medieval sub-Saharan

Africa is oral tradition. While historians and archaeologists had long looked on oral traditions with suspicion because of the selective nature of human memory and because such traditions could alter over time, more recently these scholars have come to regard oral tradition as a legitimate source of information about the past. While specific details may be unreliable, the overall theme and structure of the tale is likely to contain a core of truth. These oral traditions were initiated and passed on by griots, or the storytellers and community historians of medieval (and ancient) African communities. These individuals occupied special places in the social order of African tribes and kingdoms, and they often served as wise counselors to rulers and community leaders.

One of the most detailed stories of resistance and dissent comes from the kingdom of Mali in the 13th century. Most of what historians know about it comes from oral tradition about Sundiata Keita, referring to the king of Mali who was born in about 1217 and ruled in the years before his death around 1255. According to tradition, the king of Mali, Naré Maghann Konaté, had converted to Islam but still adhered to many of the beliefs of his indigenous religion, with its emphasis on spirits and prophecy. One day he was approached by a hunter who predicted that he would marry an ugly woman who would give birth to Mali's greatest king.

The prophecy came true when two hunters brought Maghann a hunchbacked woman named Sogolon Kedju. Maghann married her, and soon she became pregnant. Maghann, though, already had a wife, Sassouma Berté, who grew jealous and wanted her own son, Dankaran Touman, to become king. She plotted to have Sogolon killed before her child was born, but she failed, and Sogolon gave birth to a son, who eventually came to be called Sundiata Keita. Sundiata Keita was himself ugly and crippled as well as gluttonous and lazy, but his father, still confident that this son would become king, assigned to him a griot and counselor by the name of Balla Fasséké. When Maghann died, Sundiata Keita was still a crippled child, so Sassouma saw to it that Dankaran assumed the throne. Sundiata Keita, though, underwent a miraculous transformation, one still celebrated by griots in "The Hymn to the Bow."

Sundiata Keita was now a threat to Dankaran and Sassouma. To keep Sundiata Keita safe, his mother took him into exile until he came of age and could seize the throne. Meanwhile, Dankaran sent Sundiata Keita's griot, Balla Fasséké, along with Sundiata Keita's half sister, to the palace of Suman-guru, the king of the western African Sosso, whose armies were growing and who were threatening the surrounding kingdoms. After Sundiata Keita reached manhood, he learned that Sumanguru had conquered the kingdom of Mali and had appointed the captive Balla Fasséké as his own griot.

It was at this point that Sundiata Keita led a rebellion against Sumanguru. He gathered warriors, cavalry, and archers and defeated Sumanguru's forces at Tabon, though Sumanguru himself escaped. Later the two forces met at Kirina, and this time Sundiata Keita fatally wounded Sumanguru. Thus, Sundiata Keita acquired the reputation of being Mali's greatest king by revolting against his nation's foreign overlords. According to tradition, many of his accomplishments were the result of spiritual forces, but historians regard the historical events narrated as essentially factual.

Oral tradition, too, provides information about resistance and dissent in medieval Ethiopia. Sometime in the late 10th century a princess, Yodit, launched a conspiracy to murder the members of the Axumite royal family and seize the throne for herself. Tradition says that the Axumite heir to the throne, an infant, was spirited away. Yodit reigned for four decades, but in the 11th century one of her successors was overthrown by Mara Takla Haymanot, founder of the Zagwe Dynasty, who married a female descendant of the surviving Axumite line. Then, in 1270 the last Zagwe king was overthrown by Yekuno Amlak.

One of the major sources of resistance, rebellion, and dissent in Africa stemmed from the nature of the kingdoms and governments that ruled throughout the medieval period. Because empires, such as the Mali Empire, were forged out of conquest of neighboring peoples, the makeup of these empires was fluid over time. That is, neighboring kingdoms would resist subjugation by an imperial power, though eventually they may have fallen under that power's sway. Rebellion, though, would lead to the breakup of these empires. Complicating the situation was the issue of who was to rule. Because kings often had two or more wives, competition for the throne would develop between half brothers. The result was often chaos when a ruler died and the question remained open as to who would assume the throne. It was this kind of dynastic struggle, when two or more contenders for the throne weakened the line of succession, that led to the decline of the Zimbabwe Empire in southern Africa in the 1400s. Without a clear ruler who enjoyed the support of his people, the empire fragmented into parts and ceased to exist as a single entity.

Again, Mali provides one of the best examples of competition to seize the throne. In the 13th century the kingdom was ruled by Sundiata Keita. When he died, the throne normally would have been assumed by his son, Wali Keita (often spelled Ouali and also known as Yérélinkon). But Wali Keita was a minor, so Sundiata Keita's own half brother, Manding Bory, should have succeeded to the throne; instead, it was seized by Wali Keita, who expanded the empire through conquest and agricultural reforms. Complicating matters, though, was that Sundiata Keita, as a way of rewarding his generals, had

adopted their sons, raising them at the royal court. When Wali Keita died around 1270 these adopted sons came to see the throne as theirs by right. The two then launched a ruinous war against one another. The winner was Wati Keita (also spelled Ouati), whose reign was noteworthy for its cruelty and lavish spending. After four years, in 1274, the other adopted son, Khalifa Keita, seized the throne; he, too, was a poor ruler. After just a year on the throne he was assassinated, and the kingship was assumed by Manding Bory. These and other disputes over the line of succession weakened the Mali Empire until it was eclipsed by the Songhai Empire.

That eclipse took place in the 15th century. The Mali Empire controlled the capital city, Gao, of the Songhai, one of Mali's tributary states. The Songhai, though, rebelled against Mali, disrupting its trade on the Niger River. The Songhai attacked and occupied Timbuktu, the center of learning in Mali, in 1433 and 1434. Then in 1464, under the leadership of Sonni 'Ali (r. ca. 1464–92), the Songhai again attacked Timbuktu as well as the city of Djenné. As a result of this ongoing resistance from the Songhai, worsened by the dynastic squabbles of the Mali Empire, Mali by the 1600s ceased to exist as a power in the area.

One of the most prominent instances of resistance and dissent by medieval Africans took place not on African soil but rather in Iraq. Often referred to as the Zanj Revolt or the Revolt of the Blacks, it was carried out by tens of thousands of African slaves who had been imported from the east coast of Africa to work the salt marshes of Iraq. Their working conditions were miserable, and they rebelled against their masters on at least three occasions. During the longest and most widespread of these rebellions, spanning the years from 868 to 883, the Zanj repeatedly defeated Arab armies sent to subdue them. As the rebellion spread, more and more black Africans joined it, and because they had been worked so hard and were used to enduring harsh conditions, they proved to be formidable warriors. The rebellion in time spread to Iraq, coming to within 70 miles of the capital city of Baghdad. The Zanj even created a capital city, Mokhtara, or the "Elect City." The revolt finally ended when Arab armies sent to quell it were too large for the Zanj to resist. Even then, the Arabs were able to defeat the rebels primarily by offering amnesty and large rewards to those who surrendered.

THE AMERICAS

BY MICHAEL J. O'NEAL

Historians trying to recreate patterns of resistance and dissent in medieval North America are forced in many cases to rely on the archaeological record and then tease out theories that might explain what has been found. It is known, for ex-

ample, that in many medieval North American cultures social inequality was widespread; one way this can be determined is by burial customs. Thus, over time elite classes of people emerged who maintained their positions by virtue of heredity and control of precious resources such as food. They also retained their stations of status and power by controlling trade networks and in many cases by directing the spiritual affairs of the people in their communities as priests or shamans. It is under conditions of social inequality that resentments can grow, competition for power and resources can emerge, and rebellion can erupt.

Finding evidence of rebellion and dissent within small, isolated bands of people is next to impossible, principally because of the absence of written records and the unreliability of oral traditions. It can be inferred that in tribal cultures competition for leadership would inevitably have emerged as factions of people cast their lot with one or the other contender for leadership of the tribe, believing that his opponent or the existing leader was unequal to the task. However, no records survive that shed light on any particular instance of this occurring. It is more likely that rebellion and dissent could have festered in larger communities, where differing points of view could have emerged and where competition for resources would likely have been more intense.

Perhaps the best example of dissent in North America is provided by the Cahokian culture, which emerged in the Mississippi Valley in roughly the year 700, reached the peak of its influence from about 1000 to 1050, and disappeared by the end of the 14th century. Cahokia, with about 20,000 people, was the largest city in North America—and the largest city ever built in North America until Philadelphia surpassed it in the 18th century. The culture remains best known for its 120 large earthen mounds, including Monk's Mound, the largest man-made earthen structure in North America.

On the flat areas at the tops of these mounds—and similar mounds in the surrounding communities that came under Cahokia's sway—social elites constructed their homes and literally looked down on the lower-status people below them. Built at the confluence of the Mississippi, Illinois, and Missouri rivers, Cahokia had rich agriculture lands that were easily worked because of the silt left behind by river flooding. Cahokia also controlled a trade network that extended northward into Canada and southward through eastern North America. This wealth and the population explosion that accompanied it beginning in about 1000 led to an emergence of the social elite to control the culture's vast agricultural surpluses.

By the late 14th century the Cahokians had disappeared. Historians believe that famine struck as the number of people relative to the amount of arable land grew and as the Cahoki-

ans deforested the areas around them, leading to soil erosion and the loss of game animals. Famine would have led to social unrest. Burial sites provide evidence of dissent. At one site the remains of some 280 skeletons were found. Many of the skeletons showed signs of crushed skulls or arrowheads in the people's backs, leading archaeologists to theorize that the people were killed during a rebellion the authorities had to crush.

Historians believe that Cahokians also engaged in another form of dissent wherein they left the community, either forming isolated communities of their own where there were more resources or joining other tribes, such as the Plains Indians. Through both processes, the Cahokian culture vanished.

The difficulties of documenting rebellion and dissent are also illustrated by the collapse of the Maya civilization in Mesoamerica. Traditionally, the history of the Maya is divided into periods, culminating in the so-called Classic Maya Period, which ran from about 250 to about 900. Historians further divide the Classic Period, identifying the years from 800 to 900 as the Terminal Classic Period, ending with what is called the Classic Maya collapse. The causes behind this collapse and the abandonment of cities are regarded as one of the world's central archaeological mysteries.

Numerous theories have been advanced to explain the collapse, including drought, but among the most prominent theories are those pointing to social unrest, dynastic competition, rebellion, and internal war—though certainly, drought and accompanying famine and disease could have contributed to social discontent that erupted in rebellion. According to this theory, as the Maya city-states grew in population, they began to crowd one another and compete for resources, including food, land, water, and influence over trade routes. The theory is that the Maya civilization was weakened by resistance from rural populations that the city-states tried to bring under their control. The difficulties of maintaining control over an empire may have drained resources, thus weakening the state.

Archaeologists also point to the fact that building projects reached their peak in the middle of the eighth century and then seemed to have halted. This sharp break in the archaeological record suggests the possibility that the peasants and laborers, who bore the burden of these construction projects, may have revolted. Historians conjecture that those in the lower classes began to see their lives as burdensome, and in their brute struggle for survival they no longer identified themselves with the religious and social values of the community. Without these ties, they revolted against the elites, leaving unfinished construction projects that, the record shows, were suddenly abandoned.

Additionally, archaeological data show that temples were burned and thrones were destroyed, suggesting that religious

and political elites, perhaps because of drought and hunger, no longer had authority over the lower classes. These peasant and worker revolts would not have erupted simultaneously throughout the Mayan region; rather, they would have broke out sporadically in different places and at different times, progressively weakening the culture over a period of perhaps 300 years. Further, some historians hypothesize that isolated peasant groups may have allied themselves with neighboring kings, and such groups may have taken part in plots to assassinate their own rulers. These theories, though, remain theories. They are not directly supported in the written record, and many historians see the Classic Maya collapse as the end point of numerous social, agricultural, and climatic factors.

Also in Mesoamerica, the Aztec repeatedly faced the need to put down rebellions. The Aztec Empire was ruled by the so-called Triple Alliance of three Aztec city-states in central Mexico: Tenochtitlán, Texcoco, and Tlacopán. These three states formed the backbone of the empire, and they drove the empire's expansion through military conquest. As long as an outlying state paid tribute to the Triple Alliance and remained docile, its own ruling dynasty could remain in place.

However, when one of these states began to flex its own muscles and resist domination by the Triple Alliance, an army would be dispatched to bring the rebellious state under submission. This happened with such frequency that the names of various Aztec rulers' conquests are often repeated, for rebellious states often had to be subdued on more than one occasion. An example of the type of revolt the Aztec Empire had to put down occurred in 1487, when the Huastec people of the Gulf coast region La Huasteca rebelled by refusing to pay tribute to the new Aztec emperor, Ahuizotl (r. 1486–1503), who dispatched an army to bring the Huastec under submission.

Ahuizotl had assumed the throne on the death of his brother, Tizoc, and some evidence suggests that Tizoc may have been poisoned by the royal family after a reign of about five years in 1486. Despite having been regarded as a weak ruler, he suppressed rebellion in the Toluca Valley by the Matlatzincan people, along with expanding the empire through conquest.

After the arrival of the Spanish in the 16th century, the Aztec rebelled against Spanish rule. One of the most noteworthy instances of revolt against the Spaniards occurred during the reign of Cuitlahuac, who ruled Tenochtitlán for just 80 days until his death in 1520. During a festival Hernán Cortés, one of the conquistadors who had subdued the Aztec, was away from the city. In his absence, the man he had placed in charge of the city, Pedro de Alvarado, attacked and massacred a number of Aztec nobles in the city's main temple. Incensed, the Aztec rose up in rebellion—not only against the

Spanish but in large part against the city's ruling class who were regarded as too submissive to the Spanish. The rebels besieged the royal house and replaced the king, Montezuma II (r. 1502–20), with Cuitlahuac. The Spanish attempted to flee the city, but on the night of July 1, 1520, the Aztec rebels successfully ambushed the Spanish force. Tenochtitlán was back in Aztec hands, at least for a while.

In South America the Inca Empire dealt with rebellion and dissent so ruthlessly that few kingdoms dared to rebel. The Incan army was large and efficient, and the network of roads that connected all parts of the empire was so vast that armies could be readily dispatched to quell dissent. The Inca, however, often employed a softer touch. Dissenters and rebels were forced to move into areas that were loyal to the empire, and loyalists were often forced to move into dissenting areas. In this way, it was believed that rebels could be dissuaded from their beliefs and, in effect, rehabilitated. Similarly, it was a common practice among the Inca to subdue resistant leaders of subject kingdoms by sending spies to the area, offering gifts and convincing people of influence that they would be materially better off under the rule of the empire. Additionally, marriages were encouraged as a means to cement relationships and ensure the loyalty of interlinked families.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

Among the peoples who explored the Pacific and migrated to new lands during the medieval era motivations probably varied. In some places people exhausted the food supply and then moved on to new islands. In some cases they probably yearned to explore and relished the challenges of settling unknown places. But in other cases what was involved was factionalism, violent conflict, and exile. On settled islands, those who lost contests for power sometimes had no choice but to move away. The Easter Islanders had a story of Hotu Matu'a, who lost a contest for power in an archipelago to the west and then led his followers on a voyage that found Easter Island, sometime before 690, probably in the 400s. An island that was rich in vegetation, it was slowly denuded of trees over hundreds of years, eventually leaving too little wood for building boats. When there were factional conflicts, the losers had nowhere to go. Apparently, there was a ruling elite, called Long-ears by archaeologists, and there was a working class, called Short-ears by archaeologists. No one seems to know exactly when, but there were conflicts between the groups, including uprisings by the Short-ears. This may have resulted in the two factions segregating themselves to different areas of the island. Archaeologists disagree about exactly what happened, but near the end of the medieval era, the Long-ears

may have been wiped out in a revolt; some researchers insist that a small number survived.

Most medieval peoples living on the continent of Australia faced a different set of circumstances than those of the Pacific islanders. The continent offered great open spaces for people to flee into, but the climate was usually so difficult that a person alone would be unlikely to survive. Consequently, medieval Australian culture emphasized teamwork and cooperation. Children were taught the skills of survival but were allowed to play and stray from the rules of their social groups until they reached puberty, when they underwent rituals that emphasized conformity to the customs of the group. Throughout their adult lives they were governed by rules that dictated their behavior in their groups. It is likely that many people chafed under rules that restricted them to only certain kinds of food gathering or dictated with whom they could mate, but the culture of the medieval Australians was focused on survival and on maintaining the discipline that would ensure that the group survived.

Farther to the west, in Indonesia, Southeast Asia, China, Korea, Japan, India, and Sri Lanka, resistance and dissent took on other forms. Large groups of people sometimes organized themselves into protest movements and even outright rebellions, and the movements often survived efforts to suppress them. Indonesia and Southeast Asia developed kingdoms that almost constantly interacted with one another, with some becoming dominant at different times. Folktales and myths from medieval times sometimes tell of vassals

resisting overlords. There existed rituals and rules for dealing with upstarts, dissenters, and protesters among the social elite. In one famous tale a Cambodian monarch of the Lower Chenla kingdom fretted about the tribute he had to pay to a king in Java and wished that someone would cut off the king's head. Word of this reached the Javan king who, in 790, led an army to into Cambodia to punish the Cambodian monarch. Having overcome the Cambodian defenses, he had the malcontent's head lopped off, while declaring that if the fretful wish had included more than beheading, he would have done more. As it was, he had made his point. This kind of behavior was intended to ensure the stability of the ruling order and of the relations among kingdoms. Malcontents of lower social orders who complained about public policy such as taxes could be imprisoned and tortured. Those who sought reform of their governments faced torture and execution.

To the north was China, a land for which many records of resistance and dissent survive. Throughout the medieval era, there were well organized secret societies in China that persistently sought the overthrow of the imperial government. These societies had to be secret because of the vigilance of Chinese governments; all social organizations outside those of the family and the government were regarded as potential threats to those in power. The secret societies almost always involved religious cults or religious minority groups such as the Manichaeans. Thus, there was some truth to Emperor Wuzong's (r. 840–46) claim in 842 that Buddhism and other foreign religions were undermining his government—although



Scenes from the life of the emperor Ming Huang and his favorite concubine, Yang Kuei-fei; Japan, ca. 1565–1608. Yang Kuei-fei died in the An Lusha rebellion, 755–56. (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1901-20-21)

his primarily motivation was greed. By seizing the property of religious groups, he increased his wealth. His persecution of foreign religions did not end their menace to him and to Chinese governments; instead it seems to have inspired secret societies to become even more secret. Initiations into the societies involved swearing oaths of brotherhood with other secret society members, often sealed in blood.

When a member of a secret society was discovered by the government, he or she would be executed, but many members of secretive groups were willing to lose their lives in the cause of their organizations. The government punished all family members of any suspected society member. The exact punishments varied from dynasty to dynasty, but in general all male family members, including uncles, nephews, and cousins, would be tortured and executed. Women could be executed but were more likely to be forced into slavery or exile. One of the most enduring, and perhaps the most influential, secret groups was the White Lotus society, which survived for centuries in spite of efforts to exterminate it. It was a Buddhist sect that worshiped Maitreya, who was to return as the last Buddhist. In general, it fostered peasant revolts. During the medieval era the most important of these was the Red Turban revolt. Under Mongol rule many peasants and soldiers were drafted into repairing levees along the Yellow River in 1351, and the White Lotus society took advantage of the discontent this caused to draw peasants together in a revolt. Although its declared aim was to restore the Song Dynasty, another of its aims was to redistribute the lands of Chinese aristocrats to the peasants. The Red Turbans met with much military success, but their leadership divided into factions, causing the collapse of their movement in 1363.

The Mongols suffered from factionalism of their own. When a Great Khan, the paramount leader of all the khans, died, there was often competition among rivals for the powerful position. When the Great Khan Mangu died in 1259, tribal leaders elected his brother Kaidu to be the Great Khan, but Kaidu's older brother Kublai (1215–94) was declared Great Khan by his own supporters, which resulted in a war that ended in 1264 with Kublai victorious. When he conquered China, Kublai faced another factional conflict among the Mongols. The factions divided between those Mongols who wanted to remain nomadic and those who wanted to settle down and rule the Chinese. Kublai seems to have been among those who wished to have the Mongols settle down as a ruling class. Conflict among the factions of Mongols made them vulnerable, and in 1368 a Chinese revolt led by Zhu Yuanzhang (1328–98) defeated the Mongols. It was alleged that he was secretly a member of the White Lotus society, which he denied. He persecuted secret societies, including the White Lotus.

Far fewer details are known about resistance and dissent in Korea. In general, Korean society demanded a high degree of conformity. Those who did not conform to social expectations were publicly ridiculed by both government authorities and their neighbors. Rebels were usually put to death and their families were sent into exile. The most powerful faction in Korean government was that of the learned elite of government bureaucrats. These men were proponents of Chinese culture, law, and government and advocated the following of Chinese examples for governing Korea. They spent many years learning Chinese writing and how to make Chinese ideograms fit the spoken Korean language. Korean nationalists often advocated a shift away from Chinese models but usually with little success, because the learned bureaucrats had a near monopoly on literacy and therefore on the making and enforcing of laws. Their control of government began to be broken in 1443, when King Sejong (1397–1450) organized scholars to create a written language suited to the Korean spoken language. What resulted was hangul, a written script that was easy to learn, and which King Sejong insisted be taught to everyone. By learning the language, men and women outside of government were able to read the important documents of their culture and began to have a greater voice in how their government was run. After King Sejong's time, the bureaucrats tried to suppress hangul and retained their control of government for many years.

In Japan dissent was common. In particular, peasants complained of unfair treatment by landlords. Japan had a customary set of rules for protesting. Protesters were supposed to tell the headmen of their villages their grievances, and then the headmen were supposed to write to the local samurai lord. Peasants often made up the main bodies of armies and therefore tended to know how to use weapons and how to organize themselves to fight. When they did fight, their anger was usually directed at a local government official or aristocrat, rather than the central government. Often the samurai of the local lord just stayed out of the peasants' way while the peasants rioted in a town; the riot usually ended with a shop or two burned and the peasants going home. Leaders of peasant uprisings were usually executed, with their families often exiled, but in general few reprisals were taken against the other peasants. The revolts of peasants were called *ikki*, and they tended to focus on ill treatment. During the Heian Period (737–1185) peasants often succeeded in driving away cruel tax collectors, sometimes keeping tax collectors away for years at a time. Serious revolts occurred in 1428 and 1485 against representatives of the central government. In some places peasants ruled themselves for decades after these revolts, electing their own leaders and organizing their own militia to keep bandits away.

At the start of the medieval era in India there were fairly effective methods for dealing with dissatisfaction with the government or with people of high caste. Perhaps the most important outlet for protest was the craft guild. Guilds gave people places to go where they would be among equals and not have to try to remember all the rules for conduct when dealing with people of other castes. Sometimes craftspeople established their own villages. There might be one for blacksmiths, another for carpenters, and another for foresters. In such villages the guild became the government. People elected their own guild officials who ran the villages. Guild leaders could talk to government agencies on behalf of their members and villages. There may have been caste villages, too. For instance, the Untouchables might congregate together and organize their lives to make sure they could survive. These outlets for dealing with social disaffection slowly changed during medieval times. From about the 900s onward the caste system and its social rules gradually became more rigid as a reaction against Muslim government, because the rigid following of these social rules was seen as a nationalist alternative to the Islamic regime.

EUROPE

BY BRADLEY A. SKEEN

In medieval Europe dissent did not typically take a political form. Rather, calls for reform, dissent, and protest were organized around religious institutions and ideas. Political dissent tended to focus on access to power, which often led to civil strife and rebellion or wars between rival claimants to positions of authority. Calls for change to the social order, dissent from the rigidly established class system of medieval Europe, took the form of religious movements. These could be either accepted as the basis for the reform of existing society or rejected and marginalized by the institutions that governed society.

Mere political rivalry concerned the concentration of political power in the hands of one group or another without any fundamental call for change. For example, the Hundred Years' War (1337–1453) and the War of the Roses (1455–87) were about which dynasties would control the French or English thrones, but they did not include any appeals for social reform. At stake were ties of personal obligation between the claimants to the monarchy and the great nobles who supplied the military resources to wage the wars. Because conflicts were not about any particular political idea or social cause, nobles acted in their self-interest and could and did change allegiance when it was to their advantage. Even the signing of the Magna Carta after the Battle of Runnymede (1215), often viewed as the beginning of a histori-

cal movement toward democracy, had to do with powerful nobles gaining more rights and privileges for themselves at the expense of a weak monarchy.

The Italian city-states preserved the old Roman social system of patron-client relations. Powerful families (patrons) dominated the politics of the ostensibly democratic cities through their unofficial control of employees and other dependents (clients). Most cities were wracked by rivalry between patronage factions whose conflicts would occasionally flare up into civic strife and rioting. The patrons themselves would look for aid in their struggles from powerful figures outside the city, such as from the pope or the emperor. When these two leaders came into conflict in the 11th-century Investiture Crisis (over the right to appoint bishops), the civic factions supporting the emperors became known as Guelfs and those supporting the popes as Ghibellines. But the conflicts within the cities were about the exercise of local power and did not arise from any interest in reform. In Florence, for instance, the Ghibelline faction was quickly defeated and exiled, but the Guelf faction split into Black and White Guelfs, who then predictably appealed for support to the emperor and pope. These kinds of conflicts and alliances were constantly shifting because they, too, were primarily based on self-interest rather than larger concerns.

Saint Francis of Assisi (1181–1226) voiced dissent from prevailing culture in a very different way. As the young son of a wealthy merchant, Francis noticed that most people were concerned with wealth and power and did little to help the poor; they did not lead Christlike lives for all their profession of Christianity. When Francis donated a large sum of money to the poor, he was mocked by his friends and beaten by his father. In response to a vision of Christ, Francis renounced his family and his inheritance and devoted himself to helping the poor. He went into a graveyard and preached to the wolves and crows as a way of showing that contemporary society was, in his view, as far removed from a Christian way of life as were those predatory and carrion-eating animals. Many of his contemporaries heard his call, however, and came to help in his work of aiding the poor, while others donated the money needed to do it. Eventually, the church accepted Francis and his message and incorporated him and his followers into the Franciscan Order of Friars, which became one of the most important institutions in the church during the later Middle Ages.

Other calls for resistance to and dissent from the consensus of medieval culture were more radical and so could not be accepted by the church or by the society that they sought to overturn. These were eventually treated as heresy and suppressed either by court proceedings (since heresy was a crime in both canon and civil law) or, in some cases,

by military action. However, the heretics' basic criticism of society as it existed in the Middle Ages usually grew in the same ground as Saint Francis's, the need for the Christian to live in imitation of Christ, even if it called for radical solutions to social conditions.

Around the year 1000 agricultural expansion led to an increasing gap between rich and poor. Priests and monasteries usually drew their income from land, so they became noticeably richer, as did the nobility. The very problem of the injustice of wealth and its power to oppress the poor, which had been at the heart of Jesus' preaching, came to the forefront of life in the Christian community of Europe. One reaction was a new trend in popular Christology that emphasized Jesus' suffering as a man and called on Christians, especially the clergy, to imitate his life of self-sacrifice. Peasants often came to believe that society should be reformed in the image of Christ with justice and poverty replacing exploitation and pride. Often the grievance that led to the call for reform could be understood in economic or class terms and began with demands for the repeal of a new tax or the restoration of old rights to land use, but it would inevitably be expressed in a religious idiom. The preaching of the church taught peasants that Christian society ought to be just. For instance, the just price of bread was not the highest price fixed by market forces but the price that would keep the poor from starving. Injustice could become a cause of protest and revolt.

If a movement of protest became inspired by a visionary leader claiming to represent an alternative source of authority by direct mystical contact with Christ, then the call might come for a true leveling of society through the abolishment of the church and the nobility as a means of preparing for Christ's apocalyptic return. When the monk Joachim of Fiore (ca. 1135–1202) denounced the pope as the Antichrist, he was expressing the belief that a society that claimed to be just and pious had in fact become unjust and corrupt—that things had become the opposite of what they ought to be. These movements were usually suppressed by branding them as heresy and thus in violation of all society's laws. They could then be dealt with through the harshest measures.

In the Middle Ages there were innumerable movements for social reform that took on a religious structure, ranging from the Cathars in 12th-century France—who introduced an essentially new religion, whose leaders were chosen for their spiritual purity, whose followers held all their goods in common, and who were suppressed in the 13th century only by a military crusade—to the Fratricelli, a sect of Franciscan monks who wished to do away with the temporal power and wealth of the church in imitation of Christ's life of poverty. Jan Hus (born in 1372 or 1373 and executed as a heretic at the Council of Constance in 1415) in 15th-century Bohemia be-

gan to call for the abolition of the church hierarchy because of its greed. His followers, the Hussites, ended by calling for the complete destruction and rebuilding of society based on their understanding of Christ's exaltation of poverty. Finally suppressed only after a long and difficult war, the Hussites prefigured the Protestant Reformation that took place in the early 16th century, which may be seen as the ultimate development of peasant resistance and dissent in the Middle Ages.

One of the most widespread—and certainly today the best known—popular protest movements of the Middle Ages was that of the flagellants. The term comes from the Latin *flagellare* meaning “to beat with a whip.” While there was an established tradition of cloistered monks and nuns whipping themselves in expiation of what they saw as their own sinful human nature, the flagellants transformed this practice into a public spectacle where up to 10,000 men and women (who were rarely clergy) would march from city to city in Italy, France, or Germany, whipping themselves. Their leaders preached that the church and all other social institutions were completely corrupt and that salvation could be achieved only by joining the flagellant procession. Flagellant preachers frequently claimed to have a new revelation, for example, in the form of a letter written by an angel read out in each city the movement visited, or to be messianic figures heralding the return of Christ and the last judgment: The flagellant leader Konrad Schmid, for instance, claimed to be the Holy Roman Emperor Frederick II Barbarossa resurrected from the dead.

Flagellants sometimes lynched priests, Jews, and lepers, whom they saw as symbols of the social evils of greed, corruption, and pride they opposed. The flagellant movement was often vigorously suppressed, but some rulers protected its followers out of respect for what was seen as the piety of their criticism of society. The flagellant processions inspired many examples of personal repentance and remarkable charitable acts, even among the crowds that came to see them but did not actually join the movement. The earliest flagellants originated in Italy in 1259, and the movement persisted for the next two centuries, reaching its peak during the Black Death (1347–50). It was not a continuous phenomenon but would flare up in different times and different places, finding new leaders and followers fundamentally dissatisfied with the state of the society they lived in and ready for radical change.

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

The seventh-century Arab Muslim conquest was fundamentally one of nomadic tribes over settled civilizations outside the Arabian Peninsula—civilizations of cities and towns where trade and crafts were practiced and of villages

dispersed across vast agricultural lands. These population centers were distributed between the Byzantine and Persian empires, which had been at war for decades and were largely unaware of religious and political developments in Arabia. They were, however, aware of seasonal raids by Bedouin tribes aimed at plundering livestock, household goods, stored foodstuffs, and other items. Raiding was common among these tribes, largely because, as nomads, they had not developed the infrastructure needed to manufacture handicrafts and accumulate storehouses of foodstuffs. The bounty possessed by the settled peoples they would conquer became a central ongoing point of contention within the *umma* (the Muslim community as a whole).

Muhammad built up his armies by recruiting from those same tribes, and he enticed his recruits with the prospect of plunder. Moreover, the Koran established Muhammad (and successor Muslim heads of state) as the leading authority to control and distribute the spoils of war. This authority was nevertheless a continued source of friction between the emerging Muslim state and the nomadic tribesmen of Muhammad's armies. From the beginning, a clash of interests arose. The nomads wanted immediate reward, with plundered goods divided right after a conquest—preferably on the battlefield itself—and conquered populations enslaved, following which they would burn villages and leave a barren land that would revert to grazing grounds for their flocks. The Muslim state, however, preferred to transfer land ownership to its own commanders and turn peasants into tenant farmers who would continue to till the soil (the Arabs not being particularly inclined to or skilled at agriculture, owing to the desert geography of Arabia), thereby ensuring a continued source of tax revenue.

This divergence of interests resulted in repeated bloody eruptions in the seventh to ninth centuries throughout the Arab Muslim world. The prize under contention, the life's work of the conquered peoples, put defenseless non-Muslim villagers and peasants in an unenviable situation: suffer immediate destruction at the hands of the nomads or endure a more stable but ultimately equally destructive regime of social discrimination, personal humiliation, and economic exploitation meant to bleed them for the benefit of the growing *umma*.

Another kind of dissent within the *umma* arose following the death of Muhammad in 632 C.E. Several Bedouin tribes that had agreed to send an alms tax to Medina as a sign of allegiance apparently no longer felt obligated to do so. The first caliph, or successor to Muhammad, his father-in-law Abu Bakr (r. 632–34), moved swiftly to subdue these dissidents, branding them as apostates. The ensuing wars constituted the first organized resistance to Islam. It is noteworthy

here that political dissent concerning a tax became a religious issue: The dissidents, deemed resistant to Allah, were put to the sword. With growing numbers of conquered peoples to control, a strategy of using religion to reinforce political control was articulated. The strategy devised and implemented by Arab Muslims during the first wave of conquest in the lands around the bottom half of the Mediterranean (from Syria and Iraq across North Africa and into Spain) proved so effective that it remained largely intact during the second wave of conquest, by Turkish Muslims beginning in the 11th century, north of the Mediterranean (in eastern Europe, Greece, and southern Italy).

Muhammad granted political authority to his successors, whether caliphs or the religious and secular leaders known as imams (the matter of the caliphate versus the imamate is a complex one in Islamic theology) and legitimized their rule by making it sacred. Thus, the head of the *umma* was at once a political, social, and spiritual leader. Obedience to the religio-political authority of the imams was continually reinforced in both the Koran and the Hadith, the sayings of Muhammad. By the 10th century conservative Muslim writers warned against even engaging in discussion with anyone who questioned the established order or the imams, even if they were unjust and tyrannical. Thus, innovative thought became suspect and oppression was sanctioned.

For those who continued to resist Islamic rule, the consequences were dire. Whereas believers became part of the new polity and recipients of plunder, resisters faced continual fear for their physical safety and lives filled with shame, humiliation, and social isolation. The Koran pronounced proscriptions against them that, in practice, were neither abstract nor metaphorical nor exaggerated.

The model for dealing with conquered peoples was Muhammad's handling of the Jewish tribes of Khaybar, whose leaders agreed to submit to Muslim authority and pay tribute—over half of their harvests. This “protection money” provided much-needed revenue for the *umma*. Muhammad, however, did not consider the treaty permanent and reserved the right to rescind it at any time, a tactic that would be repeated in later times.

The second caliph, Umar ibn al-Khattab (r. 634–44), created the Pact of Umar, under which conquered non-Muslims who elected to remain loyal to their faiths would endure sanctions meant to actualize Koranic mandates. Many of the pact's provisions remained common throughout the medieval era in dealing with unbelievers. Among the numerous restrictive requirements the pact imposed on them in return for protection of their lives, the non-Muslims agreed not to build any new churches or monasteries or repair any old ones, not to manifest their religion publicly or convert anyone to



Silver medallion (Iraq, 937) struck to commemorate the establishment of order in the city of Baghdad, Iraq, following the arrival of the powerful Amir al-Raik. The amir had been invited into the city to subdue the various factions that were causing civil disturbance in the city. (© The Trustees of the British Museum)

it, not to bear swords, not to build any house overtopping Muslim houses, and not to strike any Muslim. They were also to dress and to crop their hair in a characteristic manner, to give three days' board and lodging to any Muslim who passed their way, and to show deference in many other ways. Finally, they were to pay a poll tax, a land tax, and other unusual taxes. Such a pact or covenant was known as a *dhimma*, and the unconverted Christians or Jews who agreed to it were called *dhimmi*.

The Pact of Umar gives the full scope of the measures the Muslim state was willing to take to subdue nonconverted conquered peoples, who formed majorities during the first two centuries of the conquest. However, except for collection of the various taxes, the harsher provisions of the pact were unevenly applied, depending on the zeal of the ruling imam and which school of Sunni thought prevailed within a given region.

Muslim sources contain numerous references to the restrictions imposed upon *dhimmi* under the pact and to the need to gather taxes from these people. However, these sources do not otherwise include the history of Christians and Jews under Islamic rule, these groups having no political power and no rights beyond conditional tolerance, which they had to purchase annually, which could be abrogated at any time, and which could be expanded by demands for gifts, bribes, and other forms of extortion. Western sources include

letters from European colonial representatives to their home governments describing the circumstances under which the *dhimmi* lived and noting the Europeans' limited capacity to help them. European travelers witnessing the plight of their coreligionists living under Islamic rule made their observations within the framework of their own prejudices and conflicts back home (Catholic versus Protestant, Christian versus Jew, Western versus Oriental). Sources from *dhimmi* leaders themselves are influenced by the conflicts among various Christian sects and between Christian and Jews.

Despite its ongoing struggle to control tribesmen competing for loot, the Arab Muslim state developed a formula for maintaining political and military control over conquered lands. On a military level Muslim commanders placed garrisons near conquered towns, where they could quickly quell revolts. The fate of the conquered peoples depended on whether they had fought the Muslims, capitulated, or entered into a treaty. Pagans or idol worshippers who had fought against Islam were given a simple choice: convert or die. Christian and Jewish resisters were given the options of converting, accepting the *dhimma*, or being put to the sword. Religious and political leaders typically chose the *dhimma* as the lesser evil between marauding nomads who terrorized the countryside and Muslim commanders with whom they could negotiate the terms of surrender in exchange for protection.

Within this context the economic dimension of conquest, coupled with a pervasive climate of fear, had the greatest impact in quelling resistance. The poll tax was a sign of submission and inferiority because Muslims were not required to pay it; moreover, the *dhimmi* were required to endure humiliation during the public payment ceremony, in which each male head of household would hold out his hand with the tax money and be administered a blow on the head or neck by a Muslim. In addition, *dhimmi* peasants had to pay the land tax from the produce of the lands they farmed but no longer owned, the ownership having passed to Muslim commanders. The scope and degree of taxation was, moreover, open-ended. Other taxes might be levied for the maintenance of tax collectors, many of whom also expected gifts of money and goods in exchange for favorable treatment. Taxes were imposed on foodstuffs and on building projects. Besides the injunction against the building and repair of churches, *dhimma* agreements typically required turning some churches into mosques. Money was also regularly extorted from churches and monasteries, leading to an overall decline.

Enslavement and deportation completed the Arab Muslim policy for quelling dissent. Following a conquest, those towns that had not entered into a treaty—and there were many—were plundered and their inhabitants either massacred or enslaved and deported. In conquered towns, increasingly burdened by taxation, peasants who could no longer pay their taxes saw their children seized, enslaved, and deported. Finally, treaties of surrender, in addition to payments of money and agricultural products, might prescribe a “blood tribute”: a quota of boys, girls, and women to be turned over to Muslim authorities for enslavement and deportation.

The blood tribute was institutionalized by the Ottoman sultan Orhan (r. 1326–59) in the *devshirme*, the practice of levying one-fifth of Christian children from the Balkan states for conversion and conscription in the sultan’s armies. Contingents of 1,000 Greek, Serbian, Bulgarian, Armenian, and Albanian children were rounded up annually from towns and villages. (Certain places, among them Constantinople and Rhodes, were exempt.) Fathers were ordered to present their sons at specific gathering spots, where the strongest would be selected by janissaries, former Christians who had been taken, converted, and formed into a special corps. Resistance was punished. The practice lasted several centuries, into the modern era.

These patterns of rule, repeated over and over among an increasing number of cities and towns, fractured indigenous settled societies, weakened social ties and group identity, and disrupted the ability to rebel effectively against the

minority who held political and military power. The gradual impoverishment of conquered societies and the ongoing collaboration of their leaders and elites with Muslim authorities further undermined the indigenous populations. Chronic fear and insecurity became part of the psychological fabric of *dhimmi* communities, and pessimism seeped into their collective consciousness and passed from generation to generation. This, too, weakened the urge to revolt. Over time the *dhimmi* learned the limits within which they could safely operate. They became essentially economic producers. Their tributes of money became the leading source of revenue for the Muslim state, financing continued warfare against their yet unconquered coreligionists; their tributes of blood, their own children, provided an endless supply of slaves (nearly all of whom converted to Islam) for Muslim domestic and military use.

Active resistance to Islam did erupt early on. Burdened by excessive taxation, the Coptic Christian peasantry of Egypt staged several major revolts, notably in 697, 712, and 725–26. Following the crushing of a last massive revolt in 832, large numbers of Copts in Egypt converted to Islam. Mu’tasim, caliph of Baghdad (r. 833–42) ended a revolt by prisoners of war by putting 6,000 Greeks to the sword.

Slaves occasionally rebelled. Ill treatment and harsh working conditions drove East African slave laborers working the sugar plantations, irrigation projects, and salt marshes around Basra (southern Iraq) to revolt in 869 against their Arab Muslim owners. The rebellion was large—the rebels even set up their own capital—and long, lasting some 14 years, but it was ultimately suppressed and its leaders executed.

The most significant Christian resistance to Muslim rule came several centuries later. It was not a revolt, but an invasion: the First Crusade (1096–99), launched by European kings and nobles and followed by several other crusades over the next century. Although the crusaders won some battles and their presence inspired some local revolts, the crusades ultimately ended in failure.

See also AGRICULTURE; ALCHEMY AND MAGIC; BORDERS AND FRONTIERS; CITIES; CLIMATE AND GEOGRAPHY; CRIME AND PUNISHMENT; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; EXPLORATION; GOVERNMENT ORGANIZATION; LAWS AND LEGAL CODES; LITERATURE; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NOMADIC AND PASTORAL SOCIETIES; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SCANDALS AND CORRUPTION; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WAR AND CONQUEST; WRITING.

FURTHER READING

- David C. Conrad, *Empires of Medieval West Africa: Ghana, Mali, and Songhay* (New York: Facts On File, 2005).
- Herbert Franke, "Factions and Rebellions." In *The Cambridge Encyclopedia of China*, ed. Brian Hook and Denis Twitchett (New York: Cambridge University Press, new edition 1991).
- Michael Frassetto, ed., *The Year 1000: Religious and Social Response to the Turning of the First Millennium* (New York: Palgrave, 2002).
- Ira M. Lapidus, *A History of Islamic Societies*, 2nd ed. (Cambridge, U.K.: Cambridge University Press, 2002).
- Gordon Leff, *Heresy in the Later Middle Ages: The Relation of Heterodoxy to Dissent c. 1250–c. 1450* (Manchester, U.K.: Manchester University Press, 1967).
- Bernard Lewis, ed. and trans., *Islam from the Prophet Muhammad to the Capture of Constantinople*, 2 vols. (New York: Oxford University Press, 1974).
- R. I. Moore, *The Origins of European Dissent* (New York: St. Martin's, 1977).
- Michael Mullet, *Popular Culture and Popular Protest in Late Medieval and Early Modern Europe* (London: Croom Helm, 1987).
- D. T. Niane, *Sundiata: An Epic of Old Mali*, 2nd ed. (New York: Longman, 2006).
- Gilbert Rozman, "Secret Societies." In *The Cambridge Encyclopedia of China*, ed. Brian Hook and Denis Twitchett (New York: Cambridge University Press, 1991).
- Jeffrey Burton Russell, *Dissent and Reform in the Early Middle Ages* (Berkeley: University of California Press, 1965).
- Jeffrey Burton Russell, *Religious Dissent in the Middle Ages* (New York: John Wiley and Sons, 1971).
- Nathan Seppa, "Metropolitan Life on the Mississippi," *Washington Post* (March 12, 1997). Available online. URL: <http://www.washingtonpost.com/wp-srv/national/daily/march/12/cahokia.htm>. Downloaded on October 24, 2007.
- Hugh Thomas, *Conquest: Montezuma, Cortés, and the Fall of Old Mexico* (New York: Simon and Schuster, 1993).
- David L. Webster, *The Fall of the Ancient Maya: Solving the Mystery of the Maya Collapse* (London: Thames and Hudson, 2002).
- Philip Wilkinson, "Easter Island." In his *Time-Life Encyclopedia of Mysterious Places: The Life and Legends of Ancient Sites around the World* (Alexandria, Va.: Time-Life Books, 1990).
- Bat Ye'or, *The Decline of Eastern Christianity under Islam* (Madison, N.J.: Fairleigh Dickinson University Press, 1996).
- Bat Ye'or, *The Dhimmis: Jews and Christians under Islam* (Madison, N.J.: Fairleigh Dickinson University Press, 1985).

► roads and bridges

INTRODUCTION

Many medieval governments were caught between two needs when building roads and bridges. One need was for swift, easy passage from one area to the next for government armies and law enforcement as well as for farmers who were bringing food to town and cities and merchants who were importing goods that enhanced the land's economy. The other need was

for impeding invading forces. Wars of conquest and looting were common in the medieval era, and good roads and bridges could mean quick movement of defense forces to confront attackers. On the other hand, good roads and bridges could allow attacking forces to move quickly from a land's borders to its capital. Defending and destroying bridges were common tactics for slowing down enemies.

Balancing such needs was tricky business. For instance, in medieval India one of the standards for judging a monarch's merit in some kingdoms was how well he or she maintained the roads. In western India, in particular, maintaining roads that merchants could use for transporting goods between inland cities and coastal trading posts was essential for maintaining a kingdom's economic health. Making wide roads with drainage so that rainwater ran off to the sides rather than puddling, as well as creating rest spots with shade trees and rest centers were part of a government's everyday functions. Local governments were often required to maintain rest areas in their jurisdictions. Still, well-maintained roads were open to exploitation. From southern India greedy monarchs led raids into the north to loot cities. Muslim invaders from the northwest could race along roads to cities that they looted and burned, carrying away as slaves those they did not kill. These wars of greed put pressure on Indian kingdoms to either heavily guard their international routes or turn inward and neglect maintenance of roads that made surprise attacks easy.

Elsewhere, many governments built roads to facilitate movement of goods as well as troops. In China the capital of Xi'an had severe problems with supply of food in the early medieval era, only managing to maintain a steady food supply by building and maintaining roads that brought goods quickly from harvest in distant parts of the empire to the capital. These roads almost always involved several bridges, and it was routine in Chinese wars for defenders to destroy the bridges and then to defend the river to try to thwart the enemy's attempts to cross the river in boats or on rafts. In Japan most long roads on Honshu had bridges, but in some places, rivers had to be forded, an undertaking made dangerous by earthquakes and floods. This may have been the main reason why the Nakasendo road was made; although it was less traveled than the Tokaido route to the east, it offered travelers an alternative route for traveling north-south that avoided fording rivers.

In China and Japan merchants were officially regarded with contempt, because they were regarded as parasites who produced nothing themselves while making a profit from the work of others. Even so, governments usually coveted the exotic goods that merchants could bring into the country. In the Islamic world the attitude was very different. Mohammad

had been a merchant who was noted for his honesty. He had asserted that merchants were specially blessed, because they carried the words of God wherever they went. Thus, in addition to material self-interest, governments had a moral imperative to aid merchants. This may be why the Islamic world had some of the world's best-built and best-maintained roads, allowing for an ease of communication among its disparate parts matched only in China and the Inca Empire during medieval times. The amenities provided by Islamic governments included areas in the rings of gardens around cities and towns where travelers could rest and their animals could be fed and watered. There were caravansaries, which were remarkable not only for their frequency along well-traveled roads but for their durability through hundreds of years of wars and social upheaval. At such places people found lodging for themselves and their animals and protection in fortresslike enclosures that kept out bandits.

Perhaps the easiest-to-recognize example of the importance to everyday people of roads and bridges is what transpired in Europe during the medieval era. Driven by their desire to find markets, merchants pioneered routes through Europe that eventually developed into a road from the Baltic Sea to Italy. In France they stopped to buy and trade goods, creating large trade fairs where local peddlers could acquire goods to sell in villages and towns, giving people access to textiles, spices, ceramics, and other goods that they would not otherwise have had. Further, the peddlers would buy locally produced goods to trade with merchants at fairs along major trade routes, bringing wealth to commoners who would not have had access to profitable markets without well-maintained roads.

AFRICA

BY MICHAEL J. O'NEAL

Medieval sub-Saharan Africans built little in the way of roads and bridges, at least those that had any permanency. Most of the transportation that took place in the region was conducted to the north through the Sahara, as trade goods were transferred from the north in a southwesterly direction to west-central Africa, including such cities as Timbuktu. During the medieval period Africans did not use wheeled transportation; goods were transported across the Sahara by camel caravan and then were offloaded for river portage to their southerly destinations. While the routes that traders followed over the Sahara were relatively well defined, constructing anything like a road over such a vast distance and in the shifting sands of the desert would have been fruitless. Similarly, transportation routes through the savanna regions of west-central Africa would have been well defined, but the

immense distances they covered made the construction of roads impractical.

In the forested regions of sub-Saharan Africa the problems were similar. While there were certainly lines of transportation linking the major cities in these kingdoms, roads were little more than tracks through the forest. During the rainy seasons, these tracks turned into seas of mud. Given the nature of the climate, building permanent roads capable of withstanding the seasonal downpours would have been a daunting task. Such construction would have been prohibitively expensive. Instead, the people adapted by relying on pack animals and human portage, which had the advantages of being cheaper and better suited to the terrain and the climate.

With bridges as with roads, medieval sub-Saharan Africa offers no noteworthy examples. It can be assumed that any bridges would have been made of wood, which did not survive the elements and which deteriorated over time, leaving behind little in the way of an archaeological record. To cross rivers such as the Niger, medieval Africans probably relied on boats and rafts and on fording at places where people and pack animals could wade through the waters where they were low.

Throughout much of Africa the terrain also discouraged road building. For example, in western Africa salt marshes dotted much of the landscape, and these marshes and the land surrounding them would not have provided stable beds for roads nor would they have provided road builders with any convenient source of building materials. East Africa, for its part, was marked by ranges of mountain peaks running from the Ethiopian highlands down the continent to the high grasslands of South Africa. These mountains would have made the construction of roads enormously expensive. The peoples of East Africa settled primarily along the coast, where the sea provided them the means of communication and transportation.

THE AMERICAS

BY PENNY MORRILL

Developments in photography and remote sensing, especially from the air, have resulted in the detection of roads and other archaeological features throughout the Americas. This physical evidence has radically changed the study of formal and informal roadways, especially since few descriptions exist from the past. In one that does, however, from soon after the Spanish conquest of Mexico in the mid-16th century, an Aztec informant explained to the Spanish Franciscan ethnographer Bernardino de Sahagún the different types of roads. Using the terms found in de Sahagún, the "main road" is wide and

often smooth, although gullies, gorges, and crags can exist. There are wooden bridges or log crossings placed where the land is perpetually muddy, watery, or rough. As travelers go along the main road, they must take responsibility for maintenance, removing downed trees or weeding when necessary.

A “trail” is a narrow road that follows the natural terrain. The “shortcut” is the straightest route, while the “secret road” can also be a shortcut. Because this kind of road is not well traveled, it can be dangerous. It can cross difficult terrain, and there can be wild animals present because of the small numbers of travelers. It is a place where one can meet death in the jaws of a beast. Equally dangerous is the “footpath.” The traveler along a narrow, weed-filled footpath can encounter fearsome challenges, both in the landscape itself and as a result of isolation. When taking into account the description of the poor condition of these informal routes, the implication of de Sahagún’s informant is that the Aztec had little control over what took place on remote roadways.

The *oquetzalli* is a “new road,” made smooth and cleared of impediments of any kind. This road is meant for the ruler. The “old road” is different, perhaps having once been a wide and often-used route but one that has been abandoned, pitted, and choked by weeds and debris. This older, traditional route was called *coatl*, meaning “serpent.”

In Mesoamerica the road could be traveled only on foot, since there were no wheeled carts or draft animals. The forms of the various roads were influenced by terrain and by their use as military routes, as trade links, and for ceremonial pageantry. Significantly, de Sahagún’s Aztec informant characterized the road as a living entity, a serpent. Thus, roads could take on a symbolic meaning, as scholars have found at Cobá in the northern Maya region, at Xochicalco in central Mexico, and at various sites in modern-day Peru.

In central Mexico at Teotihuacán (ca. 100–ca. 600 C.E.), the Street of the Dead, on a north-south axis, retains its ceremonial character both within the site and along its extensions. On the other hand, the east-west axis may have had both political and economic uses, for it extends to the east, leaving the valley through a pass in the Sierra del Malpais to Calpulalpan. This road may have connected Teotihuacán to a less formal road network beyond Calpulalpan.

At Xochicalco (ca. 650–ca. 900 C.E.) in present-day western Morelos, a regional road network helped impose and centralize the rulership for this chiefdom. Ceremonial roadways within the site were stone-surfaced pavements leading out in four directions from the Pyramid of Quetzalcoatl. The pavements helped dictate the use of the architectural space by directing the manner in which the people of Xochicalco could approach the various structures within the ceremonial center. Access to this fortified site was controlled by walls

and limited by formal roadways. Roads reached a width of 8 feet, and ramps were built to cross over natural impediments. The roads extending out of Xochicalco supported regional transportation needs. The reach of these external roadways was significant, for they established political and economic relationships with the local elite in the surrounding polities. As was the case throughout the Americas, the roadways of Xochicalco gave expression to the power of the central state.

Contemporaneous with Xochicalco, *sacbes*, or raised causeways, at Cobá (ca. 500–ca. 900 C.E.) in Yucatán were rock-filled roadbeds paved with stone and filled in with lime. The roads were about 10 to 66 feet wide, with narrow culverts that allowed water to run off the surface and down the sides. Occasionally the roads were interrupted by small altars or covered by free-standing vaulted arches. Ramps were built to provide ceremonial access to sacred monuments, as at Xochicalco. *Sacbes* also joined with ritual underground passages. As a result, some scholars believe the roads may have had astronomical alignments or cosmic significance, especially related to the free-standing arches. While the causeways connected other centers in the region for ceremonial and trade purposes, the *sacbes* could have had an even greater extension beyond Yucatán to a larger trade network. These *sacbes* may have been boundary markers as well as the means of long-distance trade relationships with other urban centers in Mesoamerica.

In present-day south-central Zacatecas, Chicómozto (ca. 600–ca. 800 C.E.) sits above the Malpaso Valley on a series of mountain terraces. The site is accessible by way of raised and paved causeways that have low retaining walls of slab stone. The roads were constructed of a rubble core covered by flat stones. At their widest point they reach 39 to 46 feet. Small square altars are placed in the center of the causeway, as in Yucatán. It is evident that this large-scale regional causeway network required complex planning, engineering, and a large labor force.

Farther to the north, in present-day northwestern New Mexico, the Anasazi (ca. 1000–ca. 1200 C.E.) built an extensive road system centered on Chaco Canyon. The roads reached a width of up to 20 feet. They were linear, overcoming natural obstacles with rock-cut stairways, ramps, and raised roadbeds. The Anasazi roads extended from the central site as much as 50 to 60 miles. These roads were cleared and provided with borders of banked earth or with masonry walls at approaches to major sites. It is believed that the roads not only had trade and ceremonial functions but also may have mirrored cosmological beliefs.

A survey of the Virú, Moche, and Chicama valleys along the northern coast of Peru brought to light more than 150 ancient roads. The identity and dating of both formal and infor-

mal routes were verified by analyzing cross sections through older roadbeds as well as by taking note of related ancient structures, canals, and walls. Over the span of 2,500 years roads in the Moche valley were cleared and graded, with roads cut through small hills and with ramps that were stone-faced. Along certain sections the roads were curbed with debris from road construction, or they were walled.

Early in the history of this area the Cupisnique (ca. 500 B.C.E.) had built roads exclusively with walls. It would be another 1,500 years before another group, the Chimú, would construct roads with walls or curbs. The Chimú chose to build walls of stone-faced rubble and to raise the roadbeds when they passed through irrigated fields. These two methods of road-building helped keep people on the road and water from washing away the roadbeds. All Chimú roads at Chan Chan were elevated causeways with walls.

As in other regions of the Americas, the development of chiefdoms in Peru led to the construction of formal roads as manifestations of power. There is evidence from the Spanish colonial period that indigenous rulers sent engineers to lay out roads before they were constructed. The ability of a ruler to designate the placement of roadways indicates that these roads established control over the landscape and that their construction required command of a large workforce.

The Spanish conquerors were awed by the system of royal roads built by the Inca over very difficult mountainous terrain. The royal roads revealed the power of the Inca, for they confronted and defied natural barriers. Roads traversed snow-covered sierras and were cut through rock. The construction of the roads included suspension bridges over rivers, stairways carved into the sides of mountains, and deep ravines filled with solid masonry. Nothing seemed to have deterred these Inca road-builders. In Mexico the Spaniards were amazed by the causeways that the Aztec had built across the lake into the center of their capital city, Tenochtitlán. On an island in the middle of Lake Texcoco, Tenochtitlán was traversed by canals, used as roadways by the Aztec.

Whereas most of these roads have been discovered through photography, remote sensing, and archaeological research, the depiction of roadways in the *Lienzo de Quauhquechollan*, an Indian map on a large textile hanging, identifies the route taken by the Spaniards and their allies, the Quauhquecholteca, from the Tlaxcala-Puebla region in central Mexico as they made their way to present-day Guatemala. The roads in the *Lienzo de Quauhquechollan* provide a narrative guide and a temporal context. The *Lienzo* shows direction, with footprints and hoofprints. The mapmaker's artistry allows the identification of actual roads and paths that existed after the conquest and shows how these roads connected cities, villages, and settlements. The roads were probably major routes before the ar-

rival of the Spaniards. Many of the roads were wide enough to allow the passage of large numbers of soldiers. Combined with the archaeological record and modern visualizing techniques, the study of the *Lienzo de Quauhquechollan* and other similar documents and maps could enlarge understanding and appreciation for the accomplishments of the various peoples throughout the Americas.

ASIA AND THE PACIFIC

BY ILICIA SPREY

Roads and bridges formed an integral part of statecraft and defense, and only secondarily were they part of the growing system of trade and transportation of goods and people that existed in premodern Asia. They were the link between coastal ports of trade and the populations living inland, who were both providers of raw materials sought by other groups and consumers of goods brought to them and available only through merchants who worked in the ports. The presence of roads and bridges in a region and the state of their repair served as a measure of the stability of the local and regional governments.

The major roads and bridges in Asia and South Asia began not as a means of increasing commercial trade or of strengthening the economy of a region but as a means by which military forces could move quickly from one area to another. The Chinese forces, which invaded Vietnam early in the third century C.E. and held it for almost 800 years, built many stone bridges in the northern region of the kingdom that crossed its many rivers and helped maintain authority over the conquered people. In 1428, as a sign of Vietnam's newly won independence from Chinese authority and as a means of deterring future invasions, the Vietnamese destroyed many of these bridges, which had become symbolic of Chinese dominance.

Although the Venetian traveler Marco Polo (1254–1324) wrote of seeing more than a thousand bridges made of wood, stone, and iron in and around Hangzhou, on the eastern coast of China, the numbers of Asian cities with bridges were few, and the kinds found in the region varied widely. Around 605 a bridge with segmented arches under its flat roadbed was built in Hebei Province, near Beijing, out of stone with iron joints, which gave it both the stability and flexibility to handle the heavy loads carried across its expanse. A similar bridge was built in what is now Cambodia under the Khmer King Jayavarman VII (r. 1181–ca. 1215). Still in existence, it spans almost 250 feet and is made of over 20 stone arches that support it.

The most common form of bridge built over rivers, whose locations had strategic and economic importance, was the lift bridge or drawbridge. These bridges were built in such a way as to allow the middle section to be lifted or tilted upward.



Rock bridge at Tiantai Mountain; ink and color on silk, China, 1178 (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1907.139)

In wartime these bridges were raised to impede an invading army from gaining access to the heart of a city. In peacetime this style of bridge allowed taller ships to move through the deeper waters that the bridge spanned.

Because of its many canals, Ayutthaya, the capital of Siam, had the largest number of bridges of any region in a

major Southeast Asian kingdom. As populations grew, new living space was needed, and commercial traffic expanded. Certain avenues developed as centers of trade along which individual merchants began to set up shops not only beside the roadways but also on the bridges themselves. Such was the case in Melaka (Malaysia), where the main bridge over the Malacca River became home to a series of shops as the activity of the marketplace spread outward. The increase in trade on and around the bridge slowed down the flow of traffic, and other bridges had to be built to handle the developing need of the population to move efficiently.

The labor for constructing roads and bridges varied based on location. For strategically important roads and bridges, peasants and prisoners were conscripted into work gangs, or *corveés*, which quickly built and repaired roads and bridges as needed. In the countryside, roads were fairly narrow and consisted of earth beaten down by the constant traffic of people and animals carrying loads. Lack of state interest in maintaining roads and bridges in the countryside meant that local merchants and the populations who used the roads undertook their construction and maintenance.

In cities roads tended to be fairly broad in order to handle the daily movement of their sizable populations. By the end of 1566 King Bayinnaung of Burma, heavily influenced by Buddhist concepts of harmony and heaven, had overseen the implementation of an urban building plan at Pegu that called for five major streets to be built straight and to run north-south and another five to run east-west. In Bangkok, Hoi An, and Peking, only the most important roads—important being defined as being heavily used by diplomats and courtiers—were paved. Leaving roads unpaved was often practical. It was easier and cheaper to have animals move wagons over roads made of packed dirt and sand than over a paved surface, which wore down faster and needed constant repair and cleaning. This lack of paving meant that when it rained most roads turned into muddy streams; in residential neighborhoods wooden planks were laid down over raised wooden structures to keep many from the worst of the dirt, dust, and mud.

The original placement of roads in the hinterland was based on the movement of local populations, who cut pathways out of the forests and grasslands in order to transport raw materials and goods such as timber, animal skins, exotic birds and feathers, and fresh water. As these narrow paths developed into more heavily used roads, they were unpaved, rough-surfaced, and rarely ran straight, instead meandering in harmony with the geography of the region, moving around naturally occurring obstacles, such as mountains and rapids. Many of these rural roads suffered annual damage from heavy rains and floods, which washed out roads and made

THE EIGHTY-EIGHT TEMPLE PILGRIMAGE

Medieval Japan had several roads that had cultural importance. For instance, there were roads that aligned with ancient palaces and served as borders for new palaces. Others served pilgrims who walked the roads to visit shrines and temples. One of the most important of these was the road that circled the island of Shikoku. This was the route taken by Kukai (774–835) posthumously called Kobo Daishi, the founder of Shingon (“True Word”) Buddhism. Kukai argued that the understanding of the subtle shadings of meaning in words was essential to understanding the spiritual meaning of Buddhism; as part of this, he argued that Sanskrit’s use of symbols for syllables was better suited than Chinese ideograms for conveying the meaning of Japanese words. Some historians believe that Kukai’s work gave rise to the Japanese syllabic writing system called kana. In addition to being one of the leading mystics of his era, Kukai was a prolific writer of studies of Chinese and Japanese culture and was an accomplished civil engineer. Many Japanese historians believe his work marked the first expression of a truly Japanese culture.

The date of his pilgrimage around Shikoku is disputed, with 805 often mentioned but seeming at odds with the work may have been doing during that year. His was a pilgrimage of prayer and contemplation that lasted for several months. Each stop he made was recorded by his followers, marking almost 300 places, nearly all of which have shrines. Out of these many places, 88 were marked as essential to the progress of enlightenment that Kukai undertook and therefore the basic 88 places for later pilgrims to visit. During the medieval era these places were marked by temples.

It was customary to begin the pilgrimage by visiting the temples of Ryozenji and Gokurakuji at the town of Naruto and then following the road to temples at Itano and on around the island, ending with three temples at Sanuki. The trek took about seven weeks and followed a road that was sometimes easy and sometimes passed through difficult terrain. It was not necessary for a pilgrim to visit each of the 88 stops to gain spiritual merit, which meant that people could skip the more difficult stretches of road. Some pilgrims thought that making the pilgrimage in the reverse order from that which Kukai originally took would gain them special spiritual rewards.

even the simplest of bridges disappear. When they met with this state of disrepair, merchants and their caravans had to move off the road and around the washed-out portion, often having to go down steep riverbanks, through riverbeds, and back up the other riverbank to rejoin the road.

As local urban and foreign trade increased the demand for materials available only in the far reaches of Asia, merchants developed their own road systems, which connected with the more rural roads and ran more directly to the major trading ports. Wider and more traveled roads or caravan routes improved economic prosperity and provided greater security. Transportation of goods by land was approximately 20 times more expensive than transporting them by water. These routes brought raw materials more quickly from the hinterlands of premodern Burma and Vietnam down to ships waiting to carry them along the Irrawaddy and Mekong river systems, respectively.

Over time these caravan routes joined many of the major commercial and political centers of Asia. The Cambodian and Siamese capitals were connected by such a road, which ran almost 400 miles and which could be covered by an individual in just over two weeks. Of course, caravans composed of slow-moving, heavily laden animals and carts subject to

breakdowns could take upward of five months to cover that same distance. Other major caravan routes included the famous Silk Road, which began in earnest in the second century and which ran from Xi’an, China, to trade centers in the Middle East, including Damascus, with goods ultimately reaching Europe and North Africa.

Under the Chola Dynasty (949–1279) of southern and eastern India major trade routes were carved from the hinterland to major ports such as Nagapattinam on the Bay of Bengal. Once the sea route through the Straits of Malacca, which merchants had used to move goods as part of the international trade from the Bay of Bengal to the Gulf of Tonkin, fell into the hands of religious and political rivals, merchants used the longer land route over the Malayan Peninsula increasingly from the late 13th through the 16th centuries. In Southeast Asia major routes developed—such as the Sukhumvit, South Pattaya, and Khao-san roads connecting Bangkok, Siam, and Cambodia. In Burma, merchants moved easily along a land route connecting the ports of Martaban and the Chao Phraya River valley. China was connected to the rest of mainland Asia via land-based trade routes, such as the one running from Yunnan over the mountains into northern Vietnam and then on to Siam in the premodern period.

Rulers saw trade routes on land and water as potential sources of income secondary at first to the resources raised through more traditional methods of tribute payment, taxation, and warfare. Over time, as petty warfare decreased and stability was established, economic efforts were encouraged by the state, and taxes and tolls paid by merchants became a more important source of additional income for the ruler. Merchants traveling along the inland roadways had to pay tolls when using the major roads.

While regional politics were unstable, regional rulers often allowed the majority of roadways in their lands to fall into a state of disrepair or decay, because roads that were too well maintained made it far easier for invading armies to move through their land. Domestic opponents of the regional rulers also could become effective political rivals by blockading roads, collecting and keeping tolls, and seizing merchandise. The money taken in tolls meant that much less income could be used by the rulers or by their subjects and could weaken important aspects of the local economy. In much of Asia the idea of a strong economy was closely associated with a government that had divine approval. Anything that interfered with the economic strength of a region would be interpreted as showing the ruler to be weak and incapable and without divine support. This could and did encourage political rivals to move into rebellion. Only those roads that were strategically vital received regular maintenance and were repaired annually after the monsoon rains ended, and only in periods of strong stable centralized government were commercially important roads and bridges maintained.

Since regional rulers often allowed the roadways of their lands to fall into a state of decay, merchants were left to fend for themselves. Not only did merchants join up with others to form larger caravans meant to scare off human attackers and fend off animal attacks, but they also developed new patterns of movement to deal with the conditions of the roads. To avoid the worst of the heat, which bullocks and buffalo did not tolerate well; the dust kicked up on the unpaved roads; and the afternoon rainstorms, merchants often moved their goods in the cool morning air when the dew helped keep the dust down to a minimum.

There were three ways to move goods, whether raw materials to ports or goods for sale in the hinterlands: human porters, animals, and wagons. In the steeper lands of mountainous Asia and Southeast Asia, where the roads—really nothing but narrow worn-down paths—were subject to constant mudslides, the only method that made sense was to have men carry the goods on their backs. Once out of the mountains, the paths became slightly wider and less steep, and animal labor replaced human. With animals doing the heavy pulling, these routes bore more traffic than their mountain counterparts.

The mountain paths used for transportation of materials and goods and many of the major arteries for long-distance trade were cut through the forests that covered the region in the preindustrial age. Those traveling these roads were often subject to attacks by tigers and other animals. Mules could move 130 pounds and buffalo upward of 800 pounds, although they moved slowly, thus creating the need for regular areas where the caravans and porters could stop each night in relative safety. In the more isolated areas this meant having open areas carved out at intervals alongside the road where the goods-bearing carts were placed in the center of the encampment and the humans slept on the carts as protection from potential animal attacks. Along the major roads, inns and way stations were established under government auspices, often a dozen or so miles apart, which supplied water, food, shelter, and security to merchants and other travelers.

EUROPE

BY AMY HACKNEY BLACKWELL

Roads and bridges were essential to maintaining the economy and social life of medieval Europe. Farmers needed roads to get from their homes to their fields and to transport their goods to local markets. Traders needed to travel from town to town to sell their wares. Roads and bridges were also essential to armies that were marching from place to place. Many medieval roads started as footpaths that got a lot of use because they ran between popular destinations. Historians believe that many medieval routes and fording sites were established in ancient times and that the medieval road network was well developed by 1000.

Most medieval roads were unpaved. Although the Romans had left behind some thoroughly engineered and paved roads with deep foundations, the tradition of building elaborate roads died out around the fifth century. Romans had built their roads to accommodate carts with wheels, but most early medieval transport of goods was done on foot or by using pack animals such as horses instead of carts, and dirt tracks were sufficient for this purpose. Paving roads was too expensive and difficult for most medieval towns and villages. Medieval roads were often very rough and could become impassable after heavy rains turned them to mud.

There were five main types of roads in medieval Europe, all of which could exist within towns and cities or in the countryside. "Paths" were the smallest roads. They were about 4 feet wide, wide enough for foot traffic, horses, and narrow carts. Paths connected larger roads to one another and formed the most basic road network within towns and villages. "Cart roads" were about 8 feet wide, wide enough for a single cart to travel comfortably but not wide enough

for two carts to travel side by side, though one carter could pass another with some cooperation. A “way” was twice as wide as a cart road, about 16 feet wide. Ways connected rural towns with one another and with castles. They could accommodate herds of sheep or cattle, multiple carts, and large groups of people on foot or horseback. A “road” was twice as wide as a way, about 32 feet wide. Merchants used roads to transport merchandise to market. Governments taxed travelers on roads (a term used here, however, to refer to any type of path or thoroughfare used for land traffic on foot, by horse, or by cart and not specifically the second-largest type of road in medieval Europe). “Royal roads” were the largest medieval thoroughfares, twice as wide as roads and able to accommodate all types of transportation.

Within towns and cities most roads were very narrow, many of them only wide enough to allow people to walk through them in single file. Some streets had names, but few had street signs; locals knew what they called streets and had no need for external markers. People used landmarks to explain how to get from one place to another. There were few lights, so streets could be very dark at night. Even within urban areas many streets were unpaved, and they could become very muddy in the rain. Passing carts and horses left behind hoofprints and wheel ruts as well as ample manure. Humans also used the streets to dump their own excrement. Some towns dug channels down the centers of their streets to provide a sort of open sewer for this mess.

Roads belonged to the feudal lords or church establishments on whose land they sat. In the 1100s nobles began to see roads as a potential source of revenue. They levied tolls on people who used their roads for transportation. These tolls paid for the upkeep of new roads and provided a good source of income to the landowners. This development had the benefit of inducing landowners to build more new roads, but it also created incentives for them to charge extortionate tolls. High tolls had become such a problem by the late 12th century that the Catholic Church passed an edict threatening excommunication to anyone who raised his tolls without the king’s permission.

In addition to tolls, the owners of roads came up with other sources of revenue. In Germany landowners passed laws stating that anything that fell off a cart and touched a road became the property of the road’s owner. If a wheel fell off a cart and its axle hit the ground, the landowner would claim the cart and its contents. For example, in 1396 a man traveling on a road owned by Chertsey Abbey in England fell into a hole in a road and actually drowned in it. The abbey in charge of the road then confiscated all his goods. Some nobles were said to deliberately create hazards intended to damage passing carts in their roads.

Even without underhanded activities, traveling on medieval roads could be dangerous. Natural hazards such as falling trees and bad weather claimed a number of travelers. Wild animals might attack people traveling in the country-



Old London Bridge, as it would have appeared during much of the medieval period; ca. 1500 (© Museum of London)

side. Travelers also fell prey to highwaymen who lurked on the sides of roads and robbed passersby. Crossing streams and rivers could be challenging in medieval Europe. Bridges were expensive and difficult to build and fairly uncommon, especially in the early medieval period. The landowners who maintained roads were supposed to take care of bridging streams and rivers along the way, but this did not always happen. People most often crossed streams at shallow spots called fords, simply walking or driving straight across the stream bottom. Fording streams could be dangerous if the water was deeper than usual, the current was strong, or the bottom was slippery. In other places boats called ferries would carry people and cargo across rivers for a fee.

Bridges became more common starting in the late 11th century. Bridges were often built on the sites of fords. The earliest bridges were made of wood, but as the medieval period progressed engineers became more adept at erecting sturdier stone structures. Bridges were prone to various types of damage, such as fire and collapse. Major floods destroyed many medieval bridges. The most basic type of bridge was a beam bridge. The simplest version of this bridge was just a log or plank laid across a stream. Travelers walked across it. Sometimes people would lay several planks across a stream, using rocks in the streambed as intermediate supports. People might also arrange large rocks within the streambed to make stepping-stones across it. Beam bridges were inherently weak because they were not supported in the center; the longest distance a single plank or log could span was about 20 feet. The wood had to be replaced regularly because it rotted. Nevertheless, beam bridges were perfectly adequate for their purposes and they were cheap and easy to construct, so they were quite common throughout medieval Europe.

In areas with large numbers of boats, people sometimes put together pontoon bridges. A pontoon bridge consisted of several boats moored side by side across a river with boards laid across them that formed a surface to walk on. The boats were tied to one another to prevent them from drifting and disassembling the bridge. This type of bridge could be created and dismantled quickly for temporary needs, but it could also be used as a permanent structure. The first bridge over the Grand Canal in Venice was a pontoon bridge called the Ponte Della Moneta built in 1181 on the site of what is now the Rialto Bridge.

During the later medieval period, arched bridges made of stone became more common. Builders used engineering techniques similar to those for building cathedrals to create foundations and arches that could support heavy bridges which rose high over the surface of the water. Builders sank wooden pilings deep into the riverbed and then built dams to divert the flow of water while they created concrete pilings

to support the structure. Stone bridges could be quite large. The stone bridge built in the 1370s to span the Adda River in Italy was built on one arch about 240 feet long and 70 feet high. London Bridge, built between 1176 and 1209, was 1,050 feet long and supported by 19 stone arches. The Ponte Vecchio, which spanned the Arno River in Florence, was built on three arches, each of which was between 88 and 98 feet wide. The stone Ponte Vecchio was built in 1345 to replace an old wooden Roman bridge that had been destroyed by a flood in 1333.

Building bridges that could permit boat traffic was a challenge for medieval engineers. Boats typically could not pass beneath beam bridges, but these structures were often simple to dismantle and rebuild. Pontoon bridges likewise blocked the stream and did not permit free boat travel. Boats that were not too tall could pass under stone arches. For larger boats, one solution was to build bridges that could be lifted when necessary. Some canals and streams had drawbridges across them. A drawbridge was attached to a hinge on one bank and could be raised and lowered to span the water as needed. Drawbridges often formed the entries into castles surrounded by moats. The Rialto Bridge was first built in 1250 as two wooden ramps with a center section that could be lifted out to allow ships to pass. This wooden structure closely resembled the stone bridge that eventually replaced it in 1591 and that still exists in the early 21st century.

Bridges were expensive to build and maintain. Wooden bridges required more maintenance than stone ones because wood rotted and burned easily. The wooden Rialto Bridge, for example, burned in 1310 and collapsed in 1444 and again in 1524. Cities paid for construction and maintenance by levying taxes (the London Bridge, for example, was paid for with a wool tax), charging tolls to those who crossed, and by renting out space on the bridges to merchants. The London Bridge, the Ponte Vecchio, and the Rialto Bridge were all covered with apartments and shops and were often packed with shoppers and vendors.

THE ISLAMIC WORLD

BY BASHIR A. KAZIMEE

During the Middle Ages, Islamic countries experienced significant growth in all areas of their economies, including commerce, agriculture, and industry. Material goods, products, and raw materials for exchange and consumption had to be transported across vast stretches of land along safe and supervised routes to major urban centers. To facilitate trade and travel, the rulers in the Islamic world paid particular attention to building and maintaining roads, along with their necessary infrastructures, which connected the thriving cit-

ies of the region. Many roads and bridges were built in the medieval period, and those ancient trade routes that were already in use were improved upon. This made it possible not only for traders but also for pilgrims, merchants, and bureaucrats to travel with ease across the Islamic world.

Earlier routes for trade followed the ancient Silk Road and the famous King's Highway that had been built by Persians in the fifth century B.C.E. These routes, which were an interconnected series of roads and highways, passed through various regions of the Middle East and linked the European continent to India and China. During the Islamic period these ancient routes were improved upon, and new channels and facilities were provided. Transport was simple yet very effective. Major trade routes were designed for the convenience both of individual travelers and of caravans that transported goods and merchandise by means of camels and horses, mules, and donkeys. The routes were provided with caravansaries for accommodation and rest areas about every six to 12 miles called *rabats*. Each city had an area outside its gates where pack animals were assembled, while inside the city walls there were large, secure warehouses for storing goods.

Famous centers of trade in eastern Islam such as the cities of Bukhara, Herat, Ghazni, Ray, and Nishapur were connected by a network of roads that eventually led west toward Iraq, Syria, and Egypt and east to India and China. The merchandise that filled the bazaars and commercial markets of these cities consisted of ceramic pottery from India and China, metalwork from Iran, and different kinds of scents and spices from Yemen and Africa.

Damascus, during the Mamluk Period (1250–1517), experienced significant prosperity in trade and development. The main route from Cairo to Damascus became the Royal Road of the kingdom, transporting, among other things, glass and artisans from Syria and textiles and grain from Egypt. Cairo, the capital of the Mamluk Empire, grew phenomenally because of its location at the intersection of the spice route from the Red Sea and the pilgrimage roads from Maghreb and sub-Saharan West Africa.

The Islamic mail system called *baride* was the most advanced in the medieval period, and the rulers of the empire paid particular attention to its functioning. Postal stations existed at regular intervals along the major routes, and at each one there were fresh horses and riders ready to launch out on the next leg of the route, as well as offices and accommodations for the postmen. Empire officials guaranteed the security and proper maintenance of these stations because the *baride* was primarily for official use by the government couriers, who carried important messages—especially during military campaigns or when collecting the essential tax required from each region by the central authority.

The Islamic religious duty to perform hajj, the pilgrimage to Mecca, meant that large numbers of Muslim pilgrims traveled once a year to Mecca and Medina in present-day Saudi Arabia, the birthplace of Islam. As a result the existing trade routes took on new importance, and new roads were built that facilitated travel from all over the Muslim world to Mecca. Getting to Mecca required that travelers reach one of the major departure points in Baghdad, Damascus, or Cairo from which they would be escorted to Mecca by one of the hajj caravans.

The route that began at Baghdad went through Al-Kufa, crossing the region of Nejd to Medina and passing through Fayd south of Hail to Mecca. Caliph Harun ar-Rashid (r. 786–809) and Zubayda, his wife, made many pilgrimages, and this route became known as the Darb Zubayda. Ultimately, the Abbasid treasury paid for 54 large rest stations with water reservoirs and wells, fire signal towers, and caravansaries and mosques for the pilgrims. There was also a southerly route that began from Basra and passed through Al-Hasa and then through Deraiyeh.

Damascus served the Muslim world as another departure center for the major hajj caravans coming in from the east Baghdad route and Anatolia. The distance from Damascus to Medina was about 800 miles. A large, well-organized caravan would probably take about 55 days to cover this distance. Pilgrims from Maghreb (North Africa) and Spain would go to Cairo as their chief departure point to Mecca. Caravans traveling the North African coastal route from Maghreb to Cairo took roughly 40 days to reach Cairo. The caravans would then proceed east to Thughrat Hamid and the port of Aqaba. From Aqaba the caravans would continue on the coastal route to join the Darb Sultani route connecting Mecca and Medina.

The design and construction of bridges, for the most part, continued to rely on earlier Sassanian and Roman bridge-building techniques. The Muslims used the skills of builders drawn from the indigenous people in a given region. Masonry bridges constructed with pointed arches were the most common type, although other styles, depending on the span of the river, such as flat wooden-slab bridges, pontoon bridges, and cantilever bridges, were also employed.

Many of the arched bridges that existed in western Iran dated back to the Sassanian Period (224–656). During the late 10th and 11th centuries new bridges were built on the remains of the old ones. There were three Sassanid bridges over the river Kashgan near the modern-day town of Khurramabad that were restored during the Islamic period. The best preserved of these bridges was the Pul-I-Kashgan, dating back to 1008. It was built over the Kashgan River on the road to Dur Kudasht about 35 miles west of Khurramabad. Several arches were standing as late as 1936. The Pul-I-Dukhtar was

also reconstructed at about the same time near the town of Jaydar and the third—the Pul-I-Kalhur, from 984—was about 12 miles above the Pul-I-Dukhtar.

Another unique Sassanian bridge in western Iran that is worthy of mention is the Khurra Zad, which was originally built in the reign of King Ardashir I in 241. Stone blocks used for the arches were bonded by a unique anchoring technique that used iron clamps set in lead. The bridge was in ruins by the 10th century, but a two-year reconstruction was begun in 977. Many craftsmen from western Iran and Isfahan were collected to participate in the work.

During the Timurid Period (1370–1506) there was extensive road- and bridge-building activity in the province of Khorasan. Records state that during the reign of Shah Rokh (r. 1405–77), the son of Timur, 13 bridges were built. He commissioned the repair of many other bridges during his time as ruler, including the repair of the Tavakul Bridge, which was destroyed in a disastrous flood in 1492, and the bridge of Tirpul that still exists in the first decade of the 21st century. The construction of these bridges typically consists of brick arches set on protruding rubble piers.

In Egypt during the reign of Ahmad ibn Tulun (884) a bridge was built with 40 arches that formed the first part of a causeway six miles long leading from the west bank of the Nile near Al-Fustat in the direction of Alexandria. Its purpose was primarily military so that the army could repel any attack coming from the west. Later, under the Mamluk rulers, bridges were built at Ludd in Palestine and at Yubna near Cairo.

Bridges that are attributed to the Seljuk Period (1038–1194) in eastern Anatolia are admired by 21st-century travelers for their sense of strength and their aesthetic appeal. The Tekgoz Bridge at Kayseri, consisting of a single graceful arch, dates to 1202. The Dicle Koprusu Bridge across the river at Diarbekr dates to 1065 but has been heavily restored. The Coban Bridge with six elegant, wide arches spanning the Araks River dates back to the first quarter of the 13th century. The famous Malabadi Bridge crossing the Batman Su River was built in 1146. The bridge had two guardrooms at the bridgehead, and there was a roofed guard post one third of the way across from the shore.

In Ottoman times (1281–1924) a bridge built at Uzunkoprui in Thrace had 174 arches and was a little over three-quarters of a mile long. It formed part of the road network of the empire. Pontoon bridges and cantilever bridges were commonly built to span short distances, such as small ravines or streams. Pontoon bridges were built, often for military purposes, by placing boats side by side at a landing, tying them

together, and then laying planks across them to make it easier to walk on the floating platform made by the boats. In the 10th century there were two bridges over the Tigris River in Baghdad. There were pontoon bridges across the Khuzestan River in western Iran and the Helmand River in the Seistan region of Afghanistan. When the span of a ravine or a stream was wider than a single timber could cross, abutments were built out, or cantilevered, from the banks to narrow the gap until it could be bridged by single wooden timbers. This type of bridge is still in use in central Asia and north Afghanistan in the 21st century.

See also ARCHITECTURE; ASTRONOMY; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; MIGRATION AND POPULATION MOVEMENTS; MILITARY; RELIGION AND COSMOLOGY; SACRED SITES; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION.

FURTHER READING

- Florine G. L. Asselbergs, *Conquered Conquistadors, the Lienzo de Quauhquechollan: A Nahuatl Vision of the Conquest of Guatemala* (Leiden, Netherlands: CNWS Publications, 2004).
- William J. Folan, "Sacbes of the Northern Maya." In *Ancient Road Networks and Settlement Hierarchies in the New World*, ed. Charles D. Trombold (Cambridge, U.K.: Cambridge University Press, 1991).
- Karl R. Haellquist, ed., *Asian Trade Routes* (London: Curzon Press, 1991).
- Kenneth R. Hall, "Khmer Commercial Development and Foreign Contacts under Suryavarman I." *Journal of the Economic and Social History of the Orient* 18, no. 3 (October 1975): 318–336.
- David Harrison, *The Bridges of Medieval England* (Oxford, U.K.: Oxford University Press, 2004).
- Donald R. Hill, *Islamic Science and Engineering* (Edinburgh, U.K.: Edinburgh University Press, 1993).
- Kenneth Hirth, "Roads, Thoroughfares, and Avenues of Power at Xochicalco." In *Ancient Road Networks and Settlement Hierarchies in the New World*, ed. Charles D. Trombold (Cambridge, U.K.: Cambridge University Press, 1991).
- Bernard O'Kane, *Timurid Architecture in Khurasan* (Costa Mesa, Calif.: Mazda, 1987).
- David W. Tschanz, "Journeys of Faith: Roads of Civilization," *Saudi Aramco World* 55, no. 1 (January/February 2004): 2–11. Available online. URL: <http://www.saudiaramcoworld.com/issue/200401/journeys.of.fai.th.roads.of.civilization.htm>. Downloaded on September 22, 2007.
- Susan Whitfield, *Life along the Silk Road* (Berkeley: University of California Press, 2001).
- Jeffrey R. Wigelsworth, *Science and Technology in Medieval European Life* (Westport, Conn.: Greenwood Press, 2006).

Entries S to Z



► sacred sites

INTRODUCTION

In most traditional religions the place that is sacred is the place where ritual is performed. For many areas of the world, such as the Americas and much of Africa and Australasia, this remained true throughout the Middle Ages. The hearts of cities were grand backdrops for the display of ritual, most often animal sacrifice, whether in the Hindu temples of India and Southeast Asia; atop the giant pyramids in the cities of the Mississippians, Aztecs, and Incas; or in the palace complexes of China. The famous stone walls of Great Zimbabwe in southern Africa were not city walls in the usual sense, but they served to limit the space of the royal compound from the houses of the city's populace to create a sacred space for ritual. But ritual could also make much more private spaces sacred. East Asian homes contained shrines to the family ancestors and household gods, while in Africa blacksmithing forges were made sacred by the deposit of magical talismans under the foundations and by rituals of exorcism and consecration conducted by ecstatic priestesses.

Still, the great story of religion in the Middle Ages is the emergence of the three Abrahamic faiths as world religions. Even for these faiths, the synagogue, the church, and the mosque, where rituals are performed, remain the most familiar sacred places (though sacred talk—the sermon—holds a much more important place than sacred action compared

with traditional religions). The nature of these new religions created a new sense of sacred place.

Although Judaism has older roots, the destruction of the temple in Jerusalem in 70 C.E. called for a fundamental transformation in its character that was not fully established until formation of the sacred texts the Mishnah (ca. 200 C.E.) and the Talmud (ca. 500 C.E.). Christianity, too, began at the turn of the era but came to its full prominence only with the conversion of the Roman Empire under Constantine (314). Islam arose entirely within the medieval period, in the seventh century. All three are religions of the book, whose primary means of devotion was reading a sacred scripture. The sacred sites important to each religion were those mentioned in the scriptures (in the case of Islam, in the Hadith—accounts of Muhammad's life and sayings—rather than strictly in the Koran). Thus pilgrimage, a visit by the faithful to the historical locations described in the text, became an important part of all three faiths.

The Hebrew Bible describes a whole series of religious rituals proper to Judaism, which are centered on sacrifice at the Jerusalem temple and are not radically different from those of other traditional religions. However, the destruction of the temple and the exile from Israel (a ban that the Romans did not strictly enforce) made the practice of this traditional cult impossible. The study of sacred scripture became a substitute for the original cult; indeed, much of the new Talmudic scripture produced at the beginning of the Middle Ages concerns intense and detailed debates about the correct procedures

and customs to follow in every minute detail of the temple cult, precisely because it could no longer actually be realized. The substitution of text for cult was so complete that when in the 350s the Apostate Roman Emperor Julian undertook to rebuild the temple (never completed because of his death), Jewish religious leaders were far from enthusiastic over his offers to allow them to renew cultic practice there. Nevertheless, prayer performed at the ruins of the temple (but not inside them, for entry is forbidden to Jews by Talmudic law) is considered especially holy; one of the things they must pray for there is the restoration of temple by the coming messiah. For this reason, and in light of the entire history of Jerusalem, the city and the land of Israel as a whole was a destination of pilgrimage to Jews throughout the Middle Ages.

Christians, too, considered Jerusalem and Israel, as the scene of Jesus' life and ministry, to be their own sacred place, and pilgrimages to the Holy Land were being made in late antiquity. One impetus of the Crusades was the belief that those sacred lands ought to be under Christian political control. Since journeys to a place as far distant from western Europe as Jerusalem was impractical, however, medieval Christians began to make pilgrimage to sites considered holy because they supposedly contained relics of the persons described in the New Testament, such as the body of James the Apostle in the cathedral at Santiago de Compostela in northwestern Spain. Pilgrimages also could be made to churches containing the relics of later saints. In fact, an entire itinerary was developed, describing the spiritual merits of the pilgrim that derived from the importance of the relics visited, the distance traveled, and the personal inconvenience endured. (Walking up flights of steps on one's knees was considered beneficial, for example.)

Pilgrimage is an even more central feature of Islam. Every Muslim (unless prevented by some extraordinary circumstance) is required to make at least one pilgrimage to Mecca (the hajj) to view the places important in the early history of Islam there and at the neighboring city of Medina. Jerusalem, the site of Muhammad's ascension to heaven in Islamic tradition, is equally an object of Islamic pilgrimage as much as in Judaism and Christianity. Islamic authorities built two shrines on the Temple Mount, the Dome of the Rock, from where the prophet is said to have ascended, and the al-Aqsa Mosque.

AFRICA

BY TOM STREISSGUTH

The religious worldview known as animism has been present in Africa for thousands of years. By one definition, animism finds spiritual force in natural surroundings. Spirits inhabit

lakes, rivers, forests, mountains, and deserts, providing essential water, food, and soil to those living nearby and protecting such places from desecration by outsiders. Unlike the monotheistic faiths that arose in the Middle East and which arrived in Africa in the centuries just before and during the early medieval period, the animism of Africa was not expounded in books; its doctrines changed with each society, often with each individual community. Through the medieval period animist beliefs on the African continent were an integral part of everyday life; they were learned within families and understood by all members of African communities, providing a basic framework for their perception of the world and for understanding the workings of fate and the natural world.

Animist belief was not under the guard of experts or scholars, nor was the faith renewed by regular visits or prayers in sanctified buildings. There were few sanctified locations at all; rather the entire natural world was understood as the abode of spirits—good or bad, benevolent or malevolent. Manifestations of otherworldly energies were seen in natural phenomena, such as a volcanic eruption, which often marked a location as important. Particular locales, as a result of human or natural events or merely through their appearance, were also sacred or taboo. African societies perceived certain forest groves, remote mountains, empty deserts, or bodies of water as having a strong connection with the unseen world, making them appropriate places for sacrifice or propitiation of the spirits. Other places threatened death or other misfortune for those who unwisely trespassed.

The Yoruba of Nigeria, whose kingdom flourished in the medieval period, marked off sacred groves outside their villages. One of the most enduring was the abode of the river goddess Osun, who inhabited a forest near the city of Osogbo. The goddess of the Osun River, she bestowed fertility, healing power, and protection on all those who came to worship her at the river's edge. Mount Kenya, or Kirinyaga, was known to the Kikuyu of eastern Africa as the home of Ngai, the god who created the world. According to tradition, Ngai bestowed on the Kikuyu the surrounding land and granted worldly goods and good fortune in exchange for sacrifices made to the mountain.

Beginning in the 15th century the Dogon of Mali inhabited several hundred villages lying along a series of sandstone ridges—the cliffs of Bandiagara—that are 125 miles in length and reach 2,000 feet in elevation. Sacred places in this area are associated with the cult of Binu; they were (and still are) used for ancestor worship, sacrifices, and communication with the spirits. In the Dogon story of creation the sky god Amma made the god Nomo, who was transformed into several pairs of twins. One of these offspring was sacrificed by Amma by

having its body cut up and scattered; where the limbs and organs of the body came to rest a sacred place was made and a shrine was raised. The shrines contained the spirits of ancestors and the representation of a protective totemic animal. The Dogon mythology extended its conception of sacred place to the star Sirius and its invisible companion, known as Sirius B, a smaller companion star that was not known to European astronomers until well after the invention of the telescope.

Supernatural power also was associated with monuments and tombs left by earlier, vanished civilizations. In the upper Nile Valley the kingdom of Kush grew rich from the trade in iron, gold, and textiles; fought Roman legions to a standstill; and extended its authority throughout what is now northern Sudan and as far west as Lake Chad, at the southern limit of the Sahara. Modeling their society on the Egyptian realm, the Kushites worshiped the Egyptian gods and, like the Egyptians, preserved the bodies of their rulers within elaborate pyramids. The kingdom of Kush fell by the third century of the Common Era, after its defeat by a king of the Ethiopian realm of Axum. Near the Kushitic capital of Meroë, on the east bank of the river, more than 200 pyramids remained, testifying to the power and wealth of Kush over an empty desert plain. To the north the much larger pyramids and monuments of the Egyptian civilization were considered evil symbols of a false pagan religion by the Christians who inhabited the lower Nile Valley under Byzantine rule in the early medieval period. Many Egyptian monuments were destroyed, their tombs robbed of treasure, their inscriptions erased, and their stone used for the construction of new cities such as medieval Cairo.

The physical remains of ancient Egypt could never be erased, however, and the Nile Valley and the surrounding deserts contained thousands of temples and monuments marking out sites considered sacred to the gods. The temple of Amun in the Siwa oasis was the site of a famous oracle once consulted by Alexander the Great. The oasis resisted the Islamic conquest for several centuries, becoming a sanctuary for medieval Christian pilgrims and way station for anchorites who made their homes in the remote desert to be closer to the divine.

Mount Horeb, rising in the Sinai Peninsula, was considered sacred by Jews, Muslims, and Christians. According to tradition, Moses received the tablets of the law and the Ten Commandments on the mountain's slopes. A sixth-century monastery, Saint Catherine's, provided a resting place for pilgrims and remains in operation to this day—the oldest functioning Christian monastery in the world. Religious monuments were scattered throughout the nearby landscape. By Jewish tradition the law tablets of Moses were contained within the Ark of the Covenant, which vanished from its

sanctuary in Jerusalem and, according to common belief in Ethiopia, was taken south by Menelik, the son of King Solomon and the Queen of Sheba. A medieval treasury was built near the Church of Saint Mary in Axum to house the Ark. It has remained a holy shrine, and viewing of it is still forbidden to all but the priest appointed for life to guard the Ark.

Near Axum is Lalibela, the site of monolithic Christian churches that were originally founded during the reign of Gebre Mesqel Lalibela in the late 12th century. After making a pilgrimage to Jerusalem, this ruler returned to Ethiopia and attempted to recreate what he had seen in Jerusalem, which fell to the Muslims in 1187 after nearly a century of rule by Christian crusaders from Europe. Eleven churches were hewn directly out of rock. The largest, the Bete Medhane Alem, contains the Lalibela cross and is the largest monolithic church in the world. Bele Golgotha holds the tomb of King Lalibela. The churches were built over a long period of time; some may have been constructed from the remains of earlier fortifications that were raised during the time of Axum Empire.

Rock paintings created by the San are common signifiers of sacred space in the deserts of southwestern Africa. In the Kalahari the site of Tsodilo contains more than 4,000 rock paintings created over many thousands of years. The paintings are made from mineral pigments, mostly red ochre, and depict wild game and hunters. More recent paintings that date from as early as the sixth century show domesticated animals and abstract shapes. The San consider this ancient outdoor gallery to be the abode of ancestors. A similar purpose is seen in Ambohimanga, a hill that marks a royal precinct and burial ground on the island nation of Madagascar and where a palace was built in the 15th century. The site encompasses fountains and pools whose waters were used for the purification of dead kings as well as shrines and altars and certain trees and groves considered to have spiritual significance.

In Uganda the royal tombs at Kasubi mark a sacred precinct within the national capital at Kampala. Historians believe the site may have been venerated by the Luo, a people who migrated into Uganda from the north in the 15th century. The site was later adopted as a royal burying ground, maintained by clans with specific tasks: the Nalinga as spiritual guardians, the Ngo who maintain the site, and the Lubungas, who control access by visitors. The site of Kasubi is characteristic of a feature common to many African religions, which hold that long-dead ancestors and important individuals are still present in the world, overseeing the fortunes of their clans and people as powerful spirits who also demand attention and care of their final resting places. Shrines of durable stone are often raised to mark the sites and warn off passersby. The task of maintaining these shrines and gravesites is too important to be left to untrained people

or casual visitors; such places are placed under the care of certain lineages that enjoy the high status that comes with their obligations.

THE AMERICAS

BY ALESSIA FRASSANI

The sociopolitical developments that took place in the Americas between 600 and 1500 triggered the construction of large cities with centrally located sacred structures like temples and pyramids. At the same time Native Americans continued the ancient tradition of celebrating natural forces by visiting and worshipping natural sacred places, such as caves, mountaintops, and springs, set far from residential areas. Spanish documents dating around the mid-16th century, at the time of the Spanish conquest, provide historical information to complement the archaeological findings of Amerindian sacred sites. Caves, mountaintops, and temples alike were dedicated to specific gods and attended by specialized priests. In these places people sought to ensure their well-being by controlling natural forces, such as rain and earthquakes, on which their survival depended.

The word *pyramid* is a misnomer that describes the most important ritual structure that archaeologists have identified in the Americas. Unlike the Egyptians, Native Americans rarely used pyramids as tombs, and even American pyramids in which burials have been found never served the mere function of monuments or mausoleums. Rather they were prominent urban features, stages of ritual activities, and reminders of the gods' power.

The mound-building tradition of the Adena (ca. 1000–ca. 100 B.C.E.) and Hopewell (ca. 200 B.C.E.–ca. 400 C.E.) cultures was continued between 700 and the time of European contact by the Mississippian civilization. (De Soto reached the region in 1539) Cahokia, in southern Illinois, just 8 miles from the present-day city of Saint Louis, hosted at its height more than 20,000 people. Mounds were built in several stages and resemble Mesoamerican pyramids, with large steps and central staircases. Pyramids are found within large enclosures. One side of the pyramid serves as a ritual stage and faces a plaza for public gatherings. Effigy mounds are found in the northern Woodlands and Great Lakes areas. They date 200 to 400 years later than the Adena Serpent Mound in modern-day Ohio but belong to the same tradition. The animals depicted are mostly bears and birds, although occasionally other mammals and geometric figures appear. The mounds were burial places, and individual and communal graves have been mostly found in the heart or head of the animal depicted, suggesting perhaps that the animal was a totem clan for the family of the deceased.

The ancient city of Teotihuacán in central Mexico, site of the impressive Pyramid of the Moon, continued to be a sacred site even after its decline around 600. The Aztec gave the city its present name, which means “Place of Becoming Gods,” acknowledging the deep and sacred relation that connected them to their ancestors. The largest pyramid in Mesoamerica, however, is found in Cholula, in the Mexican state of Puebla. Although it was first built around 200 B.C.E., the city of Cholula and its pyramid gained political, economic, and religious preeminence in Mesoamerica around 700 to 800 C.E. The pyramid was dedicated to the cult of Quetzalcoatl, the Feathered Serpent, a supreme god of creation and civilization in ancient Middle America. Rulers came to the city to receive their honorific titles during ceremonies that were carried out at the pyramid. The pyramid has the characteristic Mesoamerican stepped construction and appears to have been surrounded by numerous plazas and smaller platforms.

Two pyramid-temples, standing side by side, dominated the sacred precinct at the heart of the Aztec capital of Tenochtitlán. One shrine was called Tonacatepetl, “Hill of Sustenance,” and was presided over by Tlaloc, the rain god. The other temple was a reproduction of Coatepec, the hill where the Aztec patron god, Huitzilopochtli, was born. In the 1980s archaeological excavations at the main temple revealed enormous caches of offerings, ranging from fine gold and jade pieces to humble ceramic pots. The offerings were brought from all over Mesoamerica by tribute payers' subjects and sanctified the economic and political hegemony of the Aztec Empire.

Chichén Itzá is the most prominent Mayan site of the Postclassic Period, flourishing from about 750 to 1200. It



Stone serpent, Aztec culture, Mexico, ca. 1325–1521. Stone serpents were common architectural elements; a wall of serpents (coatepantli) was often used to delimit sacred spaces within a ceremonial area.
(© The Trustees of the British Museum)

CAHOKIA MOUND 72

The Mississippian city of Cahokia is laid out on a grid well aligned to the cardinal points. The central structure is the enormous earthen ceremonial platform now called Monk's Mound. The main plaza of the city and other important earthen ceremonial mounds are laid on the south axis, while other structures of a more purely ceremonial nature, including the mysterious "woodhenge," are laid out on the west axis, extending toward the Mississippi River.

The southern axis terminates about a mile from Monk's Mound at a small artificial ridge known to archaeologists as mound 72. It lies just to the east of a straight line extending from the center of Monk's Mound and, unlike any other structure at the site, is aligned northwest to southeast. Excavation of the mound in the 1980s revealed that it is the marker of the most extravagant burials ever made in medieval North America north of Mexico. Radiocarbon dating of wood in the grave indicates that it was made in about 1000 C.E. The figure whose grave it appears to be is a middle-aged man who almost certainly was the ruler of Cahokia and who must have somehow been extraordinary even beyond that status to rate such treatment. He is laid out on a bed of seashells arranged in the pattern of a peregrine falcon, the image of the creator god in Mississippian belief. His grave goods consist of both ceremonial regalia and weapons.

The most extraordinary thing about the grave is that it also contains the skeletons of approximately 250 other individuals. Many had their heads and hands cut off, strongly suggesting that the process of burial included the offering of human sacrifice. That such sacrifices were common at Cahokia is indicated by the presence of pots in the shape of human heads, which archaeologists believe commemorated the identity of the victims after the flesh had rotted from their skulls. That practice might well indicate the sacrifice of prisoners of war, but a disproportionate number of the burials in Mound 72 were of pubescent girls, who must have been chosen for some other reason, perhaps to become the king's wives in the next world. Such an extravagant ceremony of sacrifice was probably a public spectacle. The site of the grave suggests that it must have remained an important sacred site after the actual burial ceremonies were completed.

dominated the northern Yucatán Peninsula, a lowland and arid area of Mexico. Several monumental structures make Chichén Itzá an exemplary late Mayan sacred site. The so-called El Castillo is a pyramid with nine terraces and staircases on all four sides. Like Cholula, the temple is dedicated to the Feathered Serpent, known in Yucatán as Kukulcan. Archaeologists and historians have long speculated about the political and religious connection between Chichén Itzá and central Mexico because of the widespread cult of the Feathered Serpent. The name of the site, which translates to "At the Mouth of the Well of the Itza People," indicates the importance of the natural wells, known as cenotes, among the Maya. Lacking rivers, Yucatán depended on wells for water. Chichén Itzá was built in proximity of two major wells, one of which, the Cenote of Sacrifice, was used only for religious purposes. It is reached through a sacred elevated way from El Castillo and continued to attract pilgrims even after the city was abandoned. From the depths of the Cenote of Sacrifice archaeologists have extracted gold, jade, pottery, and human bones. As in the sacred precinct of Tenochtitlán, tributes and offerings to the gods made in Chichén Itzá not only exalted the supernatural power of the deities but also fostered social cohesion among the various civilizations of southern Mesoamerica.

Sacred places in South America, and especially in the central Andes, are better described as *huacas*, which in the language of the Inca indicate sacred places or shrines, either human made or natural, where gods and ancestors are venerated. At the time of the Inca (15th and 16th centuries) the emperor was considered a *huaca*, and people worshipped mountain passes and stones where the ruler walked and rested during his journeys. Imperial burials or sacred places of origin were also *huacas*. These sites were found along imaginary straight lines that ideally connected every shrine to the most sacred place for the Inca, the city of Cuzco, considered the center of the empire and its political and spiritual capital. The most important *huaca* was considered the parent of the smaller *huacas*, referred to as siblings.

Besides the religious prestige they emanated, *huacas* were important economically. Priests and women devoted their entire lives to the maintenance of the cult at their *huacas*. Although historical information about these shrines is known for the Inca only at the time of the Spanish conquest, civilizations before that period probably worshipped *huacas* as well. The Inca actually appropriated *huacas* of the territories they conquered, superimposing the imperial cult to preexisting deities. The site of Pachacamac, the supreme god creator of the coastal region, is located just south of Lima, the modern capital of Peru. Although the Inca claimed that it was founded by the emperor Thupa Inca, archaeological

excavations have proved that the *huaca* had been visited for at least 500 years, before the Inca added their contribution in the 15th century. The island of Titicaca in the Andean lake by the same name was also an accepted place of origin of the Inca. Incan rulers created an imperial cult around the sun, the supreme deity in the highland, and worshipped a rock on the island where, according to tradition, the sun was born. Archaeologists have found evidence that pilgrims gathered from all over the Andes to watch the sunrises and sunsets at Lake Titicaca and made offerings to the sun god.

ASIA AND THE PACIFIC

BY KENNETH HALL

China's early ritual tradition was shaped by its developing Confucian states. The imperial courts and their accompanying ritual and urban complexes celebrated the role of the Chinese emperor as the source of an orderly and productive society. Early imperial art not only stressed Confucian secularity but also respected preexisting popular concerns about ancestors and the realm of nature. Sensitivity to nature encouraged the Chinese and their Japanese and Korean neighbors to use wood as the primary building material for both public and religious buildings. China's architecture also celebrated the orderly use of space, consistent with what became known as *feng shui*—a practice based on the writings of the scholar Zhu Xi (ca. 1126–ca. 1200) regarding the placement and arrangement of space to achieve harmony with the natural surroundings.

Chinese courts and their urban surroundings consisted of properly placed public buildings; the residences of officials; Buddhist, Dao, and Confucian temples; and the marketplaces, public squares, and homes of the resident nonelite. Deliberately planned, these urban centers were laid out in a grid pattern on a north–south axis. North was positive, sacred, and traditionally associated with the realm of the supportive ancestors and celestial divine. South was negative, potentially dangerous, and associated with malevolent spirits and threatening outsiders. East and west marked the middle ground, where the sacred and secular intersected. Burial grounds, including royal tombs, were placed outside this orderly urban ritualistic, administrative, and residential realm, because they contained the unpredictable spirits of the dead.

The imperial palace compound was in the north; beyond the palace and outside the northern city walls was an imperial park that included a large artificial lake and served as a royal hunting preserve and private space for the emperor and his court. The palace compound inside the city wall included imperial academies (where the children of government officials received their education), a Hall of Ritual (the site of



An image thought to be of Shiva, from the Kashmir-Smast caves, Mardan, North-West Frontier, Pakistan, ca. seventh through ninth centuries; several Hindu caves with wooden architectural interiors and sacred images have been found in this region. (© The Trustees of the British Museum)

Confucian ceremonies), a Hall of Spirits (where the Chinese spirit pantheon was acknowledged), and a Hall of Learning (where the imperial examinations were administered). At the extreme north was the emperor's private residence, in a gardenlike setting containing carefully placed groupings of plants and rocks, winding streams, and pathways. Inspired by Dao and Buddhist religious doctrines, these natural elements satisfied the emperor's need for a sense of universal order beyond the secular orderliness of his surrounding imperial compound. Symbolically only the emperor, in his residential compound, was able to bridge the two realms.

Consistent with Confucian logic that emphasized secularity over the celestial, imperial tombs celebrated human existence. By the Tang Dynasty (618–907) royal tombs, which have been found near Xi'an in northern China and Nanjing in southern China, were set off by *pailou*, or large commemorative archways. A tomb's *pailou* served as an aboveground entranceway into an "urban" area complete with broad avenues ("spirit ways") that contained larger-than-life human and animal statuary, ritual halls, and elaborate gardens. The spirit ways led to the burial mound, which was located above the tomb entrance. A vertical shaft connected the mound to the underground burial chamber. In front of each Tang tomb was a memorial stone marker inscribed with the worldly accomplishments of the deceased. Tang tombs are also known for their three-colored glazed pottery figures of horses and human figures intended to accompany the deceased in their death.

The Chinese (like other Asians) did not think of themselves necessarily as members of a single church but compartmentalized their religions according to need. The worshipper went to a temple of the divinity he or she believed to have the most potential to secure the desired results. In China no ties bound a worshipper to a priest.

Chinese religion was centered ultimately on the family and combined elements of Daoism, Buddhism, and Confucianism daily practices. Acknowledgment of Buddhist or Confucian gods in family ritual was limited to lighting three sticks of incense in the morning and evening: one outside the back door for wandering ghosts, one for the Fireplace God in the kitchen, and one for the ancestors before their tablets in the main hall. The Fireplace God was especially important because he was likely to report inappropriate behavior to his superior gods.

While properly worshipped ancestors were the family's benevolent protectors, ghosts were ancestors who had no descendants to acknowledge them. The Chinese believed that three souls left the human body at death: one soul stayed in the grave and was like a stranger, another traveled to the otherworld to be judged as a member of the wider universe or condemned to the realm of demons, and the third soul stayed with the ancestral tablet and remained a family relative.

Ancestral tablets were stone, metal, or wooden tablets on ancestral altars, with accompanying urns meant for incense sticks and food offerings. In Chinese homes ancestral tablets stated the names of male ancestors and their wives. These family ancestors were honored in the home as well as in community or family clan temples and at grave sites. The Chinese believed that deceased ancestors who were not properly worshipped might become harmful ghosts rather than benevolent and loyal ancestors.

Buddhist statuary, temple art, and ritual tradition spread from India to Tibet and China in the early first millennium. Buddhism moved along the Silk Road from northwestern India across central Asia and the Indian Ocean maritime passageway used for the spice trade. The religion's path into China was marked by pilgrimage and monastic sites. The fifth-century Longmen Grotto complex in China's northwest Henan Province consists of more than 100,000 statues in a series of caves and temples. At the grotto Indian stupas (dome-shaped structures) transformed into pagodas—multi-tiered towers that became the focal point of Buddhist temples throughout East Asia.

The architects of India's medieval religious sites drew inspiration from forms of religious devotion introduced during the era. The Bhakti devotional tradition in Hinduism and the Mahayana Buddhist tradition in Buddhism encouraged devotees to embrace the divine through personal devotion

and moral commitment, expressed by gifts, prayer, and ritual performance. The earliest Indian temples were third-century Buddhist and Hindu meditation sites cut into the faces of the mountains near Ajanta (ca. 200–ca. 600) and Ellora (ca. 600–ca. 1000), west of modern-day Mumbai and elsewhere in northwestern India, where the monastic compounds consisted of one or more chapels for worship. The oldest chapels contain abstract representations of the Buddha as stupas crafted out of solid stone. Later, the Buddha and the Hindu gods Vishnu and Siva were depicted in statuary accompanied by icons or representations of Mahayana Buddhist and Hindu divinity. Buddhist and Hindu texts were carved in stone images and painted on shrine walls. By 600 freestanding Buddhist shrines and Hindu temples across Asia adopted and adapted the art and architecture portrayed in these early mountain temples.

In northern India a fluted melon-shaped cushion called an *amalaka* crowned most Hindu temples; in southern India rounded stupas topped the spires. These decorations reflected an adaptation of earlier temple art that culminated in depictions of the *linga* (the male phallus), a symbol of the Hindu god Shiva, the lord of fertility. Hindu temples usually included the image of a divine being, with a spire above the image pointing to the god's celestial home and a hall in front of the image



Silver Buddha on a bronze lotus base, Borneo, Indonesia, eighth or ninth century; such sculptures were carried to the islands of Southeast Asia by pilgrims returning from the Buddhist holy land in eastern India. (© The Trustees of the British Museum)

for worshippers to pray. Preliminary iconography, stone and cast-metal (normally bronze) icons, and wall murals inspired by the oral and textual traditions of the temple's god prepared the worshipper to embrace the god in his inner sanctum.

A medieval Indian temple was a sacred space normally dedicated to the god Vishnu or Shiva or an alternate form or personality of either god, known as an avatar. After entering a temple, the worshipper prepared to embrace the god by meditating on the numerous statuary, stone carvings, and wall murals. These visual images were intended to help worshippers recall sacred stories that portray the various personalities associated with the divine and prepare them to proceed on their pilgrimages. Temple worship included prayer at several supplemental altars, culminating in entry to the innermost shrine of the temple, where the worshipper encountered the most sacred temple icon of the divine. Temple worship was partly a reciprocal exchange between the worshipper and the god. The worshipper normally presented a material offering, such as money or food, to the icon of the god. In theory, the god consumed the offering and was then spiritually present to receive the prayers of the worshipper.

At that moment the second aspect of temple worship began, in which the worshipper internalized the god to experience and temporarily become one with the divine presence. In preparation the worshipper cleared his or her mind of all external thoughts and centered attention exclusively on the god. To do this, the worshipper focused on the aspects of the god portrayed in the temple iconography and statuary: the depictions of the Lord's hands and legs, the items in the god's hands, and the posture and facial expression associated with the well-known oral and written traditions concerning the god. The worshipper might also invoke a chant or hymn, ring a bronze bell, light a candle or oil lamp, or burn incense to ensure a successful prayer.

Beginning in the sixth century artisans in the new monarchies of Southeast Asia redefined and modified Indian temple art to fit their cultural needs. Among the earliest ritual complexes, the late eighth-century monument called the Borobudur in central Java set the standard. The worshipper symbolically entered the Borobudur as a pilgrim, moving physically and spiritually from the materialism of the secular world to the abstractions of the divine. The pilgrim first encountered elaborate stone relief engravings of Indian Buddhist texts at the base of the Borobudur, moved through intermediate terraces of Mahayana Buddhist statuary, and finally reached a large stupa at the top of the monument. The ninth-century Prambanan complex of temples, on the other side of the sacred volcanic mountain from the Borobudur, contained the definitive Loro Jonggrang Hindu temples dedicated to Vishnu, Shiva, Brah-

man, and their subordinate deities (including the Buddha) and local spirits, mixing Indian religions and traditional Javanese ritual traditions.

Cambodia's 12th-century Angkor Wat, dedicated to the Hindu god Vishnu; the Mahayana Buddhist Angkor Thom Bayon; and the 11th- and 12th-century Bagan Theravada Buddhist complex in Burma (present-day Myanmar) are the most impressive among the later temple sites. Like other temple builders of that era, the architects of the Cambodian temples drew inspiration from the Indian architectural tradition but prominently incorporated local variations consistent with their unique cultural heritage.

The Shinto religion of Japan is a collection of local nature-worshipping cults that revere spirits called *kami*, which are celebrated in traditional Japanese myth and ritual. *Kami* include mythical gods and goddesses associated with objects of nature or features of the landscape, like trees, rocks, waters, or mountains. The most revered *kami* became the patron, or *ujigami*, of a familial clan or community.

Shinto in the early medieval era addressed people's earthly needs rather than providing a doctrinal path to salvation. It had no single founder but developed out of the communal rites and symbolic expressions of ancient Japanese society. In the sixth century it was paired with Buddhism, which provided the answers to the philosophical questions that Shinto did not. Only then did the word *Shinto*, which means "the way of the gods," emerge to distinguish local religious practices from those of Buddhism.

Among the *ujigami*, the sun goddess Amaterasu ranked highest as the guardian deity of Japan. Other Shinto divinities included the spirits of the deceased, the most important of whom were emperors, heroes, and other significant historical figures. *Kami* were initially worshipped and presented with offerings at sacred rocks and, from the sixth century, at shrines that had territorial associations with individual *kami* spirits. The earliest of these were Izumo (659) in west-central Japan, which honors the deities of the Izumo family clan, and Ise (690) in east-central Japan, which honors the guardian deity of the Yamato imperial clan.

A Shinto shrine is usually simple and naturalistic in style, surrounded by tall trees or set in a mountain location. The shrines have ponds, fountains, or streams, which are believed to cleanse the worshipper as well as the ritual site. Shinto shrines are framed by simple open gateways to the sacred grounds. The center of a shrine is a sacred space framed by a large rope that symbolically holds open the doors of Amaterasu's cave, preventing her from reentering and thus saving the world from eternal night. The shrine's altar may have a sacred object associated with the local *kami*, in which the *kami* spirit may temporarily reside at the call of the worshipper.

A Shinto service began with worshippers clapping their hands or making other noises to summon the *kami*. A period of prayer followed, and the service concluded with worshippers offering small gifts as symbolic sacrifices. At some time during the year a shrine would be the site of a community festival, with a carnival-like atmosphere that celebrated the relationship between the people and the *kami*—a relationship that served as the basis of the continuing success of the community. Shinto shrines were the sites of personal appeals for divine assistance; community and patriotic celebrations; and traditional ritual commemorations of certain life achievements, especially births and marriages. A Shinto priest served as an intermediary between the earth deity and ancestors on the one hand and the human community on the other. *Uji-gami*, the supreme guardian spirits, could only be accessed by commoners through the intervention of aristocratic patrons or their associated Shinto priests.

The heaviest concentration of medieval ritual sites in Japan was in the imperial capital cities of Nara and Kyoto in central Japan and in the earliest shogunate capital at Kamakura south of modern Tokyo in the north. The Todaiji Buddhist temple in Nara, built in 743, is among the finest of the early ritual sites. At that time Buddhism was practiced by the emperor and his court and thus was the state religion. The temple building and its statue, like other Japanese civil and ritual structures of that era, were modeled on the art and architecture of contemporary China's Tang Dynasty. The Todaiji temple was built to symbolically unify all the Buddhist temples throughout Japan and their elite patrons under the centralized political and spiritual leadership of the emperor Shomu (724–49). According to Japanese legend, 2.6 million people participated in its construction.

Inside the Todaiji temple is the massive Daibutsu ("Great Buddha") statue. At a height of 49 feet and a weight of 500 tons, the Daibutsu is the world's largest cast-bronze Buddha. Its ears are 8.25 feet long, and its hands can hold 20 people. The structure is held up by thick wooden pillars. One pillar in the rear of the temple has a hole through it said to be the size of the Buddha's nostril. By tradition any person able to pass through that hole is a candidate for entrance to heaven. The Buddha is seated in a meditation posture on a lotus throne (symbolic of purity and the foundation for the "flowering" of knowledge), presiding over the various levels of the universe. With outstretched hands, the Buddha willingly offers truth and knowledge to his faithful devotees. The giant Buddha statue is housed in a wooden structure rising 157 feet, making it the world's largest building made of wood.

Social life in medieval Pacific Island communities centered on group performances and rituals held at local meeting grounds. Community assemblies convened inside a large

wooden hall adjacent to the meeting grounds, where speeches, songs, and ritual processions took place. The proceedings frequently ended in gift exchanges between the meeting hosts and their guests, acknowledged by ceremonial physical contact (such as the touching of noses among the New Zealand Maori), and a concluding ceremonial sharing of food.

The spectacular ritual city at Nan Madol on the southeast shore of Temwen Island, off the coast of Pohnpei in modern Micronesia, and the mysterious stone heads of the Easter Island, which date from roughly 400, are representative of higher levels of ritual performance in the medieval Pacific Islands. However, neither site offers any explanation of the rituals beyond the archaeological remains.

Nan Madol was built by the line of kings of the Saudeleur Dynasty. At its peak between the eighth and 13th centuries the city consisted of a coral reef of 92 human-made islets intersected by a network of artificially constructed canals and waterways. Most of the islets were rectangular-shaped basalt rock platforms made of coral rubble. The islets were surrounded by seawalls of loglike basalt stone, each weighing up to 5 tons and measuring more than 15 feet long. The seawalls, standing up to 50 feet high and 20 feet wide, were built to protect the islets from the high waves of ocean storms. The ritual sector of the city consisted of 58 islets that were the site of elaborate funeral rituals, the residences of priests, and royal tombs surrounded by walls up to 25 feet tall. Administrators used another city sector, consisting of 34 islets, where the nobility also lived.

EUROPE

BY AMY HACKNEY BLACKWELL

Sacred sites were very important to medieval Europeans. People visited shrines and cathedrals to pray for help in all matters. They asked to have their illnesses cured, prayed to have children, asked for advice, and tried to ensure their eternal salvation. Although they could pray for these things anywhere, they hoped that prayers made at sacred sites would be more effective. They hoped that the saint or holy figure associated with the site would take a special interest in petitions made at that location and would look favorably on them.

Sites were considered sacred to Europeans if they had some religious significance. In this case, the religions in question were Judaism and Christianity, both Roman Catholic and Eastern Orthodox. Sites became sacred in several ways. If Jesus or one of the apostles was said to have been born, to have died, or to have taught in a particular place, that location might be considered sacred. Likewise, if a saint or holy person worked, performed miracles, or died in a place, that spot would hold special significance. A church that held a

holy relic, such as the body or even a small piece of the skeleton of a saint, often would be considered particularly sacred. Sometimes people saw visions of the Virgin Mary or Jesus, and thereafter people would consider the locations of these visions to be sacred sites.

Sacred sites were everywhere. Many medieval towns housed the relics of their own local saints, who were not widely known but nevertheless had spiritual significance to the people who claimed them. Ireland, France, Spain, and Italy, in particular, had large numbers of saints and sacred sites associated with miracles, though sacred sites were plentiful in other areas as well.

Pilgrimages, or journeys to sacred sites, were an important activity to medieval Christians. Starting in the 10th century many religious leaders taught their believers that they could earn spiritual credits called indulgences if they completed one of the three main pilgrimages. These three were the journey to the Holy Land, specifically Jerusalem; the journey along the Via Francigena (for those coming from France or other parts of northwestern Europe) to Rome; and the journey on the Way of Saint James (El Camino de Santiago) to Santiago de Compostela in northwestern Spain. Pilgrimages to Rome and Jerusalem could be combined, because most travelers heading to the Holy Land had to pass through Rome on the way. Many sacred sites on pilgrimage routes sold badges that travelers could wear to show that they had been to those places. People who made it all the way to Jerusalem often attached a scallop shell to their hats to mark their accomplishment. Not all pilgrimages took months. Some could be accomplished in a matter of days. For example, the pilgrims in Chaucer's *Canterbury Tales* were on their way from Southwark to Canterbury in England, to visit the shrine of Thomas Becket (the archbishop of Canterbury who was assassinated in 1170 by knights of King Henry II), a journey that took at most several days for travelers who stopped to tell stories on the way.

Five cities were considered particularly important to Christians. These cities were the Pentarchy, the five cities that were centers of the early church. According to tradition, five patriarchs had settled in these cities to establish Christianity. Peter and Paul supposedly went to Rome; Peter also traveled to Antioch. James settled in Jerusalem. Andrew went to Constantinople. Mark settled in Alexandria, Egypt. All of these cities rose and fell in Christian prominence throughout the medieval period; Rome, Jerusalem, and Constantinople emerged as the most important.

The Holy Land, the part of the Near East where the events of the Bible occurred, attracted both Christians and Jews. Jerusalem had been the holy city of the Jews since about 1000 B.C.E. and had been a destination for religious pilgrimages



Pilgrim badge from Walsingham showing the Annunciation (Britain, 14th century) (© Museum of London)

since that time. Other towns and cities around Jerusalem also attracted visitors. This region was ruled by Muslims for much of the medieval period, with brief periods of Christian rule, but Christians and Jews managed to visit it to pay homage to its sacred sites throughout the period from 500 to 1500.

Jews had been banned from Jerusalem in the second century by the Roman emperor Hadrian, but the Islamic caliph Umar ibn al-Khattab opened the city back to them in the seventh century. Medieval Jews especially liked to visit the site of the old temple in Jerusalem. The Temple Mount was the site of the Holy Temple, the center of organized worship, and the holiest place in Judaism. The First Temple (as it was known) had been built by Solomon in the 10th century B.C.E. and destroyed by the Babylonians in the sixth century B.C.E. The Second Temple, built on the site of the first between 535 and 516 B.C.E., was destroyed by the Romans in 70 C.E. The outer walls continued to stand over the centuries. The famous Western Wall is the retaining wall that supports the western side of the Temple Mount. According to Jewish tradition, the emperor Titus left it standing to remind the Jews that Rome had conquered them, but the Jews regarded it as a sign of God's promise that they were his chosen people. The wall

immediately became a popular site for prayer and attracted numerous Jewish pilgrims every year.

Christians were more interested in the Church of the Holy Sepulchre, built by the emperor Constantine in the fourth century over the spot in Jerusalem where Jesus was said to have been crucified. This church was deeply revered by Christians in Europe. It was destroyed by the Egyptians in the 11th century, one of the events that precipitated the First Crusade in 1099. The Christian conquerors rebuilt the Church of the Holy Sepulchre and converted the Muslim sites of the Dome of the Rock and al-Aqsa Mosque to Christian places.

Other sacred sites in Israel were important to Jews and Christians. People visited Nazareth because it was Jesus' adult hometown. Bethlehem was particularly important to Christians in its role as the birthplace of Jesus. Bethlehem's Church of the Nativity was built by Constantine in 330 over a cave called the Holy Crypt, where Jesus was believed to have been born. Close to the Holy Crypt was a grotto where Jerome, an early church father, translated the Bible into Latin in about 400. For Jews, Bethlehem was sacred as the birthplace of the biblical king David, father of Solomon. The tomb of the Jewish woman Rachel, the wife of Jacob in the Hebrew Bible, was also a sacred site to Jews and was traditionally believed to be on the outskirts of Bethlehem.

Constantinople was an important city to both Roman Catholic and Eastern Orthodox Christians. The church Hagia Sophia, or Holy Wisdom, was one of the largest and most beautiful churches in the world at the time, and many visitors reported being struck by awe upon seeing it. The bishop of Constantinople, known as the ecumenical patriarch, had his seat at Constantinople. After the Great Schism of 1054, which split apart the eastern and western churches, Constantinople became the most important city in the Eastern Orthodox Church, and the bishop of Constantinople took responsibility for administering Orthodox churches in non-Orthodox regions.

Within western Europe, Rome was the most important holy city. Christian tradition held that the saints Peter and Paul had founded churches there and died within the city. The pope's seat was in Rome, and the city was full of churches and shrines. The church of Santa Maria Sopra Minerva, built on the site of an ancient Roman temple to the goddess Minerva, housed the headless body of Saint Catherine of Siena (her head was in Siena) who had died there in 1380. Santa Maria Maggiore was a major church built in the fifth century and dedicated to the Virgin Mary. It contained an icon of Mary supposedly painted by the evangelist Luke, a silver urn containing the fragments of the Christ child's cradle, and the grave of Saint Jerome, translator of the Latin Vulgate bible.

A road called the Via Francigena became the main route for pilgrims heading to Rome in the 900s. Although its route varied depending on where pilgrims started, by tradition one end was in Canterbury, England, and the other was in Brindisi (Italy), the main port of disembarkation for the Holy Land. Numerous shrines lay along the way. Santiago de Compostela was a cathedral in Galicia, Spain, said to mark the burial site of the apostle James. According to tradition, James's body was brought to Spain and buried after he died in Jerusalem. The site supposedly became known to Christians after a shepherd saw a bright light glowing over the burial site. James became the patron saint of the local people, who believed that he had helped them in their battle against the Moors.

Another road, called the Way of Saint James, was the main route to Santiago de Compostela. The trail had several departure points in France, among the, Paris and Arles. The trails met up in the Pyrenees and led on to Galicia. Thousands of people from all over Europe visited the shrine during the medieval period. Another major medieval pilgrimage was the journey to Nidaros, Norway, the site of the Christ Church (also known as Nidaros Cathedral), built in the 12th century. This cathedral was built over the tomb of Saint Olaf, who had brought Christianity to Norway and the other Scandinavian territories in the 10th century. People flocked there every year on July 29, hoping to gain spiritual favors by visiting the reliquary that housed Olaf's bones.

There were literally thousands of other sacred sites in medieval Europe, some quite significant and well known. Glastonbury, England, was said to be the place where Joseph of Arimathea built the first church in England during the first century. He was thought to have brought with him from Jerusalem the Holy Grail, the chalice Jesus used at the Last Supper, and placed it in the church. Legend said that when he got off the boat on arrival he struck the ground with his staff, which caused a hawthorn tree to grow. This tree, called the Holy Thorn, attracted many medieval pilgrims.

Saint Patrick's Purgatory was a pilgrimage to Station Island in County Donegal, Ireland. During the fifth century Saint Patrick was said to have felt some doubts about the success of his mission. God showed him a pit in the ground called Purgatory, a place where Christians would be purified before entering heaven. People came from all over Europe to visit this site, and monks would often spend a month at a time there, fasting and meditating.

Assisi in Italy attracted its share of visitors. Saint Francis of Assisi was canonized in 1228, and shortly thereafter Pope Gregory IX had a basilica built in Assisi in his honor. Saint Clare, the other saint associated with Assisi, was herself a medieval pilgrim who had visited the major sacred sites. She was canonized in 1255. Pilgrims came to Assisi to visit Santa

Chiara, the church built in her honor, where her remains had been buried under the altar.

Mount Athos in Greece was on a peninsula that was supposedly visited by the Virgin Mary, sailing with the evangelist John on her way to visit Lazarus, the man Jesus raised from the dead. Mary was so taken with the beauty of the mountain that she asked Jesus to give it to her for a garden. Monks moved there in the third or fourth century and banned all women except the blessed Virgin. It became a major holy site for both Orthodox and Roman Catholic Christians.

THE ISLAMIC WORLD

BY ROSE ASLAN

The three most sacred places of Islam are Mecca, Medina, and Jerusalem. Mecca was the birthplace of the prophet Muhammad and home to the Kaaba, a rectangular, hollow, cube-shaped structure made of stones that Muslims believe was first built by Adam and was restored by Abraham with help from his son Ishmael. After the deaths of Abraham and Ishmael, the people started to forget their monotheistic heritage and fell back into idol worship. By the time Muhammad was born, Mecca was the center of polytheism in the Arabian Peninsula because the Kaaba was a major site of pilgrimage for polytheists.

When Muhammad gained control of Mecca in 630, he purified the Kaaba by smashing the 365 idols placed inside and around it and sanctified it in the name of God. Since then Mecca has been the most sacred place to Muslims around the world. Muslims pray in the direction of the Kaaba, and it is the destination of the hajj, or pilgrimage, which is one of the five pillars of Islamic practice. The Kaaba is so sacred to Islam that only Muslims were allowed to enter the borders of the cities of Mecca and Medina, and pilgrims to those cities were required to enter a special state of purity, wherein men donned only two pieces of unstitched white cloth while they carried out the rituals. (Women were allowed to wear ordinary clothes, which among Muslims must cover their entire bodies except for their faces, hands, and feet.) Each station of the hajj holds symbolic meaning; pilgrims would go through a spiritual cleansing, following the footsteps of Abraham, Ishmael, and Ishmael's mother, Hagar.

For Muslims the entire universe, including the earth, is sacred because it is part of the creation of God. In the early years of their religion Muslims prayed privately in their homes, especially because they faced harsh persecution from the polytheists who were against the new monotheistic religion. In 622 Muhammad decided to create a self-contained sacred space that would separate the mundane world from the spiritual. Thus he built the first mosque in Quba, a vil-

lage on the outskirts of Medina. Soon after, the Prophet built a bigger mosque in Medina, which became the focal point for the Muslim community. The mosque in Medina was very simple, consisting of four unbaked brick mud walls, pillars made of dry palm tree trunks, and a shaded area covered by palm branches. Having undergone several updates throughout the centuries, the mosque remains an important center of worship for Muslims from around the world.

Jerusalem holds special significance to Muslims for several reasons. First, the Koran narrates stories of ancient prophets from Jerusalem, such as Solomon and David, who are also mentioned in the Jewish holy book, the Torah. Jerusalem has such a special significance that Muslims used to pray in the direction of that city, before the Kaaba in Mecca became the focal point. In addition, Muslims believe that in 620 the archangel Gabriel transported Muhammad from Mecca to Jerusalem. In Jerusalem he was said to have stood on the Dome of the Rock, which is where the Al-Aqsa Mosque now stands, and was then taken to the heavens. Afterward the Prophet descended again to Jerusalem, where he met the ancient prophets mentioned in the Koran and led them in prayer. In the Middle Ages, Muslims also believed that the Dome of the Rock was the site of the legendary Temple of Solomon.

Unlike prayer halls in Christian churches, mosques have many functions beyond being a place for prayer. In the time of the Prophet the mosque also functioned as a town hall, a



Model of the Church of the Holy Sepulchre in Bethlehem, late 17th century; the church is one of the holiest sites in Christendom and the focus of pilgrimage, especially during the medieval era of the Crusades.
(© The Trustees of the British Museum)

shelter for the homeless, and a general meeting and socializing area. The wives of the Prophet had rooms built for them adjacent to the mosque that opened onto the main courtyard. Thus, the mosque was a vibrant center for the thriving Muslim community and had great importance in early Muslim society.

After the spread of Islam, mosques were built everywhere Muslims settled, often built according to the regional style. The common term for “mosque” in Arabic is *masjid*, the root of which means “to prostrate” or “to kneel”; thus a *masjid* is a place for prostrating oneself to God. Another type of mosque, often very large, is the *jamaa*, or “a place of gathering.” Traditionally the *jamaa* is where the community would pray on Fridays, the Sabbath for Muslims, while *masjids* are more commonly used for the five daily prayers. Basic features inside mosques include a prayer hall covered with a carpet and a prayer niche, or mihrab, that indicates the direction of Mecca. In front of the mosque is usually a *minbar*, which comprises a set of steps leading to a platform from which the imam, or leader of the congregation, gives a sermon every Friday. Mosques can be decorated with ornate calligraphy and motifs of inanimate objects, but art depicting humans or animals was strictly forbidden. Decorations are intended to affect worshippers’ emotions and often incorporate verses from the Koran to remind people of God.

Typically, mosques have ablution fountains built either outside or within the courtyard. Worshippers perform the ritual Islamic ablutions, symbolically ridding themselves of the dirt of the mundane world in preparation for entering the sacred and spiritual space of the mosque.

During the Umayyad (661–750) and Abbasid (750–1258) dynasties, most mosques were built following hypostyle architecture, with a flat roof supported by many columns. Within its rectangular or square plan, the mosque included an enclosed prayer hall and an open-air courtyard in the center. This layout was designed to create an atmosphere of spirituality, with the rows of pillars and arcades conveying the feeling of the infinite as a symbol of God. The spatial design emphasized the sanctity of the place of worship. Hypostyle mosques spread from Medina to North Africa, Sicily, South Asia, Persia, and Spain. A classical example of a hypostyle mosque is that of the Mosque of Cordoba in Spain (built between 784 and 786), which has more than 850 columns. Another mosque layout built during the medieval era used *iwans*, vaulted spaces that opened onto a courtyard. Usually a courtyard would have one to four *iwans*, one of which was used for prayer. The use of *iwans* was influenced by pre-Islamic Sassanid (226–651) architectural styles of Persia and they were developed during the Seljuk Empire (1077–1308) in Persia.



Pilgrim bottle, Syria, ca. 1330–50; glass vessels were popular containers for mementoes, since the contents (bones of saints or the earth or water from sacred sites) remained both safe and visible.
(© The Trustees of the British Museum)

With the rise of the Ottoman Empire (1453–1923) mosque architecture was transformed by the introduction of the central dome. A large dome, often with smaller domes built around it, was built over the main prayer hall. The Suleymaniye Mosque in Istanbul, built between 1550 and 1557, is an example of central-dome architecture. According to some scholars, the symbol of the single large dome that covers the main prayer space affirmed the unity and uniqueness of God.

Traditionally, Muslims are buried in unmarked graves as an acknowledgment of the insignificance of the body after death. Yet a person who had reached a high level of spirituality could be honored after death by having a structure with a dome built on top of the grave. This tradition was common throughout the Islamic world. Sufi saints, religious leaders, and members of Muhammad’s family were buried in this manner. Some of Islam’s most sacred sites include the tombs of the Prophet and his wives and daughters in Medina and the tombs of his grandchildren in Egypt, Syria, and Iraq. Almost every Islamic town has at least one shrine commemorating a saint. Mass pilgrimages usually take place only to the grave sites of well-known members of the Prophet’s family or of Sufi saints; other burial sites are mainly visited only by local residents.

A tomb might be a simple four-walled structure with a dome, but it could be ornate with more than one dome, large rooms, a prayer niche, and sometimes an adjacent mosque. A mausoleum, or *maqam*, is covered with a gravestone and sometimes was surrounded by grating. In the medieval period mausoleums of holy people were often visited by local residents and pilgrims who traveled far to receive blessings from the deceased. Folk tradition held that saints' bodies never decompose and that the saints could give blessings to the living who visited their tombs. Thus visitors to a shrine would show the dead saint great respect and ask for blessings and help in their lives. Another type of mausoleum, called a

mashhad, was built as a memorial of someone's vision of a saint but was not a grave. *Mashhads* were also places of pilgrimage, although they were not as popular as *maqams*.

See also ARCHITECTURE; ART; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CITIES; CRAFTS; DEATH AND BURIAL PRACTICES; ECONOMY; EMPIRES AND DYNASTIES; FAMILY; FESTIVALS; GOVERNMENT ORGANIZATION; NATURAL DISASTERS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; WAR AND CONQUEST.

Asia and the Pacific

Excerpt from the Hindu Agni Purana (ca. eighth through 11th centuries)

Agni said: I will now describe the fruits of making temples for the residence of Vasudeva and other deities. He who attempts to erect temples for gods is freed from the sins of a thousand births. Those who think of building a temple in their minds are freed from the sins of a hundred births. Those who approve of a man's building a temple for Krishna go to the region of Acyuta [Vishnu] freed from sins. Having desired to build a temple for Hari, a man immediately takes a million of his generations, past and future, to the region of Vishnu. The departed manes of the person who builds a temple for Krishna live in the region of Vishnu, well adorned and freed from the sufferings of hell. The construction of a temple for a deity dissipates even the sin of Brahmanicide. By building a temple one reaps the fruit which he does not even gain by celebrating a sacrifice. By building a temple one acquires the fruits of bathing at all the sacred shrines. The construction of a temple, which gives heaven, by a religious or an irreligious man, yields the fruit reaped by persons slain in a battle undertaken on behalf of the celestials. By making one temple one goes to heaven; by making three one goes to the region of Brahma; by making five one goes to the region of Shambhu; by making eight one goes to the region of Hari. By making sixteen one attains all objects of enjoyment and emancipation. A poor man, by building the smallest temple, reaps the same benefit which a rich man does by building the biggest temple for Vishnu. Having acquired wealth and built a temple with a small portion of it, a person

acquires piety and gains favours from Hari. By making a temple with a lakh of rupees, or a thousand, or a hundred, or fifty, a man goes where the Garuda-embodied deity resides. He who in his childhood even sportively makes a temple of Vasudeva with sand, goes to his region. He who builds temples of Vishnu at sacred places, shrines, and hermitages, reaps three-fold fruits. Those who decorate the temple of Vishnu with scents, flowers, and sacred mud, go to the city of the Lord. Having erected a temple for Hari, a man, either fallen, about to fall, or half-fallen, reaps twofold fruits. He who brings about the fall of a man is the protector of one fallen. By making a temple for Vishnu one attains to his region. As long as the collection of bricks of Hari's temple exists, the founder of his family lives gloriously in the region of Vishnu. He becomes pious and adorable both in this world and in the next.

He who builds a temple for Krishna, the son of Vasudeva, is born as a man of good deeds and his family is purified. He who builds temples for Vishnu, Rudra, the sun-god, and other deities, acquires fame. . . .

By building temples for other gods, a man reaps the same fruit which he does by building one for Vishnu. By building temples for Shiva, Brahma, the sun, Candi, and Lakshmi, one acquires religious merit. Greater merit is acquired by installing images. In the sacrifice attendant upon the setting up of an idol there is no end of fruits. One made of wood gives greater merit than one made of clay; one made of bricks yields more than

a wooden one. One made of stone yields more than one made of bricks. Images made of gold and other metals yield the greatest religious merit. Sins accumulated in seven births are dissipated even at the very commencement. One building a temple goes to heaven; he never goes to hell. Having saved one hundred of his family, he takes them to the region of Vishnu. Yama said to his emissaries: 'Do not bring to hell persons who have built temples and adored idols. Bring those to my view who have not built temples. Range thus rightly and follow my commands. . . .

By building a golden temple one is freed from all sins. He who has built a temple for Vishnu reaps the great fruit which one gains by celebrating sacrifices every day.

By building a temple for the Lord he takes his family, a hundred generations past and a hundred to come, to the region of Acyuta. Vishnu is identical with the seven worlds. He who builds a temple for him saves the endless worlds and himself attains immortality. As long as the bricks will last, the maker [of the temple] will live for so many thousands of years in heaven. The maker of the idol attains the region of Vishnu and he who consecrates the installation of the same is immersed in Hari. The person who builds a temple and an image, as well as he who consecrates them, come before him.

From: Manmatha Nath Dutta, *A Prose English Translation of Agni Purana* (Calcutta: H. C. Das Elysium Press, 1903).

Europe

Annalist of Nieder-Altaich: "The Great German Pilgrimage of 1064–65"

An almost incredible multitude set out for Jerusalem this year to worship at the sepulcher of the Lord. So many people took part in the pilgrimage and so much has been said about it that, lest its omission seem serious, we should briefly summarize here what transpired.

The leading personages who took part in the pilgrimage were Archbishop Siegfried of Metz, Bishop William of Utrecht, Bishop Otto of Ratisbon, and Bishop Gunther of Bamberg. Bishop Gunther, though younger than the others, was not inferior to the rest in wisdom and strength of spirit. Although now, after his death, we can scarcely record it without sorrowful groans Gunther was at that time the glory and pillar of the whole realm. Those who were acquainted with his secrets used to say that in many virtues he was perfection itself, down to the most minute details.

These leaders were followed by a multitude of counts and princes, rich and poor, whose numbers seemed to exceed twelve thousand. As soon as they had crossed the river known as the Morava, they fell at once into constant danger from thieves and brigands. Prudently avoiding these dangers, they cautiously made their way to the city of Constantinople. . . .

They left Constantinople a few days later and, after passing through various difficulties and tribulations, came to Latakia. . . .

While they were staying for a few days in Latakia, they began to meet each day many people returning from Jerusalem. The returning parties told of the deaths of an uncounted number of their companions. They also shouted about and displayed their own recent and still bloody wounds. They bore witness publicly that no one could pass along that route because the whole land was occupied by a most ferocious tribe of Arabs who thirsted for human blood.

The question before the pilgrims was what to do and where to turn. First of all, they quickly agreed in council to deny their own wishes and to put all hope in the Lord. They knew that, living or dying, they belonged to the Lord and so, with all their wits about them, they set out through the pagan territory toward the holy city. . . .

Harassed by various trials and tribulations, the pilgrims at last made their way through the whole country to the city called Caesarea. There they celebrated Holy Thursday, which fell that year on March 24. They even congratulated themselves on having escaped all danger,

(continued)

(continues)

since it was reckoned that the journey from there to Jerusalem would take no more than two days.

On the following day, Good Friday [March 25, 1065] about the second hour of the day, [about 6:30–8 a.m.] just as they were leaving Kafar Sallam, they suddenly fell into the hands of the Arabs who leaped on them like famished wolves on long awaited prey. They slaughtered the first pilgrims pitifully, tearing them to pieces. At first our people tried to fight back, but they were quickly forced, as poor men, to take refuge in the village. After they had fled, who can explain in words how many men were killed there, how many types of death there were, or how much calamity and grief there was? Bishop William of Utrecht, badly wounded and stripped of his clothes, was left lying on the ground with many others to die a miserable death. The three remaining bishops, together with a considerable crowd of various kinds of people, occupied a certain walled building with two stone towers. Here they prepared to defend themselves, so long as God allowed it. . . .

For three whole days both sides fought with full force. Our men, though handicapped by hunger, thirst, and lack of sleep, were fighting for their salvation and their lives. The enemy gnashed their teeth like ravening wolves, since it seemed that they were not to be allowed to swallow the prey which they had grasped in their jaws.

At last, on Easter Sunday, about the ninth hour of the day, [mid-afternoon] a truce was called and eight pagan leaders were allowed to climb up into the tower, where

the bishops were, to find out how much money the bishops would pay for their lives and for permission to leave.

As soon as they had climbed up, the one who seemed to be their chief approached Bishop Gunther, whom he took to be the leader of the pilgrims. The sheik removed the linen cloth with which his head was covered, and wrapped it around the neck of the seated bishop. "Now that I have taken you," he said, "all of these men are in my power and I shall hang you and as many of the others as I wish from a tree." . . . As soon as the interpreter made known what the sheik had done and said, Gunther, who was not at all terrified by the numerical strength of the surrounding enemy, immediately leaped up and knocked the pagan to the ground with a single blow of his fist. . . . Thus the assault of the attacking pagans was quelled for that day.

On the following day, about the ninth hour, the governor of the King of Babylon [al-Mustansir, the Fatamid Caliph of Cairo] who ruled the city of Ramla, came at last with a large host to liberate our men. . . . The governor took charge of those who had been captured and tied up by the pilgrims and opened the gate so that our men could leave. They made their way, after leaving, to Ramla, where, at the invitation of the governor and townspeople, they rested for two weeks. They were finally allowed to leave and on April 12 they entered the holy city.

From: Annalist of Nieder-Altaich, "The Great German Pilgrimage of 1064–65,"
trans. James Brundage, Internet
Medieval Sourcebook.

The Islamic World

~ *Nasir-i Khusrau: Excerpt from Diary of a Journey through Syria and Palestine (1046–52)* ~

By the wayside I noticed, in quantities, plants of rue, which grows here of its own accord on these hills, and in the desert places. In the village of Kariat-al-'Anab there is a fine spring of sweet water gushing out from under a stone, and they have placed all around troughs, with small buildings contiguous [for the shelter of travelers]. From this village we proceeded onward, the road leading

upward, and I had imagined that we should come to a mountain; and then, going down on the further side, that we should arrive at the Holy City. But after we had continued our upward road some way, a great plain opened out in front of us, part of which was stony, and part of it good soil; and here, as it were, on the summit of the mountain, lay before our view Bait al Mukaddas

[the Holy City]. From Tripoli, which is by the seashore, to the Holy City is fifty-six leagues; and from Balkh to the Holy City, eight hundred and seventy-six leagues. It was the 5th of Ramadan, of the year 438 [5th March, 1047 C.E.] that I thus came to the Holy City; and the full space of a solar year had elapsed since I set out from home, having all that time never ceased to travel onward, for in no place had I yet sojourned to enjoy repose. Now, the men of Syria, and of the neighbouring parts, call the Holy City by the name of Kuds [the Holy]; and the people of these provinces, if they are unable to make the pilgrimage [to Mecca], will go up at the appointed season to Jerusalem, and there perform their rites, and upon the feast day slay the sacrifice, as is customary to do [at Mecca on the same day]. There are years when as many as twenty thousand people will be present at Jerusalem during the first days of the [pilgrimage] month of Dhu-l-Hijjah; for they bring their children also with them in order to celebrate their circumcision.

From all the countries of the Greeks, too, and from other lands, the Christians and the Jews come up to Jerusalem in great numbers in order to make their visitation of the Church [of the Resurrection] and the Synagogue that is there; and this great Church at Jerusalem we shall describe further on in its proper place.

The country and villages round the Holy City are situated upon the hillsides; the land is well cultivated, and they grow corn, olives, and figs; there are also many kinds of trees here. In all the country round there is no spring water for irrigation, and yet the produce is very abundant, and the prices are moderate. Many of the chief men harvest as much as 50,000 Manns weight [or about 16,800 gallons] of olive-oil. It is kept in tanks and in pits, and they export thereof to other countries. It is said that drought never visits the soil of Syria. I heard from a certain person, on whose word I

can rely, that the Prophet—peace be upon him, and the benediction of Allah!—was seen in a dream by a saintly man, who addressed him, saying, “O Prophet of God, give me assurance for ever of my daily bread;” and the Prophet—peace be upon him!—replied: “Verily it shall be warranted unto thee, even by the bread and oil of Syria.”

I now purpose to make a description of the Holy City. Jerusalem is a city set on a hill, and there is no water therein, except what falls in rain. The villages round have springs of water, but the Holy City has no springs. The city is enclosed by strong walls of stone, mortared, and there are iron gates. Round about the city there are no trees, for it is all built on the rock. Jerusalem is a very great city, and, at the time of my visit, there were in it twenty thousand men. It has high, well-built, and clean bazaars. All the streets are paved with slabs of stone; and wheresoever there was a hill or a height, they have cut it down and made it level, so that as soon as the rain falls the whole place is washed clean. There are in the city numerous artificers, and each craft has a separate bazaar. The mosque lies at the [south] east quarter of the city, whereby the eastern city wall forms also the wall of the mosque. When you have passed out of the mosque, there lies before you a great level plain, called the Sahirah, which, it is said, will be the place of the Resurrection, where all mankind shall be gathered together. For this reason men from all parts of the world come hither to make their sojourn in the Holy City till death overtakes them, in order that when the day fixed by God—be He praised and exalted!—shall arrive, they may thus be ready and present at the appointed place.

From: Nasir-i Khusrau, *Diary of a Journey through Syria and Palestine*, trans. Guy Le Strange (London: Palestine Pilgrims' Text Society, 1893).

FURTHER READING

- Elad Amikam, *Medieval Jerusalem and Islamic Worship: Holy Places, Ceremonies, Pilgrimage* (Leiden, Netherlands: Brill, 1995).
- Brian S. Bauer, *The Sacred Landscape of the Inca: The Cusco Ceque System* (Austin: University of Texas Press, 1998).
- David L. Carmichael, *Sacred Sites, Sacred Places* (London: Routledge, 1994).
- Henry Louis Gates and Anthony Appiah, *Africana: The Encyclopedia of the African and African-American Experience* (New York: Basic Civitas Books, 1999).
- Joseph M. Kitagawa, ed., *The Religious Traditions of Asia* (New York: MacMillan, 1989).
- John S. Mbiti, *Introduction to African Religion* (Oxford, U.K.: Harcourt Heinemann, 1991).
- Kenneth W. Morgan, *Reaching for the Moon: On Asian Religious Paths* (Chambersburg, Pa.: Anima, 1991).
- Jon Ortner, Ian W. Mabbett, James Goodman, et al., *Angkor: Celestial Temples of the Khmer* (New York: Abbeville Press, 2002).
- Lawrence E. Sullivan, ed., *Native Religions and Cultures of Central and South America* (New York: Continuum, 2002).

Richard Townsend, ed., *The Ancient Americas: Art from Sacred Landscapes* (Chicago: Art Institute of Chicago, 1992).
 John Ure, *Pilgrimage: The Great Adventure of the Middle Ages* (New York: Carroll and Graf, 2006).
 Diana Webb, *Medieval European Pilgrimage, c. 700–c. 1500* (Houndmills, U.K., Palgrave, 2002).

► scandals and corruption

INTRODUCTION

The study of scandals and corruption in any historical period entails a special difficulty. The society under investigation will have its own conceptions of what is scandalous and corrupt, which might be very different from those of the modern investigator and reader. For instance, the prevalence of anti-Semitism in medieval Europe seems shocking from the modern viewpoint, but in the Middle Ages anti-Semitic views were so thoroughly enmeshed in popular culture that it was the fact that Jews were allowed to live in Christendom that seemed scandalous to nearly everyone in the community. Whenever a ruler expelled Jews from his territories, it was trumpeted as a virtuous act and offered as compensation to the public for unpopular measures, such as raising taxes.

In the traditional cultures of the Middle Ages, social mores were set by religion. Jews seemed to violate the social consensus of both Christendom and Islam (and in Islam, Christians did as well) by refusing to convert to the one faith accepted by the community. The failure to conform was perceived as blasphemy. More ordinary forms of corruption (political and economic) were characterized as idolatry (the worship of man-made ideas or objects as opposed to the “one true god”) because religious authority established what was right and just. Also, in China and Japan, Buddhism was perceived as a foreign religion and in different eras could either be supported as possessing a superior culture and spirituality or persecuted as a corrupting alien influence. At the same time, the possibility of reform relied on restoring the ideals sanctioned by religion, whether based on revealed scripture, the will of the ancestors, or simple tradition.

Medieval rulers inevitably claimed divine sanction, if not divine status, and with it the ability to intervene with divinity on the behalf of the community; this very claim, in fact, more than mere governance, was seen as the most vital role of the ruler in premodern times. The occurrence of natural disasters, such as plague or famine, scandalously undermined the authority of medieval rulers because it seemed to demonstrate the withdrawal of divine sanction. This led to a curious situation in many places in the medieval world, from the Byzantine city of Ephesus to Great Zimbabwe, but nowhere more clearly than in the civilization of the Maya. Successful

agriculture increased the population, but the growth in population demanded more agricultural resources. The response was not conservation but more prayer and sacrifice, which often consumed more agricultural resources. Eventually, the environment became degraded and agricultural production, population, and local civilization all collapsed together.

Recent research has helped to reveal how the elite classes of Mayan society responded to this cycle. Far from being unaware of it, they recognized the threat to their own power that the degradation of the land could cause. Animals such as white-tailed deer and jaguars were vital to the religious ceremonies that displayed the elite’s power as well as to defining their own identity. Not only was the meat of the sacrificed animals distributed to the people as a form of beneficence, but their hides and body parts also were used in religious rituals and even dramas, displays that served to enforce the elite’s power over society. When the population of these animals declined in the wild, the Mayans’ response was not to stop hunting them, but rather to kill more in the belief that increasing sacrifices would restore the balance between the human and divine world as well as bolster the elites’ position in their urban centers. The failure of this policy led to a more severe agricultural crisis and the eventual collapse of Mayan culture.

A universal scandal was the corruption of officials. Before the reforms of the modern age it would have been unusual to have a transaction with a government official that did not involve a bribe. Islamic tax collectors limited themselves to bribes extorted from *dhimmi* (non-Muslims), but those were institutionalized. Although simony, the selling of church offices, was specifically prohibited by canon law, it was openly understood in western Europe that appointment to any church office with an income attached would be accompanied by a payment to the nobleman or bishop in whose gift it was by a bribe equal to 10 years of the office’s revenues. Even the vaunted Chinese civil service, selected by competitive examination in Confucian philosophy and meant to put government power in the hands of disinterested bureaucrats with no wealth or power of their own, was regularly corrupted by bribery. Throughout the whole Middle Ages, fewer than half of civil service positions went to examinees; the remainder were filled by the sons of wealthy aristocratic families who bribed either examination officials or higher officials to circumvent the examination process entirely.

AFRICA

BY TOM STREISSGUTH

The decline of the Roman state in the fifth century invited the invasion of the Germanic Vandals into Roman territory

in North Africa. The Vandals defeated the Roman defenders and overthrew their administration. For about a century what is now Tunisia and eastern Algeria was ruled by a Vandal dynasty. In the meantime, the Roman government had survived in Constantinople, the former eastern capital of the Roman state. In the sixth century the Eastern Roman Empire, or Byzantine Empire, began a reconquest of the Roman domains in North Africa and the eastern Mediterranean. The Vandal armies were defeated by the superior technology and firepower of the Byzantines, who deployed a powerful navy and companies of archers who easily overwhelmed defenders fighting with sword and shield.

To undermine Vandal authority in North Africa, the Byzantines had allied themselves with the Berbers, nomadic herders and hunters who had been living in the Sahara region for millennia. The Byzantine generals promised Berber chiefs autonomy in exchange for their assistance, but the Byzantines reneged on their promises soon after their conquest, a betrayal that ultimately brought their domain to a violent end. Instead of granting autonomy to the Berbers, the Byzantine governors attempted to restore the Roman administration and make tribute-paying vassals of the Berber tribes. They seized land and turned it over to the eastern Christian church, to army officers, or directly to the Byzantine emperor. These practices alienated a large part of the native African population, and the Byzantine rule in North Africa was marred by constant revolts of people who saw their Byzantine overlords as greedy and corrupt.

The Byzantines also attempted to bring North Africa under the control of the eastern Christian church and stamp out the Arian heresy that had been adopted by the Vandals. (The Arian heresy was a position held by some Christian believers in contradiction to the widely held belief in the divine nature of the Holy Trinity. Essentially, the Arians did not grant absolute divinity to the person of Jesus Christ.) The constant flux in Christian doctrine weakened Byzantine authority among the common people, who saw the Christian religion as little more than a tool of conquest and control employed by their new rulers. The church and the secular administration lost authority, and by the 640s North Africa had become an easy target for conquest by the armies of Islam.

To the south the empire of Axum in what is now central Ethiopia had grown wealthy from trade via the Red Sea port of Adulis. The merchants of Axum dealt in ivory, gold, salt, and valuable spices with the Middle East, India, and Persia. The rulers of the city showed a taste for grandiose displays of their wealth and power. The members of the royal family and wealthy aristocrats built ever-larger palaces on the hills surrounding the city and imported luxurious clothing and lavish

furnishings for their homes. Giant stelae raised as monuments to the dead demanded a growing share of the city's workers and resources, while iron foundries used to fashion tools and weapons required the cutting of trees for use as firewood.

The rulers found themselves unable to deal with a worsening environmental crisis, as drought and deforestation in the surrounding region made food and water supplies scarce. Trade was undermined by the conquest of Arabia by the Muslims in the seventh century, and the Axumites began to lose control of their possessions on both sides of the Red Sea. By the early 10th century the Axumite dynasty was overthrown.

At this time the Mali Empire of the western Sahara was developing into the largest state in Africa. The king of Mali ruled a central district around the capital city, and the provinces were ruled by governors appointed by the king. The governors appointed district chiefs, who oversaw several villages, each of which had its own chief. Neighboring states that fell to Malian conquest were allowed to rule themselves but also were forced to make an annual tribute. By custom the governors were members of the royal family, or court favorites of the king, and the competition for the best appointments brought constant intrigue and plotting and an occasional outbreak of civil war and rebellion.

The treasuries were filled by tribute from vassal states, by duties on goods coming to or leaving the empire, and by revenues from land held directly by the king. The constant rivalry for appointments and the king's favors contributed to the downfall of the Mali Empire. By the 14th century the general population held the royal family in low esteem. A steep decline set in after the end of the reign of Mansa Suleiman in 1360. The royal court was troubled by assassinations, civil war, violent rivalries over the succession, and the frequent overthrow of the kings by their ambitious rivals. The loss of central authority encouraged the vassal states to break away. There were four different rulers of Mali between 1387 and 1390; in the meantime the weakening empire was attacked by Tuareg from the north, the rising Songhai realm in the east, and the Mossi from the south. In the 1430s the Tuareg captured the city of Timbuktu. Akil Akamalwal, the Tuareg ruler, was known for his sense of justice and piety, but his successors ruled as corrupt tyrants.

An important theme in this history was the conflict of Islam with traditional African religions. In the 1460s, when the emperor Soni Ali Ber arrived to rule Timbuktu, he found himself in conflict with a long-established group of Islamic ulemas, or religious scholars. Decrying these scholars as corrupt and incompetent, he forced them out of office and replaced them with his favorites, who melded African tradi-

tional beliefs with Islam. Despite these attempts at reform, the decline of Mali under the onslaught of invaders from Songhai and internal corruption proved impossible to stop. By the end of the 15th century the kings of Mali were appealing in vain to the Portuguese for help. By the middle of the 16th century the empire had disappeared.

The Songhai Empire that succeeded Mali, from the capital of Gao, reduced vassal states to provinces, also directly ruled by selected governors. The king appointed his favorites to become governors, and many of these officials did not hesitate to profit from their sinecures by directing tribute payments to their personal treasuries. Judges were rewarded for their services with land, slaves, and an annual salary paid in gold, a system that made such appointments a plum reward for those able to exercise personal influence, bribery, and guile.

The arrival of European explorers along the western coasts of Africa had a long-lasting impact on the social and political makeup of the native African states. The Portuguese, who first reached western Africa in the 15th century, originally came in search of a gold route that would bypass the trans-Saharan caravans controlled by Tuareg or Arab middlemen. Soon, however, Portuguese and other Europeans were developing an industrial slave market in order to provide labor for colonies in the Americas. To obtain slaves, they raided coastal regions and dealt with native kings who captured and traded prisoners from rival tribes.

Slavery was present in Africa before the arrival of Europeans. Africans were enslaved for crimes or for debt or were made slaves after being captured in warfare. The Saharan caravans that transported gold to North Africa and the Mediterranean regions also brought human cargo north from sub-Saharan Africa. But by custom most slaves could eventually buy or earn their freedom, and slavery was never practiced as a large-scale commercial industry.

Originally, slaves were simply captured by force, but as armed resistance developed along the coasts, the Europeans resorted to bribery and guile to obtain their human cargoes. The Europeans had guns, tools, glass work, ceramics, and other useful goods to use as barter in exchange for slaves. They found willing partners in the kings of Congo and other realms, who simply extended their practice of taking war captives into a commercial enterprise. Slaves were taken by bandits, large and organized parties of professional kidnappers, and through a perverted judicial system that turned accused wrongdoers, such as those accused of witchcraft, over to slave depots as punishment. The trade in slaves became such an integral part of the social and economic life of western Africa that many historians see slaving as the root cause of the corruption, violence, and poverty that still haunt this region of the world.

THE AMERICAS

BY TOM STREISSGUTH

By the time of the Middle Ages large empires were gathering strength in the Americas. Although these realms were separated by physical distance as well as by language and culture, they shared one characteristic: rulers who glorified and legitimized their power by showing how favored they were when the gods gave protection in war, sent good weather and timely rain, and allowed their subjects to prosper. When bad fortune threatened, the kings called down supernatural assistance. If assistance did not arrive, it revealed that the kings as merely human, which in some instances led to political turmoil, revolution, and ultimately their downfall.

The Mayan realm covered what is now southern Mexico, Guatemala, and Belize and was one of the wealthiest and most populous empires in the medieval world. Mayan cities numbered in the hundreds, with a few that sheltered tens of thousands of farmers and artisans. The Mayan rulers were considered to be deities, but, as it turned out, they possessed very worldly ambitions and flaws. They employed their resources in raising great armies for raids against their neighbors; they also built immense stone palaces, ceremonial pyramids, and ball courts to symbolize their power and wealth.

Over the span of a few generations in the ninth century Mayan society collapsed. From the records of civil wars that occurred beginning early in the medieval period, it is evident that ambition and the thirst for glory among the Mayan rulers was giving rise to violent conflict. Greedy for treasure, the Mayan leaders oriented the economy to deliver luxury goods to themselves and their retainers. They strove to outdo one another in the extravagance of their buildings and raised great armies to fight for dominance. While the clash among the Mayan princes and their city-states fragmented the society, a drought robbed ordinary people of their food supply.

With the population looking to them for help and guidance, the Mayan rulers were unable to provide the hoped-for deliverance. Irrigation works and canals fell into disrepair, wells dried up, and sparse groundwater disappeared. The Mayan priesthood failed in its vital task: to bring down assistance from Chac, the god of the rains. Without the mandate of the gods, the Mayan kings lost prestige in the eyes of their followers, who saw them as merely human and their taste for wealth and luxury as corrupt. Stressed by the drought and having exhausted the land's ability to sustain their society, the Maya tore their empire apart in civil conflict and revolution.

In the northern Yucatán Peninsula, a remnant of the Mayan realm survived. According to some historical traditions the Toltec king Topiltzin Quetzalcoatl arrived at Chichén

Itzá, in northeastern Yucatán, to establish a new empire in the late 10th century. The fall of the Mayan rulers to the south provided an object lesson for the leaders at Chichén Itzá. The absolute monarchy and wealthy aristocracy, which the economy had served at the expense of the rest of the population, was transformed into a society in which a strong merchant class traded in salt, chocolate, cotton, and other locally produced goods.

In the meantime, the maize cultivation upon which the Maya relied had already been exported to North America. Maize grew abundantly in the Mississippi River valley but required large cleared fields and farming collectives, which in turn gave rise to the first large cities north of the Rio Grande. Around the middle of the seventh century, a large community belonging to the Mississippian culture arose along the banks of the river near what is now East Saint Louis, Illinois.

The city, known to historians as Cahokia, supported itself by planting maize in the fertile bottomlands along the river. The Cahokians dug an artificial channel for the river's eastern tributaries to improve the water supply and make the transportation of wood easier. The city surrounded a huge earthen mound built around 1000. Monk's Mound, as it is known today, covers 15 acres and rises to a height of 100 feet, making it the largest earthen pyramid in North America. A temple on top of the mound was the home of the kings, who were expected to control the rains, the spring floods, and all other forces of nature for the benefit of their subjects.

The city eventually gathered as many as 15,000 people, making it the largest city in North America. By denuding forests along the Mississippi for firewood, however, the Cahokian culture stripped the land of essential protection against the river's devastating floods, while the artificial channels dug to improve irrigation flooded all too easily. In the 13th century the river floods overwhelmed the fields of maize, robbing the Cahokia of their staple food supply.

In the eyes of the people, the famine that resulted was a sign of incompetence on the part of their kings. Historians speculate that political unrest grew as the food supply dwindled. Monk's Mound itself carries abundant evidence of the unfolding events. At some point, a long palisade was built around the temple mound to protect it from hostile invaders and separate the aristocratic elite from the common people. A platform was built on one side of the mound so that the priestly ceremonies could be heard and seen by the people, making the efforts and practices of the priests more visible to them. The ceremonies failed to keep the city safe. An earthquake struck, destroying thousands of homes and buildings on the mound and in the surrounding area and starting fires throughout the city. The mound was rebuilt, but so poorly that it soon collapsed. A civil war then broke

out, and by the middle of the 14th century Cahokia was destroyed, its hundreds of mounds remaining as testimony to the city's former glory.

Far to the south, in what is now northern Peru, another maize culture known as Chimú was flourishing at this time. Chan Chan, the Chimú capital, covered 4 square miles and was the site of elaborate stone palace complexes, entirely barred to commoners and outsiders and reserved for the kings and their retainers. The palaces were used to store grain as well as the mummified remains of dead kings, who were left unburied to enjoy their palatial homes and attend important ceremonies. Each new king had to build his own palace and find a means to maintain it, a system that required the royalty of Chimú to constantly seize or find new sources of wealth.

The wealth of the city made its leaders arrogant and overconfident. In the middle of the 15th century, during the reign of the 11th king of Chimú, Minchacaman, an army of Inca soldiers under Capac Yupanqui, the brother of the Inca ruler Pachacuti (r. 1438–71), arrived at Cajamarca, an allied city to the east. Cajamarca quickly fell to the Incan army, and Chimú submitted to become a tributary state. Capac Yupanqui's success, however, made him suspect in the eyes of his brother. When he returned to the Incan capital of Cuzco, Pachacuti soon put him to death.

The Inca dominion ruled by Pachacuti had risen to dominate the Andean highlands and 1,000 miles of coastlands in what is now Peru and Ecuador. The Inca demanded tribute from subject princes, who preferred submission to resistance. But without accepted rules for the succession, the Inca monarchy was riven by constant factional disputes.

In the late 15th century, a violent melee among rivals to the throne led to the rise of Huayna Capac, still a teenager at the time. Two uncles were appointed as regents but found themselves unable to share power. After one uncle murdered the other, Huayna Capac (r. 1493–1525) took the reins, putting two of his brothers to death to avoid any further disputes. The constant strife among the Inca royal families over the succession would weaken the empire's defenses against the Spanish conquistadores who arrived with Francisco Pizarro in the early 16th century.

Much the same kind of infighting was undermining the Aztec Empire of central Mexico. A central figure in this story was Malintzin (ca. 1501–50), the daughter of an Aztec cacique, or chief. After the death of her father, she was given away by her mother, a greedy woman who wanted to control the inheritance and eliminate any claims her daughter had to royal power. To further these ends, Malintzin was sold off to the cacique of another city and traded several more times until she was presented to the Spanish conquistadores under the leadership of Hernán Cortés in 1519.

Christened Doña Marina by the Spaniards, she provided valuable service to Cortés as a translator who could speak both Mayan and Nahuatl, the language of the Aztecs. Doña Marina may have seen the invaders as beneficent outsiders who could resolve the endless bickering and destructive corruption that had plagued the Aztec monarchy. What is known is that she helped opponents of the Aztec ruler Montezuma II (r. 1502–20) ally against him and with the Spaniards. Her role in the conquest of the Aztecs, however, has earned her widespread condemnation in the minds of Mexicans as a traitor who caused the fall of Mexico to European weapons and disease.

ASIA AND THE PACIFIC

BY KIRK H. BEETZ

From a perspective of hundreds of years later, medieval Asia and the Pacific seem to have been awash in scandals and corruption. The subject can be narrowed by the dependence of historians on written accounts of the scandals and corruption. Archaeology can help a little by identifying places that must have been brothels or gambling dens, but while such places would be scandalous in many societies, they may have been accepted as ordinary parts of life within their own cultures. Therefore, even with sound physical evidence of practices that some cultures would have regarded as immoral, without written documents confirming that in their own cultures such practices were considered scandalous, modern historians are still limited in their interpretations of medieval Asian and Pacific cultures.

Instructive in just how complex matters of scandal could be in a culture is the life of a 10th-century Tamil woman, Kodhai. Her adoptive father, Vishnucitta, was a devotee of Vishnu and was responsible for daily bringing garlands to Vishnu's temple to adorn the god. Kodhai made the garlands for Vishnucitta to take to Lord Vishnu, and as a youngster, she began trying on the garlands in secret before giving them to her father. This act was sacrilege because no person was to sully the garlands intended for Vishnu by wearing them first. Kodhai's father caught her and insisted that Kodhai stop trying on the garlands. She argued that she thought she should try on the garlands to make sure they were suitable for Vishnu. This discussion might have been the end of the matter, but instead, the very orthodox Vishnucitta revealed the scandalous behavior of his daughter to others and in doing so inspired events that reveal much about the nature of Indian society in the early medieval era.

It was discovered through visions that Vishnu was unhappy about receiving garlands that Kodhai had not worn because he liked her having tried them on before he received

them. Instead of severely punishing Kodhai for her sacrilege, her community was flexible enough in its thinking not only to forgive her but to accept her as a spiritually gifted person. Instead of facing disgrace and exile, Kodhai became an Alvar, or a saint; known as Andal, she became one of the foremost religious writers of her time. In fact, people guilty of severe sacrilege were expected to be reborn as dung worms that would live for 80,000 years, but Andal was wed to Vishnu. Thus, even when scandalous behavior really is scandalous, people may choose to respond to that behavior in unorthodox ways.

Even when there are written accounts of scandal and corruption and people responded with expected revulsion and dismay, all may not have been as histories make it seem. For instance, Kassapa I, "the Usurper" (r. 477–95), king of Sri Lanka, murdered his father and usurped his brother, who fled the land. Thereafter, Kassapa built a stronghold called Sigiriya—even today one of the world's most spectacular feats of architectural engineering—built atop a 600-foot-high bluff with sheer sides. According to the chroniclers in Kassapa's era, Sigiriya was either a fortress in which Kassapa hid himself from his many enemies or a pleasure palace where he indulged his many depraved desires. In either case, he was a corrupt ruler who scandalized his subjects. In 495 his brother returned with an army, and Kassapa left the safety of his stronghold to lead his own army on the plains below; he became separated from his troops and fell on his sword rather than be captured. He would seem to have been a thoroughgoing reprobate.

Nevertheless, the accounts were written by monks who had received more favorable treatment from his brother. Sigiriya still has a small number of figures remaining from the hundreds that once adorned its murals, and they include beautiful, sensuous women; however, such figures are common to many Hindu places of worship, and archaeologists have identified several temples on Sigiriya. These temples and the meager fortifications suggest to some archaeologists that Sigiriya was a place of religious contemplation and that Kassapa was defending it from defilement when he perished.

Chronicles and tales from medieval India often tell of greedy Brahmins (priests), self-indulgent princes, scheming prostitutes, and cruel monarchs. Although considered very corrupt by Indians, it was nonetheless common for a king to be murdered by his son, for a brother to murder another over who should become king, and for a queen to poison the sons of concubines who might rival the queen's own favorite son for the throne. Indeed, it seems to have been a noteworthy achievement for a monarch to die of natural causes. Perhaps the most scandalous act occurred during the reign of Sasanka (r. ca. 600–ca. 625), founder of the Bengal kingdom

of Gaur. Among the many misdeeds attributed to him, he murdered King Rajyavardhana of Thanesar (r. ca. 606) while meeting under a safe-conduct agreement, probably to discuss a peace treaty. This event triggered a long war in which Rajyavardhana's brother, Harshavardhana (r. 606–47), was driven back into the core of his kingdom. Sasanka became renowned in Bengal for supposedly creating the Bengali calendar, but one scandalous act overshadowed his good deeds as well as his other evil deeds: He reputedly chopped down the Bodhi tree in the shade of which Gautama Siddhartha (ca. 563–ca. 483 B.C.E.) had achieved enlightenment and become the Buddha. In Sasanka's own day this act would have seemed monstrous.

Other sources of scandal in medieval India seem mundane by comparison. Anyone acting out of his or her caste could become the subject of scandalized gossip, although in the early medieval era society was more forgiving of minor offenses against caste behavior than it was in the late medieval era. In cities people were scandalized by men who spent more on their favorite prostitutes than on their own families, prostitutes who became rich and took on the trappings and behavior of the aristocracy, and especially people who gambled away all their wealth on games of chance. In such matters, life was harsh. The man who spent all his wealth on a prostitute would be treated like the fool he was by the prostitute, who, having milked the man dry, moved on to other clients. The government tried to regulate gambling houses, even collecting taxes from the gambling houses, but those who gambled away everything seldom received any aid: They could go to prison if they did not pay their gambling debts, and they could become slaves of those to whom they owed money. It was often left to courts of law to deal with crimes of corruption. A common problem in courts of law was witnesses who lied in exchange for bribes, and judges were supposed to take this situation into account when making a decision.

In the many kingdoms of Southeast Asia murder and betrayal were common among the royal families and the social elite, in part because few kingdoms had clear rules for the succession of monarchs. Brothers, generals, and nobles often fought over who was to be the next ruler of a nation. Characteristic of significant scandals were the expenditures of the emperor Jayavarman VII (r. 1181–1215 or 1219) of the Khmer Empire. It was typical of monarchs of the region to aggrandize themselves with not only large temples but also statues of themselves. It was believed that statues of divine beings with the features of living people would make those people immortal. Among the Khmer the monarchs and members of the royal family wanted people in the future to worship them as if they were gods. Jayavarman VII took this desire to an extreme. He built a new capital city, Angkor Thom, as well as

many useful structures, including 101 hospitals. Further, he continued the Khmer tradition of waging war on neighbors. The 20,000 shrines he ordered built, as well the monuments of his new city, drained not only the treasury but also the people of the empire. His greed and pursuit of self-glorification badly weakened the empire.

Medieval Chinese chroniclers seem to have had a passion for recording the scandals and misdeeds of rulers and government officials. A common problem from the Tang Dynasty to the Ming Dynasty was unfairness in the government examinations that were used to identify talented bureaucrats. The examinations were based on Confucian principles, and candidates for government posts had to take a series of three, each successively qualifying those who passed for higher honors and respect. However, under the Tang only about 20 percent of government jobs went to people who took the examinations. Under the Song 40 percent of jobs went to examinees. Many who passed the examinations did not receive the government posts they were supposed to receive. Often government officials arranged for their children to be given posts without qualifying for them. In addition, aristocrats were given the opportunity to place relatives in government posts. In the 15th century people often purchased their way through the first level of examinations without taking them. Those who ran the examinations often were open to bribery. There is an account of a young man entering his examinations with coins strung on a lace on one of his shoes. The examiner asked him why he had the coins, and he replied that he had heard that those who wished to pass the examinations needed to have cash with them. The examiner understood and kept silent.

Perhaps no regimes were more corrupt than those of the empress Wu Hou (r. 690–705), the emperor Zhongzong (r. 684 and 705–10), and the empress Wei (r. 710–12), who reigned through a puppet emperor. Under these rulers the government became a criminal organization, with its members looting the treasury, kidnapping children of commoners into slavery, and selling government offices. Each of Zhongzong's daughters was given her own staff, and each sold appointments to her staff for 300,000 copper coins apiece. The daughters sold more than 1,400 government positions. In 710 Empress Wei poisoned her husband, Zhongzong, and tried to rule through a puppet emperor. In a coup Emperor Xuanzong (r. 712–56), called Minghuang (meaning the "brilliant emperor"), seized the throne. He put an end to much of the corruption of his predecessors and brought Tang China to its height of power, prosperity, and arts, but corruption eventually ruined his life. Scheming for power among government officials, not only in the capital but in the provinces, resulted in a revolt by his most trusted governor, An Lushan. Betrayed

and trapped by his own guards, Xuanzong was made to murder the concubine he loved most and then was forced into exile, dying in 761.

EUROPE

BY BRADLEY A. SKEEN

In the intensely Christian culture of medieval Europe the transgression of Christian morality was scandalous. Adultery, for instance, was a scandalous act for all that the ideal of courtly love held by the aristocracy was inherently adulterous. Witchcraft, too, was scandalous, though before the 15th century it was considered a sort of delusion held by the simpleminded. Political corruption and the perceived hypocrisy of spiritual institutions that did too little to help the poor were scandalous precisely because they transgressed Christian morality, which claimed to overturn social hierarchy and which had originated in a movement of social protest against oppression. From the viewpoint of most medieval people two events or circumstances stand out as extraordinarily scandalous because they undermined the essential unity of western Christendom: the Babylonian captivity and the toleration of Jews within Christian culture.

Boniface VIII (r. 1294–1303) made the most far-reaching claims for papal authority of any pope. Faced with the prospect of the clergy of France being taxed by the crown, Boniface issued papal bulls, or proclamations, defending the immunity of the church from secular taxation and asserting the authority of the pope over secular rulers. Philip IV (r. 1285–1314) of France in return ordered the French clergy to cease obeying Boniface's decrees. Boniface then excommunicated the king. Philip sent a military force to Rome to arrest the pope, who was tortured in an attempt to force him to abdicate. Although he refused, Boniface died from his injuries within a few weeks.

France unduly influenced the election of Boniface's successors. After the short-lived Benedict XI (r. 1303–04), the Frenchman Clement V (r. 1305–14) was elected pope. He was a close ally of King Philip's and, as an inquisitor, had conducted the famous trial against the Knights Templars that had resulted in the confiscation of the order's property by the crown. Clement broke with all tradition and established his court outside Rome at the papal enclave in Avignon (then on the French border) and set a precedent for popes to reside at Avignon instead of Rome for the next century.

This change of papal residence is called the Babylonian captivity, after the exile of the elite classes of the kingdom of Judah in the city of Babylon described in the Hebrew scripture. Avignon was likened to Babylon, famous in the medieval mind for its decadence and idolatry, because of the



Pewter pilgrim badge of the head of Thomas Becket, who quarrelled with the king over the relations of the church and the state and was murdered by four knights in Canterbury Cathedral, Britain, 14th century (© Museum of London)

increasing perception of luxury and arrogance in the Avignon popes.

During the Babylonian captivity the popes were seen throughout Europe as being increasingly under the control of the French crown. However, in 1378 Gregory XI (r. 1370–78) returned the papal court to Rome. After his death in the same year, the college of cardinals elected the Neapolitan Urban VI (r. 1378–89) as his successor. The cardinals were appalled, however, by the development of a dangerous paranoia in Urban after his election, and they left Rome and elected the Swiss Clement VII (r. 1378–94) as pope. Clement moved to Avignon and was unable to take any effective action to remove Urban. As a result, the papacy, meant to be the single unifying authority of Christendom, was split by a schism between two popes, each excommunicated as an antipope by the other. Worse, each had his own college of cardinals to elect successors, perpetuating the crisis. A church council met at Pisa in 1408 to try to resolve the crisis by deposing both ex-

isting popes and electing a new one. But since there was still no effective means of ousting the other two claimants, this resulted in three popes holding office simultaneously.

This schism was intolerable and from 1414 to 1419 another council met at Konstanz (Constance) in present-day Switzerland under the authority of the emperor Sigismund (r. 1433–37) to settle the matter. The first important act of the council was to declare the doctrine of conciliarism, meaning that a council of the church has supreme authority in ecclesiastical matters and can depose and elect popes at will. Nevertheless, care was taken to find a candidate who would win the political backing not only of the emperor but also of other important secular rulers so that the deposition of the antipopes and the election of a new pope could be enforced. In 1417 a native Roman, Martin V (r. 1417–31), was elected. He reigned until 1431.

The Babylonian captivity and the schism that followed it seriously damaged the papacy and the Catholic Church. Not only did it undermine the authority of the papal office through the alternative doctrine of conciliarism, it also lessened the prestige of the Catholic hierarchy by suggesting that legitimate rivals to the established order were possible. This set the stage for the challenge to Rome's authority mounted by the Reformation that helped to bring about the end of the Middle Ages.

The modern world finds the existence of anti-Semitism within any society scandalous. But western Europe was a highly anti-Semitic culture, to such a degree that popular opinion found the existence of the Jews within a Christian civilization scandalous, resulting in various forms of persecution against them.

Many levels of justification were offered for the irrational system of belief underlying anti-Semitism. Jews were outsiders in Christian Europe and, like any minority community, seemed suspicious to many members of the majority community. Lurid depictions of supposed Jewish blasphemy and of the Jews' role in the Gospel accounts of the execution of Christ were the subjects of popular literature and religious drama. Church law forbade Christians to loan money at interest, and because most other professions were closed to them, many Jews took advantage of this lack of competition to become bankers. Christians who were forced to borrow from Jewish moneylenders found a cause for grievance.

A more pertinent justification for anti-Semitism was found in widely circulated rumors. The basic rumor, called the blood libel, went back to antiquity. It held that Jews celebrated the Passover seder (or feast, held on the Friday before the Christian celebration of Easter) by kidnapping, killing, and eating a Christian child. This story was regularly revived during the Christian Holy Week, and its incensed hearers

would not infrequently lynch local Jews. (There were many thousands such incidents all over Europe throughout the Middle Ages.) It was in the hope of escaping violence like this that many Jews at first welcomed the formation of ghettos (segregated sections of a city in which Jews were forced to live), though they ultimately provided no safety. While the Fourth Lateran Council (1215) forced Jews to wear distinctive badges or hats in a stigmatization reminiscent of lepers or prostitutes, anti-Semitic actions were for the most part officially discouraged by the church, though to little effect.

Medieval kings sometimes decided that it was incompatible with a Christian nation to have Jews as their subjects and expelled them from their domains. In 1290 Edward I (r. 1272–1307) expelled the Jews from England. His motive seems to have been partially economic. At the time of the expulsion he also declared that all money owed to Jews was instead to be paid to the crown. It was an extremely popular measure. Edward touted it as a concession to the English nobles and won from them a voluntary increase in their tax rate as a gesture of thanks. In 1492, after the capture of the city of Granada completed the Reconquista of Spain from the Moors, Ferdinand II (1452–1516) and Isabella (1451–1504) of Spain forced all remaining Jews and Muslims in Spain to choose between either converting to Christianity or leaving the country.

The kingdom of France presents a more complicated case. From 1315 to 1318 southern France experienced a severe famine, and this caused an increased need to borrow money from Jewish moneylenders with a corresponding rise in hostility toward them. In 1321 thousands of young peasants (called *pastoureaux*) abandoned the fields and began wandering from town to town, calling for repentance and denouncing the corruption of both church and state. They also circulated a new rumor concerning lepers. In medieval society people infected with leprosy were quarantined in special hospitals where they were legally required to live. They were forbidden to work but were provided for by charitable institutions controlled by the church. They were allowed to go out during the day to beg for alms but had to wear special identifying marks on their clothing. The new rumor claimed that the lepers had been bribed by foreign rulers (the king of Babylon—an utterly fantastic title—and the king of Granada) to poison the wells from which common drinking water was taken and thus murder everyone in Christian Europe. It was claimed further that the Jews had acted as intermediaries between the Christian lepers and the Islamic rulers.

Action on this rumor was very swift. Many lepers and Jews were lynched, but others were arrested and tried. Interrogated under torture, every detail of the conspiracy was confirmed by most defendants, who were then executed. Defendants who persistently denied the charges were either also

executed on denunciations by others or else sentenced to be closely confined for the rest of their lives in prisons run by the Inquisition in the hope that they would eventually repent of their sins. These trials went on throughout France, and one result was that the same local governments that initiated the trials were able to take over administration of the endowments of the now empty leper hospitals. King Philip V (r. 1316–22) met with a group of Jewish leaders and accepted an enormous fine of 100,000 livres in lieu of expelling the entire Jewish community. His successor, Charles IV (r. 1322–28), nevertheless issued an expulsion order in 1323. Perhaps beginning in 1325, and certainly by 1338, the surviving lepers (if not the Jews) had been exonerated of all charges against them (upon reflection it was easy to see that they could not possibly have been true) and in some cases their confiscated property was returned.

A similar but even greater wave of anti-Semitism accompanied the Black Death that from 1347 to 1350 killed one-third of the entire population of Europe. With no medical or other means available to halt the plague, the identification of a conspiracy provided at least the illusion that something could be done. Accordingly, the story circulated (not only in France but also throughout western Europe) that the disease was caused by the Jews (no lepers this time) poisoning the wells at the behest of Islamic rulers. In this instance, the authorities generally resisted the accusation and pointed out that Jews were dying just like everyone else. But this did not prevent thousands of Jews from being lynched in mob violence. The Jews of the Rhineland fled to Poland and Russia in the face of this extraordinary anti-Semitic violence. Pope Clement VI issued two bulls in 1348 denouncing the conspiracy theory and proclaiming the Jews' innocence, but this had little effect.

The irrational anti-Semitic violence of these two episodes seems scandalous now, but the episodes are a measure of how the discontents of European culture could be projected onto the Jewish community. The Jews were passionately committed to preserving the traditional identity of their own community, but their very existence as something other became a provocative scandal to a medieval Christian Europe that was increasingly intolerant and uncertain of its own identity.

THE ISLAMIC WORLD

BY BRADLEY SKEEN

Muhammad set down in the Koran the kinds of corruption to which he felt civil government and society as a whole were prey. Perhaps he based his ideas on his observations of the various governments he encountered in his travels around the eastern Mediterranean. One of the corrupt practices he warned against was idolatry. Naturally, this means first the

worship of gods other than the one god (Allah) and was meant to stigmatize the traditional religions of Arabia. But Muhammad also advanced a more subtle and important understanding of the term. Idolatry, according to the Koran, is a kind of arrogance that makes men prefer institutions and ways of life dependent on human reason or tradition rather than divine revelation. He stressed that this attitude could corrupt even those who professed Islam without their being aware of it because they had been led astray by the devil. Muhammad used the term to describe anyone who opposed his own teaching and secular rule, and it was later used within Islam to characterize any political opposition, whether by those in or by those out of power.

Closely related to idolatry is the sin of pride. Muhammad taught that pride is what keeps people from accepting the truth when it is shown to them, merely because it is contrary to their preconceived ideas. Perhaps he had in mind the considerable resistance to his own teaching that he encountered; however, it can have a more general meaning too, as when people refuse to accept legitimate criticism of a government they support. Muhammad taught that the same pride is what keeps people from seeing that they are mistreating those who are beneath them in a social or political hierarchy. Pride and idolatry, conceived of in this way, are both sins that Muslims were not to tolerate within themselves and which could corrupt even a devout Islamic state.

The Islamic philosophical tradition views the state as holding a balance between corruption and correction; according to this view, the state has a natural tendency to veer toward the human, which must be checked in order to restore its conformity to the tradition of divine revelation. The precarious nature of this balance can be seen in the case of the *dhimmi*—the Jews, Christians, Zoroastrians, and Sabians (Mandaeans). According to Muhammad's own practice as well as the writings of the Koran, together with Islamic legal tradition (*sharia*), these peoples were to be treated as second-class citizens. They had to pay a special tax, for example, and could not participate in the government. Their testimony could not be used in court to disprove that of a Muslim. They could be enslaved; the justification for this was that, as non-Muslims, they were guilty of idolatry as Muhammad had conceived of it in the Koran. On the other hand, it was also an official government practice throughout much of the Islamic world during the Middle Ages that when an individual *dhimmi* paid taxes, he was to be slapped on the face by government soldiers. Although it was not officially sanctioned, it was almost a universal practice that government tax collectors would also receive bribes from the *dhimmi* at the time that they collected the tax. These policies seem to be motivated by what Muhammad denounced as pride.

The difficulties that Islamic tradition had to negotiate can be seen in the well-known story from the oral tradition associated with Muhammad's life and teaching known as the Hadith. The story goes that toward the end of his life in 632 Muhammad, on a Thursday in June (he died the following Monday), fell ill and asked for pen and paper so that he could prepare a statement that would safeguard the righteousness of the Islamic world forever. One of his companions, Omar, who as the second caliph would conquer most of the Near East, responded that no such testament was necessary, since Muhammad was ill and should not trouble himself and since he had already produced the Koran.

The meaning of the story turns on the concepts of idolatry and pride. Sunni tradition interprets the story as a test by Muhammad to see whether his companions had succumbed to idolatry and believed that another authority besides the Koran was needed as the final word of divine revelation. Shia tradition, on the other hand, teaches that Muhammad's companions had succumbed to pride and refused to see the necessity of allowing Muhammad to write a will, knowing that if he did not, they would come to power after his death. Naturally, Shiites argue that Muhammad intended to name his cousin and son-in-law Ali as his successor. Sunnis argue in turn that the Shia tradition succumbs to both pride and idolatry in imagining that Muhammad could have been thwarted in this way and in believing that any document other than the Koran might have been necessary. Shiites see Omar's proud treatment of

Muhammad as a precursor or model for what they viewed as the corrupt governance of the Islamic world in later ages.

The first four caliphs were chosen from among Muhammad's companions and relatives and are generally referred to as the "righteous caliphs" (*rashidun*), especially in Sunni Islam. All four were not without certain controversies, however. The first caliph, Abu Bakr (r. 632–34), was elected by a consensus of the Islamic elders present in Medina at the time of Muhammad's death, but many Islamic tribesmen from outside Muhammad's inner circle did not initially endorse the election and had to be subdued through civil war. The caliph declared that his enemies were apostates, that is, that they had abandoned Islam and returned to the ways of idolatry, refusing to accept the divinely sanctioned succession. Since he was successful in overcoming his enemies, this claim is not disputed in Islamic tradition.

Omar (r. 634–44) served as the next caliph. Despite his phenomenal military success, Omar continued to live in remarkable simplicity and refused to establish a dynasty by naming a successor, following Muhammad's example. Nevertheless, he was assassinated by a slave whom he had ruled against in a legal case. The slave thought Omar had acted proudly in denying him what he considered justice.

The third caliph was Uthman ibn Affan (r. 644–56). He had a standard edition of the Koran made and circulated it throughout the Islamic world, destroying copies of alternative editions. Some of Muhammad's original companions ob-



Gold tanka of Sultan Qutb al-Din Mubarak Shah I, Delhi Sultanate, India, 1318; Mubarak Shah I ascended the throne of Delhi at the age of 18, having blinded the previous sultan, his brother Umar, a child of about six years old. His reign was short-lived and also ended violently when he was murdered by his favorite, Khusra Khan. (© The Trustees of the British Museum)

jected to this practice, so he had them publically flogged. He also filled the administrative posts of the Islamic Empire with his own relatives. He was assassinated by Omar's son, who could not tolerate these seemingly proud actions.

The fourth caliph was Ali, Muhammad's son-in-law and cousin (r. 656–61). He, too, was assassinated. The controversy that followed over his succession split Islam into the Shia and Sunni factions, which each view the other as idolatrously falling away from true Islam. Ali's son, Hassan, was proclaimed the new caliph, but this was unacceptable to Muawiyah, the governor of Egypt, who declared himself caliph and precipitated a civil war in which Hassan was defeated, largely through Muawiyah's subversion of Hassan's commanders through bribes and promises of offices. Their preference for their own advantage over the good of the Islamic world is a clear example of what Muhammad meant by "idolatry."

The Umayyad caliph Yazid I (r. 680–83) was characterized as falling into idolatry through becoming an alcoholic (ignoring the Koranic prohibition on wine) and obsessed with prostitutes to the neglect of his religious duties. The later caliph al-Walid II (r. 743–44) is presented in the same light. These historical characterizations go along with the loss of the popular mandate that was meant to support the caliphate and with outbreaks of rebellion and civil war. These scandalous descriptions are meant to explain the rulers' political failure, particularly the end of the Abbasid Dynasty in revolt. Because they lacked the consensus of religious elders throughout the Islamic community but succeeded through birthright and through civil war, they are presented as proud and idolatrous.

Despite its achievements in founding Baghdad (Iraq) and creating one of the great high points of medieval cul-

ture, the Abbasid Dynasty (750–1258) was viewed as tyrannical, and its rulers were blamed by Arab historians for allowing the Islamic world to fall into permanent division and for allowing the rule of Arabs over the Islamic world to be transferred to Turks. Just as they had founded Baghdad, their secular rule ended when they failed to protect the city from Mongol invaders, who sacked it in 1258. Accordingly, the historical tradition emphasizes the scandalous personal excesses of the Abbasid caliphs. Family members killed each other in the quest for political power. Al-Amin (r. 809–13) is presented in sources as a homosexual. Al-Ma'mun (r. 813–30) was unable to control the female members of his family (a great failing in traditional Arabic culture) and failed in a suit for divorce against his wife. Details of personal scandals like these are incorporated into historical texts about rulers as a form of judgment by historians against the rulers they are writing about. In general, Arab scholars presented the history of the caliphate as one of decline. As the Islamic world's rulers moved further away from Muhammad in family relationship and further from the divine example set by him, they inevitably moved toward idolatry and pride.

See also ALCHEMY AND MAGIC; AGRICULTURE; CITIES; CRIME AND PUNISHMENT; ECONOMY; EMPIRES AND DYNASTIES; EXPLORATION; FAMILY; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; LAWS AND LEGAL CODES; MILITARY; NATURAL DISASTERS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; TRANSPORTATION; WEAPONRY AND ARMOR; WAR AND CONQUEST.

Asia and the Pacific

Excerpt from the Taika Reform Edicts (645)

Commissioners were sent to all the provinces to take a record of the total numbers of the people. The Emperor on this occasion made an edict, as follows:

"In the times of all the Emperors, from antiquity downwards, subjects have been set apart for the purpose of making notable their reigns and handing down their names to posterity. Now the Omi and Muraji, the Tomo no Miyakko and the Kuni no Miyakko, have each one set apart their own vassals, whom they compel to labor at their arbitrary pleasure. Moreover, they cut off the hills and seas, the woods and plains, the ponds and

rice-fields belonging to the provinces and districts, and appropriate them to themselves. Their contests are never-ceasing. Some engross to themselves many tens of thousands of shiro of rice-land, while others possess in all patches of ground too small to stick a needle into. When the time comes for the payment of taxes, the Omi, the Muraji, and the Tomo no Miyakko, first collect them for themselves and then hand over a share. In the case of repairs to palaces or the construction of misasagi, they each bring their own vassals, and do the work according to circumstances. The Book of Changes says, "Diminish that which is above: increase that which is below: if

measures are framed according to the regulations, the resources of the State suffer no injury, and the people receive no hurt.

At the present time, the people are still few. And yet the powerful cut off portions of land and water, and converting them into private ground, sell it to the people, demanding the price yearly. From this time forward the sale of land is not allowed. Let no

man without due authority make himself a landlord, engrossing to himself that which belongs to the helpless."

The people rejoiced.

From: W. G. Aston, trans. *Nihongi: Chronicles of Japan from the Earliest Times to A.D. 697* (London: Kegan, Paul, Trench, Trübner, 1896).

Europe

Lateran IV: Canon 68—On Jews (305)

In some provinces a difference in dress distinguishes the Jews or Saracens from the Christians, but in certain others such a confusion has grown up that they cannot be distinguished by any difference. Thus it happens at times that through error Christians have relations with the women of Jews or Saracens, and Jews and Saracens with Christian women. Therefore, that they may not, under pretext of error of this sort, excuse themselves in the future for the excesses of such prohibited intercourse, we decree that such Jews and Saracens of both sexes in every Christian province and at all times shall be marked off in the eyes of the public from other peoples through the character of their dress. Particularly, since it may be read in the writings of Moses [Numbers 15:37–41], that this very law has been enjoined upon them.

Moreover, during the last three days before Easter and especially on Good Friday, they shall not go forth in

public at all, for the reason that some of them on these very days, as we hear, do not blush to go forth better dressed and are not afraid to mock the Christians who maintain the memory of the most holy Passion by wearing signs of mourning.

This, however, we forbid most severely, that any one should presume at all to break forth in insult to the Redeemer. And since we ought not to ignore any insult to Him who blotted out our disgraceful deeds, we command that such impudent fellows be checked by the secular princes by imposing them proper punishment so that they shall not at all presume to blaspheme Him who was crucified for us.

From: H. J. Schroeder, *Disciplinary Decrees of the General Councils: Text, Translation and Commentary* (St. Louis: B. Herder, 1937).

The Islamic World

Abul Hasan Ali Al-Masudi (Masoudi), Excerpt from The Book of Golden Meadows (ca. 940)

AL MAHDI AND HIS VIZIER YAKUB IBN DAUD

When Al Mahdi's father, Al Mansur, died, he left in the treasury nine hundred million and sixty thousand dirhems, and Abu Obaid allah, the first Vizier of Al Mahdi, advised the Caliph to be moderate in his expenses and to spare the public money. When Abu

Obaid allah was deposed, his successor, Yakub ibn Daud, flattered the inclinations of the Caliph, and encouraged him to spend money, enjoy all sorts of pleasures, drink wine, and listen to music. By this means he succeeded in obtaining the entire administration of the State. One of the poets of the time composed an ode containing

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the following lines: "Family of Abbas! your Caliphate is ruined! If you seek for the Vicar of God, you will find him with a wineflask on one side and a lute on the other."

Abu Haritha, the guardian of the treasure chambers, seeing that they had become empty, waited on Al Mahdi with the keys, and said: "Since you have spent all your treasures, what is the use of my keeping these keys? Give orders that they be taken from me." Al Mahdi replied: "Keep them still, for money will be coming in to you." He then dispatched messengers to all quarters in order to press the payment of the revenues, and in a very short time these sums arrived. They were so abundant that Abu Haritha had enough to do in receiving them and verifying the amount. During three days he did not appear before Al Mahdi, who at length said: "What is he about, that silly Bedouin Arab?" Being informed of the cause which kept him away, he sent for him and said: "What prevented your coming to see us?" "The arrival of cash," replied the other. "How foolish it was in you," said Al Mahdi, "to suppose that money would not come in to us!" "Commander of the Faithful," replied Abu Haritha, "if some unforeseen event happened which could not be surmounted without the aid of money, we should not have time to wait till you sent to have the cash brought in."

It is related that Al Mahdi made the pilgrimage one year, and passed by a milestone on which he saw something written. He stopped to see what it was, and read the following line: "O Mahdi! you would be truly excellent if you had not taken for a favorite Yakub, the son of Daud." He then said to a person who was with him: "Write underneath that: 'It shall still be so, in spite of the fellow who wrote that-bad luck attend him!'" . . . Rumors unfavorable to this minister had greatly multiplied. His enemies had discovered a point by which he might be attacked, and they reminded the Caliph of his having seconded Ibn Abd allah the alide in the revolt against Al Mansur.

One of Yakub's servants informed Al Mahdi that he had heard his master say: "The Caliph has built a pleasure-house, and spent on it fifty millions of dirhems out of the public money." The fact was that Al Mahdi had just founded the town of Isabad. Another time Al Mahdi was

about to execute some project when Yakub said to him: "Commander of the Faithful, that is mere profusion." To this Al Mahdi answered: "Evil betide you! does not profusion befit persons of a noble race?"

At last Yakub got so tired of the post which he filled that he requested of Al Mahdi permission to give it up, but that favor he could not obtain. Al Mahdi then wished to try if he was still inclined toward the party of the alides, and sent for him, after taking his seat in a salon of which all the furniture was red. He himself had on red clothes, and behind him stood a young female slave dressed in red; before him was a garden filled with roses of all sorts. "Tell me, Yakub," said he, "what do you think of this salon of ours?" The other replied: "It is the very perfection of beauty. May God permit the Commander of the Faithful to enjoy it long!" "Well," said Al Mahdi, "all that it contains is yours, with this girl to crown your happiness, and, moreover, a sum of one hundred thousand dirhems." Yakub invoked God's blessing on the Caliph, who then said to him: "I have something to ask of you." On this, Yakub stood up from his seat, and exclaimed: "Commander of the Faithful, such words can only proceed from anger. May God protect me from your wrath." Al Mahdi replied: "I wish you to promise to do what I ask." Yakub answered: "I hear, and shall obey." "Swear by allah," said the Caliph. He swore. "Swear again by allah." He swore. "Swear again by allah." He swore for the third time, and the Caliph then said to him: "Lay your hand on my head and swear again." Yakub did so.

Al Mahdi, having thus obtained from him the firmest promise that could be made, said: "There is an alide, and I wish you to deliver me from the uneasiness which he causes me, and thus set my mind at rest. Here he is; I give him up to you." He then delivered the alide over to him, and bestowed on him the girl, with all the furniture that was in the salon and the money. When the alide was alone with him, he said: "Yakub, beware lest you have my blood to answer for before God. I am descended from Fatima, the daughter of Mohammed, on whom God's blessings and favors always repose." To this Yakub replied: "Tell me, sir, if there be good in you." The alide answered: "If you do good to me, I shall be grateful and pray for your happiness." . . . "Depart with my good wishes," said Yakub.

The girl heard all this conversation, and told a servant of hers to go and relate it to Al Mahdi, and to say in her

name: "Such is the conduct of one whom in giving me to him you preferred to yourself; such is the return he makes you for your kindness." Al Mahdi immediately had the road watched, so that the alide was taken prisoner. He then sent for Yakub, and said to him: "What has become of that man?" Yakub replied: "I have delivered you from the uneasiness he gave you." "Is he dead?" "He is." "Swear by allah." "I swear by allah." . . . Al Mahdi then said to an attendant: "Boy, bring out to us those who are in that room." The boy opened the door, and there the alide was seen with the very money which Yakub had given him. Yakub was so much astounded that he was unable to utter a word. "Your life," said Al

Mahdi, "is justly forfeited, and it is in my power to shed your blood, but I will not. Shut him up in the matbak." He had him confined in that dungeon, and gave orders that no one should ever speak to him or to any other about him. Yakub remained there during the rest of Al Mahdi's reign (over two years), and during the reign of Musa-al-Hadi, the son of Al Mahdi, and during five years and seven months of the reign of Haroun Al Rashid.

From: Charles F. Horne, ed., *The Sacred Books and Early Literature of the East*, Vol. 6, *Medieval Arabia* (New York: Parke, Austin, and Lipscomb, 1917).

FURTHER READING

- Charles D. Benn, "Usurpation, Overthrow, and Corruption (684–712)," in his *China's Golden Age: Everyday Life in the Tang Dynasty* (New York: Oxford University Press, 2004).
- Renate Blumenfeld-Kosinski, *Poets, Saints, and Visionaries of the Great Schism, 1378–1417* (University Park: Pennsylvania State University Press, 2006).
- Joel Carmichael, *The Satanizing of the Jews: Origin and Development of Mystical Anti-Semitism* (New York: Fromm International, 1992).
- Youssef M. Choueiri, *A Companion to the History of the Middle East* (Oxford, U.K.: Blackwell, 2005).
- David C. Conrad, *Empires of Medieval West Africa: Ghana, Mali, and Songhay* (New York: Facts On File, 2005).
- Marzieh Gail, *The Three Popes: An Account of the Great Schism When Rival Popes in Rome, Avignon, and Pisa Vied for the Rule of Christendom* (New York: Simon and Schuster, 1969).
- Carlo Ginzburg, *Ecstasies: Deciphering the Witches' Sabbath*, trans. Raymond Rosenthal (New York: Penguin, 1991).
- John Hemming, *The Conquest of the Incas* (New York: Harvest, 2003).
- John Y. B. Hood, *Aquinas and the Jews* (Philadelphia: University of Pennsylvania Press, 1995).
- R. Stephen Humphreys, *The History of the al-Tabari XV: The Crisis of the Early Caliphate* (Buffalo: State University of New York Press, 1990).
- John Keay, "Harsha-Vardhana," in his *India: A History* (New York: Atlantic Monthly Press, 2000).
- Nehemia Levtzion and Jay Spaulding, eds. *Medieval West Africa: Views from Arab Scholars and Merchants* (Princeton, N.J.: Markus Wiener Publishers, 2002).
- Richard S. Levy, ed., *Antisemitism: A Historical Encyclopedia of Prejudice and Persecution* (Santa Barbara, Calif.: ABC-CLIO, 2005).
- Paul Lovejoy, *Transformations in Slavery: A History of Slavery in Africa* (New York: Cambridge University Press, 2000).
- Charles C. Mann, *1491: New Revelations of the Americas before Columbus* (New York: Alfred A. Knopf, 2005).

Robert Michael and Philip Rosen, *Dictionary of Antisemitism from the Earliest Times to the Present* (Lanham, Md.: Scarecrow, 2007).

Roland Oliver and Anthony Atmore, *Medieval Africa, 1250–1800* (Cambridge, U.K.: Cambridge University Press, 2001).

Timothy Pauketat, *Cahokia: Domination and Ideology in the Mississippian World* (Lincoln: University of Nebraska Press, 2000).

Phillip H. Stump, *The Reforms of the Council of Constance (1414–1418)* (Leiden, Netherlands: E. J. Brill, 1994).

Denis Twitchet, "The Empress Wu," in *The Cambridge Encyclopedia of China*, ed. Brian Hook and Denis Twitchett (New York: Cambridge University Press, 1991).

► science

INTRODUCTION

Science is an invention of modern Western civilization. Its basic idea is that the natural world can be explained using a specialized form of logic called the scientific method. This entails observing facts in nature (for example, the motions of the planets through the night sky) and then formulating a hypothesis, or explanation, of how and why they move as they do. Then the scientist makes a prediction about how the system under observation or the object of study will behave in an experiment or test of the predictions. Finally, a theory is made that explains all of the facts, experimental results, and observations. This theory, in turn, will generate new predictions that have to be tested through experiment and lead to the theory's being changed or replaced with a new one, depending on how accurate its predictions are. In the case of planetary motion, the general theory of the planets' motion around the sun (rather than the ancient belief that planets moved around the earth) was proved by the accurate predic-

tion not only of the return of Halley's comet in 1759 but also of its precise path through the sky.

Not coincidentally, the same return of Halley's comet was a confirmation of predictions based on Isaac Newton's theory of gravity. (In the nature of theories, this was accepted until Einstein's more precise understanding of gravity in the early 20th century forced it to be abandoned by scientists.) Newton's theory described gravity as a force of attraction that operated over a distance without any physical connection between the bodies involved (for example, the earth and the moon). This contravened the whole mechanistic principle of science as it had been developed in the century before Newton. But Newton was able to make this imaginative leap only because of his extensive, though ultimately futile, investigation of medieval alchemy, where action at a distance was taken for granted. This is an example of a more general foundation of the scientific method in the abstract thought of alchemists, theologians, and philosophers of the Middle Ages in Western Europe as well as in Islam.

A more general contribution of medieval thought to science is in understanding the idea of the natural world itself. Traditional peoples all over the world (including Greeks and Romans and early Christians, the precursors of medieval European and Islamic thinkers) believed that the world was a continuum between the material and the divine with many intervening stages, such as the human (which was believed to reconcile both extremes) and spiritual beings (among them, angels or jinn). This idea is sometimes known as the Great Chain of Being. It would not make any sense to separate merely the physical as being natural, since the spiritual and divine were just as much a part of nature as a whole. But Christian (and, to a lesser degree, Islamic) theologians were presented with a problem by alchemy, magic, and witchcraft.

Alchemists, in particular, sometimes claimed that in manipulating physical elements they had discovered and were able to use the same divine powers over nature that God used in creating the world. Magicians, witches, and the devil seemed to be able to work wonders in terms of cursing and healing, damaging crops, and causing various misfortunes. Their powers ranged from flying through the air to transforming people into animals (all powers that witches and the devil were believed to have in the Middle Ages).

Theologians, especially at the end of the Middle Ages as witch persecutions became more common, had to formulate a distinction between the power of God and the powers of men and the devil. Alchemists, on the one hand, and the devil and his minions, on the other, either operated through deception and illusion or else caused wonders that might not be able to be immediately explained but were nevertheless

performed through natural means by the manipulation of the physical laws of nature that God had ordained. God, however, achieved miracles that contravened the natural order (such as raising the dead and the other miracles attributed to Jesus in the New Testament or the miracle of transubstantiation performed during the Eucharist) and which the devil or human agency could not duplicate. God's actions were said for the first time to come from outside the natural world, that is, to be supernatural. This separation of the natural and supernatural was a vital precondition for the later creation of science.

Because God is not separated from the physical universe, the study of physical phenomena was a specifically religious concern for medieval thinkers. Christian and Muslim philosophers in the Middle Ages both viewed astronomy, for instance, as a form of worshipping God, since it was an investigation into the perfection of his work. The foundation for this kind of investigation necessarily began with the revealed scriptures of the Bible or the Koran. In fact, within Islam astronomy was sometimes encouraged by religious authorities for this reason, but it was also sometimes condemned (meaning that astronomical books were burned) as though it implied that the revelation of the Koran was incomplete and needed to be supplemented by new learning. For the priests of the Mayan civilization of the Americas the stars themselves were a form of divine revelation and the predictability of their movements the guarantee of religious truth.

Concerning the Middle Ages itself, it is often more useful to speak of technology rather than science. Craftsmen worked slowly through trial and error based on experience to improve their control of nature and the technological systems they knew. The development of the compass in Asia, for instance, took centuries from the first discovery of the magnetic properties of the loadstone. The independent invention of the blast furnace in Europe and China is another patient development of this type. Rarely, the invention of whole new technological devices, such as printing with movable type, would come in a flash of inspiration, as seems to have happened independently in medieval Korea and Germany. Chinese alchemists, working as they always did on a chemical formula that would bring immortality and freedom from the physical restraints of the body, discovered gunpowder entirely by accident. Even the elite scholars supported by royal courts in China and India, in the Mayan cities, or in the House of Wisdom in Baghdad worked always within tradition, trying to improve it incrementally, rather than working against received wisdom, trying to disprove it—the skepticism that is the hallmark of the Scientific Revolution.

AFRICA

BY BRADLEY A. SKEEN

Science in its strict sense did not exist before the 17th century, when it was created in Europe by early scientists like Galileo and Descartes. The scientific method with its testing of hypotheses by experiment and the formulation of explanatory, falsifiable theories was developed from many traditions: from mathematical and geometrical proofs that went back to antiquity, from the graphical representation of equations as developed by Scholastic philosophers in the Middle Ages, and from traditions of verification through experiment in fields such as optics, ballistics, and, perhaps surprisingly, the pseudoscience of alchemy, among others. So the history of these precursors of science, which did exist in the Middle Ages, is an important part of the history of science as a scholarly discipline.

The worldview of medieval Africa (and with few exceptions that of the Middle Ages all over the world) can generally be thought of as religious rather than scientific. Africans believed in gods and spirits and their operation in the world through a rational (in the sense of being self-consistent but nevertheless not scientific) system that can be called magic in English for want of a better term. African thought about the gods and magic was in general symbolic and expressive of human relationships (for example, imagining the gods to govern over humankind and the world in the same way that parents govern over their children and their household) and expressive of the human tendency to project their own condition onto the world (for instance, imagining that might animals think and act like people and that phenomena like storms might do so as well or might at least be controlled by a person, such as a witch), rather than being motivated by practical considerations about how to control and influence nature through specific technological means.

The anthropologist Robin Horton has refined scholarly understanding of the traditional African worldview. Africans looked to the realm of the spiritual and the divine both as a means of understanding the everyday world around them and as means of controlling it, through rituals, prayers, and spells. In such a worldview, language is taken as precisely equivalent to reality, and to invoke the existence of or change in a thing is all that can be done to accomplish it. In this view, invoking the sky, through words, to rain is the most important practical step to ensure the rains necessary for agriculture. Ordering a fever to go away is an effective means of treating malaria. (Actually, as Horton points out, this form of treatment may well be preferable to using untested—and in the medieval context untestable—herbal medicines that could well prove poisonous.) This does not mean that other actions might

not be taken that seem more practical from the viewpoint of Western science, but they would always be understood by the Africans performing them as being effective through their linguistic or quasi-linguistic (ritual) component. Words have meaning derived from tradition (from authority or consensus within the community). In African tradition, language is used to act, not to explain, and the truth of words or ideas is always within a social context and can never be absolute. As long as these conditions prevailed, African culture could not move away from its traditional religious worldview; there was no way to criticize tradition or imagine an alternative, and Africans did not do so except through contact with the West in periods later than the Middle Ages.

Egypt played a prominent role in the development of the scientific tradition in late antiquity, and its importance continued in the early Middle Ages, especially as a mediator of Hellenistic science to the Islamic world. In Sub-Saharan Africa, however, science was largely limited to technological systems, often borrowed from Mediterranean cultures, without a scientific discipline to support them. We often think of technological change today being driven by science, but this is a fairly recent phenomenon. In medieval Africa, as in much of the world throughout human history, technology was maintained by a tradition that was capable of only accepting small changes, arrived at through accident or trial and error methods.

EGYPT

In the third century B.C.E. the Greek kings of Egypt established a museum in their capital of Alexandria. This institution attracted the leading scholars of antiquity. Egypt became a center of scientific learning and technological advances throughout the Hellenistic and Roman periods. The geometrical *Elements* of Euclid and the *Almagest* (a treatise on astronomy and geography) of Claudius Ptolemy were written in Alexandria, to name only two of the Greek works that had wide influence on Christian, Islamic, and Indian learned culture in the Middle Ages. Great strides in technology were made in Alexandria, such as a working model of a steam engine, even if they were not always given wide practical application. By the beginning of the medieval period (the fifth and sixth centuries) the level of learning in Egypt was sharply declining because the museum had been destroyed by mob violence instigated by the Christian bishops of Alexandria. It was the subject of sectarian conflict because it was a “pagan” temple as well as a center of learning.

One scientific subject, however, alchemy, developed rapidly in Egypt at the beginning of the Middle Ages. Although it was developed by scholars working in the Greek communities in Egypt, there is no evidence that alchemy owed anything to

pre-Greek ancient Egyptian culture. Nevertheless, because of the extreme antiquity of Egyptian civilization, some Greek alchemists claimed that their work was based on the translation of ancient Egyptian hieroglyphic texts. Because of continuing fascination with Egypt, this claim was perpetuated throughout the ages, and even some modern scholars look for precursors of alchemy in ancient Egypt. However, alchemy seems to have derived entirely from Greek ideas and to have originally functioned with a Greek cultural context.

The first alchemist was Bolus of Mendes (a city near Alexandria in Egypt). He composed a book called *Physical Properties and Mysteries* (*Physica et mystica*) in the second century B.C.E., which was divided into four chapters on gold, silver, gems, and purple dye. In order to emphasize the link of his work to earlier Greek science, Bolus published the book under the name of an earlier Greek philosopher, Democritus, who was the first thinker to speculate that material substances might be made out of small particles he called atoms. This ancient form of publication is called pseudepigraphy. Bolus's book is lost, but it appears from references in later writers that he dealt with the physical properties of each of the four substances and described the process of purifying and refining them as well as various chemical reactions they participated in. Gold, silver, and gems were valuable commodities in antiquity as well as today.

Purple dye was manufactured from the sea-snail murex, was extremely costly, and could be used only by aristocrats. Roman law regulated the width of the purple stripe that senators were allowed to wear on their clothes. By the fifth century C.E. Christian bishops also added purple-dyed ornament to their clothing. Only the emperor was allowed to wear an entirely purple garment; for anyone else to wear or even possess such a costume was a capital crime because it was considered tantamount to treason. Thus the science of purple dye production was as important as that of gold refining. Bolus characterizes the chemical reactions he describes in highly metaphorical terms, as though the metals and acids in the chemical process were fighting each other or marrying each other, and uses many further extravagances. This kind of language was eventually elaborated into a sort of secret code by which alchemists described chemical reactions, which is not necessarily fully understood today. Bolus also describes how each of the substances could be made, or at least simulated, artificially.

In its early stages of development, alchemy probably did not make extravagant claims of physical transmutation of elements and had little concern for the spiritual or mystical state of the alchemist. However, perfectly ordinary chemical reactions were represented by alchemists as resulting in transmutation. Alchemists were very interested in color and

tended to assume that anything golden in color was gold. The kind of procedure that might have encouraged belief in the possibility of transmutation is the combination of copper and arsenic into copper arsenide which is, indeed, silver in color.

Surprisingly, many early alchemical procedures used existing scientific principles to produce tricks, not unlike those of a modern stage magician. These seem to have functioned by way of demonstrations that could be made at formal dinner parties (an important Greek social location) in order for the alchemist to make an impression on potential patrons and interest them in financially supporting his research. (Most alchemists were male, though an important exception was Maria the Jewess, inventor of the double boiler.) For example, a brief handbook attributed pseudepigraphically to Democritus that was written in fifth-century Egypt gives instructions on how to treat bronze plates, goblets, and utensils so that they appear, at least, to be made out of gold. Other such books describe the use of the purple dye of the murex to make water appear to turn into wine before the diners' eyes.

However, by the fifth and sixth century the nature of alchemy had undergone a fundamental transformation itself. Alchemy remained concerned with the investigation of the physical properties of matter, but it had become, like Greek philosophy as a whole, almost religious in character. A new level of theological meaning and purpose had been added above the investigation of chemical reactions. Alchemical texts of a wholly different nature began to appear. These generally claimed to have been transcribed from hieroglyphic texts and were pseudepigraphically attributed to the Egyptian god Thoth, known in Greek as Hermes Trismegistus (Thrice-Great Hermes). In other words, they were not now primarily technical but theological texts.

One brief text written most likely in the sixth century in Alexandria is known as the Emerald Tablet because it claims to have been copied from an inscription in Egyptian hieroglyphs made on an emerald tablet in remotest antiquity. It contains the famous alchemical formula "as below, so above," meaning that there is a direct correspondence between the physical world on earth and the divine world in the heavens. Manipulating an element on one level, therefore, has an effect on the other. The tablet teaches that the alchemist is seeking a physical quality (later called the "philosopher's stone") that is the physical correspondence to God. This quality or substance contains within itself all four elements that the Greeks believed composed matter: fire, air, water, and earth. The control of this principle would allow the alchemist to transmute metals, but that becomes a secondary goal subordinate to the salvation of the alchemist's soul. The work of this divine principle is described in the same language used in philosophical texts to describe the ascent of the soul to heaven and its

mystical union with God. At the same time that the physical transmutation of the elements is effected the alchemist's soul is clarified and divinized. The alchemist essentially becomes like God and assumes the creative role of God.

The *Turba philosophorum* (The Philosophical Circle), from the same era as the Emerald Tablet, was also translated into Arabic and later into Latin. It purports to be the summary of a sort of alchemical conference held by the philosopher Pythagoras (sixth century B.C.E.) and his students, including Democritus and Socrates and many other famous Greek philosophers. However, these are figures that never had any contact with one another and never held any of the doctrines ascribed to them here, since they all lived centuries before the development of alchemy. It is another case of the names of ancient authorities being used in an attempt to integrate alchemy into traditional Greek philosophy.

The *Turba* begins with a discussion of the four elements conceived of by Greek science and attempts to prove their traditionally accepted characteristics through logical demonstration. It quickly moves to a complicated discussion of the sun. The *Turba* takes the sun as the physical object that corresponds to God. But just as God is one and solitary (and monotheism was hardly foreign to Greek thought of this period), the sun, as the visible God, must also be the sole source of light in the universe. It is then asserted that the light of the moon, planets, and stars is all reflected sunlight. That moonlight is reflected sunlight was well understood in antiquity and in the Middle Ages, but it was generally supposed that the planets and stars shone by their own light, since they have no apparent phases like those of the moon. So the *Turba* advances what we know to be a true scientific discovery—that the planets shine by reflected sunlight—but beginning from theological principles that cannot bear scientific scrutiny. Thus, the concept amounts to an inspired guess.

The further inference that the stars reflect sunlight is made simply by analogy with the moon and planets and is, in fact, quite reasonable for the Middle Ages (for all that it is wrong) because there was at that time no way to prove that the stars were bodies similar to the sun but considerably farther away. This argument is also used in an attempt to logically demonstrate the existence of God. But the supposed proof's circular reasoning merely begs the question. The argument is made that the sun as a unique physical object implies the existence of a unique divine object, whereas the uniqueness of the sun had earlier been established by equating it with a physical manifestation of God. A second proof of God's existence is offered by stating that the sense of sight is able to discern the difference between colors; in the same way, reason is able to discern the different grades of reality between the physical and the divine. Hence divinity, as an object of hu-

man perception, must be real. But the analogy is quite false, since reason is not a sense like sight.

The *Turba* asserts that God created the four elements and then used alchemical processes to create the physical and spiritual world (including immaterial entities such as angels and human souls) around us. From this premise, it would follow that the laws of alchemy exist in nature and can be discovered by reason and further that the alchemist, by discovering and using them, makes himself godlike. The second half of the *Turba* turns to describing a sequence of chemical reactions in the peculiar metaphorical language of alchemy. For all of its logical fallacies, the *Turba* nevertheless makes an attempt to understand the natural world through reason. It should be observed that it does not exclude God from the natural world as part of a separate supernatural realm. It is insistent that physical laws are uniform throughout a single unitary world and that every part of it can be known and explained through reason. These are basic scientific concepts.

Alchemy in early medieval Egypt was probably limited to practice by the remaining minority of adherents of traditional Greek religion ("pagan," in Christian terms), but their writings were nevertheless taken up by later intellectuals in the Islamic world and Christian Europe. Both the Emerald Tablet and the *Turba philosophorum* were translated into Arabic in the ninth century and into Latin in the 12th. They became paramount texts in the development of alchemy both in the Islamic world and in the European Middle Ages and Renaissance. They insured that later alchemical work would be suffused with religious mysticism but at the same time propagated a tradition of physical investigation of nature that eventually led to modern scientific chemistry.

ETHIOPIA

Ethiopians understood the universe through a system of astronomy borrowed from ancient Egypt in pre-Hellenistic times. The most important function of astronomy was to regulate the calendar. The Ethiopian kings converted to Christianity in the early fourth century and added the Christian tradition of the Easter *computus*, a calculation that allowed churchmen to fix the date of Easter each year and then of the rest of the liturgical calendar. Astrology never gained importance in Ethiopia.

Monks of the Ethiopian Church, however, developed an interest in the First Book of Enoch (I Enoch). The text is also called the Ethiopian book of Enoch because it first became known to Western scholars in the 18th century from its Ethiopic translation. The book itself was composed in Judea in the third century B.C.E. in Aramaic. Fragments of the Aramaic text have been discovered among the Dead Sea Scrolls, while fragments of a Greek translation have been recovered

from archaeological digs in Egypt. The book was well known in antiquity, however, even though it was dismissed from the canon of scripture by both the rabbinical authorities in Judaism and by the early Christian Church. It is, however, treated as a canonical book of scripture in the Ethiopian Orthodox Church. I Enoch supplied the predominant astronomical learning of medieval Ethiopia.

The section of I Enoch known as the "Book of the Itinerary of the Luminaries of Heaven" describes a vision of the biblical patriarch Enoch (Genesis 1:18, 5:24) in which the angel Uriel gives him a tour of the heavens and describes to him the motions of the stars and planets. The author of I Enoch shows little or no knowledge of Babylonian or Hellenistic scientific astronomy. The text presents an astronomical system based on that of the Hebrew Bible: The earth is a flat disk (with Jerusalem in the center) surrounded by a ring of gigantic mountains beyond which are limitless oceans; the sky is a solid dome covering the earth. The sun enters the sky by passing through one of six gates in the eastern part of the dome and then passes out through a corresponding gate in the west. These gates are simply 10 degree arc sections on the portion of the horizon on which dawn and sunset occur.

The sun, moon, and planets travel in chariots drawn by the winds. The lengths of day and night vary according to the height of the gate used at particular times of the year. During the night the sun journeys around the outside of the dome to return to the eastern gates. The moon follows the same paths and uses the same gates as the sun. The stars form an army ("the host of heaven") commanded by the angel Uriel and encamped around the heavenly gates. The visible planets, including the moon, are their captains. The moon is known to shine with reflected sunlight and is said to be the same size as the sun (because of the nearly identical apparent size of the two bodies) and one-seventh as bright as the sun.

I Enoch includes various computations to reconcile the 354-day period of 12 lunar months with the 365-day solar year, but these computations are imprecise compared with ancient Greek or Medieval Islamic computations. Nevertheless, Enoch is told that many human beings mistakenly use astronomical calendrical reckonings different from those he has been shown and hence hold religious festivals on the wrong days. In fact, many technical passages are highly corrupt in the manuscript tradition, suggesting that mathematical astronomical concepts were not well understood by the Ethiopian monastic scribes responsible for copying the text.

Medieval Ethiopia possessed sophisticated metalworking and shipping industries whose technologies had been borrowed from Egypt. But Ethiopia had its own stoneworking tradition. Going back to prehistoric times, when the erection of stone monoliths was commonplace in the Ethiopian high-

lands, Ethiopian masons routinely worked with exceptionally large blocks of stone. At the beginning of the medieval period the stonemasons of the Ethiopian kingdom of Axum had such confidence in their tradition that they undertook to create the largest single blocks of stone quarried in the Middle Ages or at any other time or in any area of the world. The kings of Axum commissioned for themselves grave stelae. Half a dozen of these were more than 65 feet high, while the largest was up to 108 feet high. That is the largest single piece of stone ever quarried. An idea of the skill and technological sophistication involved in cutting, dressing, and transporting these stelae can be derived from that fact that one of these enormous stones was transported to Rome in the 20th century while Italy was the colonial power in Ethiopia. When it was returned to Ethiopia, it had to be cut in half to overcome the difficulties of transporting so large and heavy an object, even using modern technology.

The Ethiopian emperor Gebre Mesqel Lalibela (r. 1189–1229) drew on the tradition of Ethiopian stone cutting in creating a group of 13 churches in Tigray when, inspired by a dream, he made the city his capital and renamed it after himself. The town is built on massive granite outcroppings, and Gebre had the churches built by cutting down into the stone, carving them like sculptures rather than traditional buildings. Rooms were relieved inside, however, so they are fully functional as buildings, even as they are still engaged in the bedrock. The largest, the Bete Medhane Alam (House of the Savior of the World), was relieved to a depth of 134 feet, making it the largest monolithic structure in the world.

Although agriculture is often romanticized as a natural pursuit, it is a science used to control nature as much as anything else and was one of the essential technologies whose development led to the birth of civilization. Ethiopians used a number of domestic crops and animals imported from Egypt and the Near East. However, Ethiopian farmers in the Middle Ages produced an important new crop by the usual method of domesticating plants through the selective breeding of wild ancestors. In this case, the plant was the coffee bean, which was domesticated in the province of Kaffa. Domestication, a process that would have taken many generations, was probably not complete before the ninth century. In earlier times other plants such as teff had also been domesticated in Ethiopia.

SUB-SAHARAN AFRICA

Sub-Saharan Africa suffered from a relative poverty in the scientific understanding of the world and in technologies used to control the human environment. In terms of astronomy and geography, medieval African peoples (outside of those cultures dominated by Islam) do not seem to have

received anything from the Mediterranean world. It is clear, in fact, that we cannot speak about science in this region but only about cosmological and astral myths. For instance, the sky was believed to be a solid dome over the earth, so that if one walked to the edge of the world it would become impossible to stand up straight as the dome bent down to meet the earth. (While this is similar to older Greek or Hebrew views, it seems in this case to be a parallel rather than borrowing, since many peoples throughout the world held the same belief, based on the circular character of the horizon.)

Just as Semitic culture explained the relationship between the earth and heaven by the metaphor of a ladder and Greeks by the flight of birds, Africans tended to represent this idea through the hanging silken string of the spider. The spider was the messenger of the gods, and other gods would travel between the two realms on the spider's thread. The idea that the stars are organized into constellations seems to have been known, but the limits and characters of the constellations varied from one group to the next and owed nothing to Hellenistic astronomy. Use of a solar (365-day) calendar was unknown; time was commonly reckoned in lunar months and by seasons.

The suggestion is sometimes made by archaeoastronomers that certain astronomically significant alignments exist in the buildings of the southern African city of Great Zimbabwe. What they mean by this is that if one were to have looked out of a certain window at a specific time of day on a precise day of the year toward a certain visible point on the horizon, one would have seen an astronomically important event, such as the year's first rising of a particular star. It is very difficult, however, to draw definite conclusions from such speculations without the aid of written records to confirm that such procedures were undertaken and would have had some meaning to the culture in question. Moreover, in cultures that have left written records of their interest in astronomy, such alignments do not play a very significant role. Thus, conclusions based on this kind of evidence must remain highly speculative.

The most sophisticated technologies in sub-Saharan Africa were those related to metallurgy. The archaeologist Peter Schmidt has advanced the suggestion that ironworking technology was invented independently in Africa. But the chief argument he uses to support this view is that ironworking was integrated into traditional Africa systems of belief, for example, by the use of ritual to guarantee the success of the smelting process. Any culture integrates what it borrows, however. Ironworking was similarly integrated into medieval European culture (where it was not invented), and rituals and prayers associated with the patron saint Barbara were used by European smiths. It is more likely that iron technology was invented once, in the ancient Near East in the second millen-

nium B.C.E. and from there was diffused to Africa just as it was to Europe and East Asia. Early (premedieval) centers of African ironworking existed at Meroë in the Nile valley and at Nok in Nigeria. Considerable inventiveness was shown in the adaptation of this technology to local conditions. Some cultures, however, such as the Bushmen of the Kalahari, continued to use stone tools and knew nothing of metalworking.

Copper working appears to have been reinvented independently during the Middle Ages in central Africa, where copper ore is abundant. There is no older period of bronze-based technology in Africa as in the Near East, and indigenous copper and bronze production appears quite late. The specific formulas for making bronze may well have been imported from Islamic or Ethiopian sources, however.

The techniques of agriculture were widespread in medieval Africa (though some peoples still lived as hunter-gatherers), having borrowed from the near East in antiquity. Crops like millet and sorghum were domesticated by the precursors of Egyptian civilization (ca. 5000 B.C.E) and spread by the ancestors of the Bantu peoples in early times. They took these crops, along with domestic livestock, as they migrated across the continent. Other crops, such as yams and bananas, were imported from East Asia probably also in antiquity and were widespread by the Middle Ages. But sub-Saharan African agriculture never became as intensive and productive as those in many other areas of the world because of problems in climate and geography that could not be solved.

THE AMERICAS

BY MICHAEL J. O'NEAL

The word *science* creates images of modern-day researchers working in laboratories, conducting experiments under controlled conditions and then publishing their findings so that other scientists can verify them. Science in the medieval Americas—and throughout much of the medieval world—did not conform to these modern methods. Rather, science was based on close observation of the workings of the natural world and on trial and error over many generations.

Further, much of modern-day science is conducted as a quest for knowledge for its own sake. Scientists want to understand the principles that underlie the workings of the universe. Science during the medieval period, in contrast, was more practical. People were more interested in finding ways to exert some control over their environment to help ensure their survival. Thus, medieval science could be characterized more as "technology" than science. It was the application of observations about the physical world to a whole range of activities: agriculture, measurement, construction, engineering, mining and metalwork, forestry management, food

preservation, and a host of other concerns. Many of these activities required an understanding of mathematics, especially geometry.

A final distinction between modern-day science and science as it was practiced in the medieval Americas has to do with the distinction between the physical and spiritual worlds. In the modern era scientists maintain a sharp distinction between the physical and spiritual. They regard spiritual beliefs—a belief in God, along with such matters as ethics and morality—as matters entirely separate from pure science. In the medieval Americas, in contrast, the physical and spiritual worlds were intimately linked. Every aspect of people's lives had religious significance. They saw the universe as composed of spiritual and divine forces that affected them every moment of their lives. The role of scientific thought was to understand those forces and put them to use for the benefit of people.

Ancient Americans were scientists. They were keen observers and experimenters. For example, they made early observations in the fields of astronomy, biology, chemistry, geology, and physics. As astronomers, they learned about the movements of heavenly objects and used those observations to create calendars and to predict changes in the seasons. They observed the “hole” in the Big Dipper long before European astronomers did. In fact, so keen was the interest of the medieval Americans in astronomy that priests and astronomers were often one and the same. Science throughout much of the medieval world was associated with magic, with understanding the power and will of the gods, so the earliest scientists were shamans, priests, and others who claimed knowledge of the divine and could read it in the heavens.

Ancient Americans typically did not have any way to understand the underlying scientific principles that gave rise to phenomena in the natural world. They did, however, observe the effects of those principles and applied them to their daily lives. A good example comes from the field of physics. During lightning storms they learned to throw pieces of cedarwood onto a bonfire to ward off the lightning. Even though they could not have fully understood the physics that explained why this was successful, successful it was. When cedar burns, it emits a negative electrical charge that repelled the negative electrical charge in the atmosphere that produces lightning. Such an observation would have been made over many generations, adding to medieval Americans' storehouse of knowledge about the workings of their physical world.

LAND MANAGEMENT

The primary resource that ancient Americans had at their disposal was the land they occupied. But the nature of this land, and the resources it provided, varied widely: the fro-

zen regions of far North America, the plains that dominated central North America, the woodlands of eastern North America, the desert regions of the American Southwest and modern-day Mexico, the highland regions of the South American Andes, the rain forests of South America, and the coastal regions occupied by tribes throughout the Americas, including the islands of the Caribbean.

Each of these environments required different methods of adaptation, particularly in the area of food production. In the frozen north, where crops could not be grown, Native Americans applied the principles of buoyancy to construct boats that enabled them to hunt at sea—and they had to understand the properties of the materials out of which those boats were built to ensure their seaworthiness and durability.

In many other regions, food was relatively abundant. A good example was the Eastern Woodlands of North America. In the dense forests of this region, stretching from modern-day eastern Canada down through the eastern third of the United States, game animals were hunted, and the forests provided nuts, berries, acorns, and fruits for human consumption. Nevertheless, the Eastern Woodlands tribes supplemented with agriculture and grew such crops as gourds, pumpkins, squash, beans, and corn. Accordingly, Eastern Woodlands tribes had to make scientific observations about crops, planting cycles (based on astronomical observations), the fertility of soil, and the management of land for agricultural purposes.

The Plains Indians faced a different set of challenges. These tribes relied primarily on large game, such as deer, antelope, elk, and especially buffalo. To manage the land for food purposes, they set large fires at the margins of the Great Plains to create what were in effect “buffalo farms,” or large, open game preserves. In many places, fires were also used to open up living spaces. In particular, fire eliminated the low brush that provided habitat for snakes, rodents, and other undesirable species. In other words, they used fire to alter their environment, in much the same way later scientists would.

The Plains Indians also used fire to clear agricultural land. Many Native American communities relied on “slash and burn” farming techniques. They cut down trees in forested areas to clear fields of 20 to perhaps 200 acres. After they cut the trees, they burned off the rubble and stumps and planted such crops as maize (corn), squash, and beans. They learned that such ground was exceptionally fertile, for the ash provided valuable nutrients for the soil, particularly potash, which boosts the development of fruits and vegetables. Similar practices were followed in the Peruvian Andes, where scientists estimate that as much as 1.5 million acres were cleared by slash-and-burn methods. Incidentally, many of those Peruvian fields were in the form of terraced gardens, requiring

the people to function as scientists in terracing the fields and constructing walls that were durable. They also had to function as hydrologists to ensure an adequate supply of water.

In the South American rain forests the quality of the soil tended to be poor, largely because the persistent rains leached away nutrients. Accordingly, rain-forest dwellers, acting as scientists, found ways to manage the land. One technique was to avoid annual crops and plant perennial crops that would provide food for many years. To accomplish this, rain-forest dwellers may have built immense earthen mounds. On these mounds they planted fruit and nut trees. Another technique was to compost the soil. Scientists believe that during the pre-Columbian centuries some parts of the Amazon rain forests were, in effect, huge compost heaps, where people scraped off soil for use in agriculture and landscaped gardens, leaving a layer of it behind. This layer continued to “brew” with nutrients and microorganisms, turning debris and the soil under it into new rich topsoil. Again, by observing the workings of nature and the way soil is produced and fed and then altering their environment in beneficial ways, people were acting as scientists.

ENGINEERING AND CONSTRUCTION

In North America perhaps one of the best examples of the application of scientific principles to engineering and construction comes from the mound-building Mississippian cultures, which flourished from about 700 or 800 until about 1400 to 1500. These cultures, as the name suggests, extended throughout the Mississippi River valley, with concentrations in modern-day Illinois. These cultures are noted for their construction of enormous mounds, or elevated earthworks, that formed the centers of their community. One of the best-known examples is the Cahokia culture, which flourished in modern-day Illinois where the Mississippi, Missouri, and Illinois rivers meet. The Cahokians required an enormous labor force and millions of man-hours to construct the 120 large mounds in the area, including Monks Mound, which covers an area of 14 acres. In addition to the mounds themselves, homes, granaries, ceremonial centers, burial grounds, stockades, and similar structures were constructed on the sites and often had to be rebuilt or refurbished as time went on. All of these activities were directed by the social and religious elites, who applied scientific principles to their construction.

The Cahokia mounds show an understanding of geometry and astronomy. The mounds are not laid out in a simple helter-skelter fashion. The Cahokians positioned the mounds in a way that reflected their understanding of the structure of the universe. In particular, archaeologists have noted that the mounds create patterns of perfect equilateral triangles (triangles whose three sides are of equal length). Further, the

mounds are oriented to face the cardinal points of the compass. In this respect, the mounds may have served a function similar to that of the Stonehenge monuments in England. By positioning the mounds to reflect the culture’s understanding of astronomy, the elites who directed their construction turned the sites into hubs that bound the community together, not just materially but spiritually as well.

This type of understanding of the principles of geometry and their relationship to astronomy were exhibited through the medieval Americas, particularly in pre-Columbian Mesoamerica. Some historians of science use the term *design science* to refer to the activities of the Maya, the Aztec, and other cultures that inhabited Mesoamerica. Design science refers to methods of thought that integrate knowledge about land, terrain, geometry, building materials, architecture, design, and art to create structures that were both functional and aesthetically pleasing. Mathematicians have studied, for example, the kivas, or dug-out ceremonial centers, many of them found in the southwestern United States but also in Mexico. These kivas and their environs served as hubs, where elites resided and where craft production took place. They were connected by roads that integrated the outlying communities. The structure of the kivas demonstrate a solid understanding of geometrical forms, including circles, squares, and spirals, as well as more complex matters, such as the relationship of a circle’s radius to its diameter.

MATHEMATICS

In addition to geometry, many Mesoamerican cultures showed an understanding of more abstract mathematics. The ancient Maya occupied the Yucatán Peninsula in modern-day Mexico, Belize, Guatemala, and Honduras. They began to inhabit the region in roughly 2000 B.C.E., reached the peak of their influence in the early centuries of the Common Era, and began to decline in about 900.

In studying Mayan history and culture, historians refer to the Classic Period, extending from about 250 to 900, the period of the Maya’s greatest achievements. However, the so-called Postclassic Period of Maya history lasted for hundreds of years more, until the arrival of the Spanish in the early 16th century. The earlier decline and collapse of the lowland Maya took place largely in the south; the more northern Yucatán Peninsula cities, such as Chichén Itzá, Edzná, Uxmal, and Cobá, continued to develop and exhibit some of the characteristics of the Classic Period throughout the Postclassic Period.

In the 16th century Spanish explorers arrived on the Yucatán Peninsula. Eventually they overran the regions inhabited by the Maya, Aztec, and other Postclassic cultures. Unfortunately, the early Spanish explorers and missionaries

saw Mayan religious beliefs as the work of the devil and had the evidence of them destroyed, including not only religious artifacts but also written texts on a wide variety of subjects. Only a handful of these manuscripts survived and are housed in museums in Paris, France; Dresden, Germany; and Madrid, Spain. They date to the Postclassic Period but probably were based on texts originally written in the Classic Period.

Historians of science are especially intrigued by the Mayan system of mathematics, which they applied to such other fields as astronomy and architecture. A similar system was also used by the Olmec of the first millennium B.C.E. Much of this complex system has been preserved in painted manuscripts and carved hieroglyphic calendrical texts. Mayan mathematics used a vigesimal system, that is, one based on the number 20 (from the Latin word for “20th”). Such a system probably evolved because people often counted with their fingers and toes; when they reached the number 20, they had, in effect, to start over with a new set of 20, in much the same way that modern systems of mathematics are based on the number 10, a decimal system derived from Hindu mathematics, and its multiples.

Thus, in Mayan texts the numeral 1 was represented by a thick dot, 2 by two dots, and so on. The numeral 5 was represented by a straight horizontal line, 6 by one dot above a line, 7 by two dots above a line, and so on. The numeral 10 was then represented by two horizontal lines, 11 by a dot above two lines, and so on up to 15, represented by three lines, and so on up to 20, represented by a single dot above a shell representing zero. The Maya were among a handful of world civilizations to develop the concept of zero. At higher numbers, position in vertical columns of numbers also determined value in multiples of 20, just as in our system, the numeral 5 has a different value depending on whether it is in the “tens column” or “hundreds column” of a decimal count.

The Maya used two calendars. One was a 260-day ritual calendar that consisted of 13 periods, each with 20 days. Days and periods were associated with various gods. The other calendar was a solar (civil) calendar consisting of 360 days, with 18 periods each consisting of 20 days (with a five-day period at the end regarded as unlucky). The two calendars “caught up” with each other after 18,980 days, or 52 solar years or 73 ritual years, a period known as a Calendar Round. The Maya also kept track of eclipses and planetary cycles, observing that the planet Venus returned to its original celestial position after two 52-year cycles. In fact, they held a great celebration after 104 years—that is, after two 52-year solar cycles or one 104-year cycle of Venus.

It is necessary to recognize that the Maya also counted history from a fixed point in the past, calculated by days and multiples of days, in a system known as a Long Count. For

their purposes they calculated that the world had been created on August 12, 3113 B.C.E., and they dated many of their historical monuments in terms of the number of days that had passed since Creation. In the Classic Period Guatemalan city of Tikal, for example, a historical marker dates a structure as having been built 1,253,912 days after the date when the world was created., arriving at a date equivalent in our system to 320 C.E. Put differently, counting did not determine the structure of the calendar; instead, the structure of the calendar determined counting, enabling the Maya to incorporate into their mathematical system their conception of the gods, Creation, the movement of heavenly bodies, and the like.

The Aztec of Mexico, too, had a relatively sophisticated system of mathematics, with application to astronomy and calendrics, that shared some features with Maya computation but was less complex. Like the Maya, the Aztec used a vigesimal system and observed a ritual calendar of 260 days and a solar calendar of 360 plus 5 years. They, too, celebrated the ending of a calendar round of 52 years and a great cycle of 102 years that coincided with the ending of a Venus cycle. Longer periods, however, were calculated by 52-year cycles rather than by a fixed date in the past.

The Aztec system was applied in two primary ways. One was in conducting commerce in the marketplaces of cities and towns. The large market of Tlatelolco, the sister city of the Mexica (Aztec) capital of Tenochtitlan, was visited by as many as 50,000 people a day, although local markets attracted much less traffic. Thus, Aztec arithmetic was applied daily to the computation of weights and measures for goods as well as for their prices. The other application was in land ownership. Mathematics enabled the Aztec to keep accurate records of the size, boundaries, and value of land. This, in turn, enabled the authorities to calculate the amount of tax the landowner owed to the state. Records show that the Aztec system of land measurement, based on the principles of geometry, were remarkably accurate and consistent. They were based on a unit of measurement called the *quahuitl*.

The Inca of Andean South America did not have a writing system, but they were nevertheless able to store mathematical information in the form of knots in strings. These devices were called *quipu*. The *quipu* was important to the administration of the Inca Empire because it allowed the authorities to keep track of all manner of information. The *quipu* was made up of strings. These strings were then knotted to form numbers, using a base 10 number system. The system was also “positional,” meaning that the value of a numeral depended on its position in a larger number—in much the same way that modern arithmetical systems are positional. Thus, for example, the number 476 would be represented on the *quipu* with six knots at the end of the string. After a space,

seven knots were used to represent seven 10s. Again a space would follow, and then four knots represented four 100s. The system continued for larger numbers, with, for example, an additional group of knots representing 1,000s, 10,000s, and occasionally even 100,000s.

The knots in each group were all touching. The spacing of groups of knots had to be highly regular and consistent, primarily because zero was represented by the absence of knots; without consistent spacing, the absence of knots could have been interpreted as the normal spacing between groups of knots rather than as a zero. Additionally, the Inca system had one peculiarity, having to do with the style of the knots. In the unit position (that is, the 1s), one style of knot was used to represent the numeral 1, with a different style for units greater than 1.

The Inca had to have a way of distinguishing strings from one another so that they could keep track of what the strings were counting. They did this in two ways. One was color, so that, for example, a green string might have been used to keep track of the number of cattle, while a white string might have been used to count sheep. The courts used this method. Colors represented the nature of the crime with which an accused was charged; the number of knots was used to record the length of a prison sentence. Sometimes, the colors had symbolic value. Thus, red was used to count items associated with war, while white was used to record the number of items associated with peacetime uses. Another method was to use subsidiary strings tied to the middle of the main string. Again, the courts used this method to record the nature of the punishment a convicted criminal had to undergo.

In each town the Inca king appointed a person called the *quipucamayoc*, or “keeper of the knots.” In larger cities the number of these people might have been as high as 30. These people were, in effect, government statisticians. They used the quipu to record census data and data about agricultural production, livestock, and weapons. A system of relay runners conveyed the information recorded to the capital city of Cuzco.

The Inca system of arithmetic had one other peculiarity worth mentioning. In the modern world numbers are thought of as abstract. That is, the number “5” has a meaning entirely apart from the objects counted with this number. Whether we count five sheep or five trees, the “5” has a consistent, abstract meaning. The Inca, however, regarded numbers in a different way. Different words were used to indicate number, depending on the nature of the items being counted. Consider, for example, the numeral 2. Different words were used to refer to a pair of matched items, two unrelated items, an object that could be divided into two parts, or two items that are bound together (such as an ox and a cart).

In addition to the quipu, the Inca also had a mathematical tool called a *yupana*. The *yupana* served much the same purpose as the strings, but it also may have functioned as a kind of abacus, or calculating tool. In 1596 a Spanish priest named José de Acosta published a book titled *Historia natural moral de las Indias*. This book was based on his experience of living with the Inca from 1571 to 1586. He described the *yupana* as a “calculator” that functioned with the use of maize kernels. He told how, instead of using pen and paper to make “a very difficult computation,” they instead manipulated the maize kernels, moving them about and solving problems “without making the smallest mistake.” He went on to say that when it came to matters of practical arithmetic, the Inca could solve problems faster than the Spanish could on paper. Unfortunately, Acosta never learned the principles underlying the use of this tool, so he was never able to provide a more detailed description of how it worked. His narrative, though, provides the modern world with a tantalizing glimpse of Incan mathematics.

MEDICINE

An important part of the scientific achievements of any civilization is its ability to find treatments for illness and disease. Again, much of what might have been known about medical lore in Mesoamerica has been lost because the invading Spaniards destroyed the manuscripts. Some of this knowledge was later reconstructed, and modern paleopathologists—those who study disease and illness by examining preserved tissues from ancient times—have been able to add to that knowledge. Generally, medical practitioners in the medieval Americas were shamans. Like the astronomer-shamans discussed earlier, shamans who practiced medicine were believed to have had access to supernatural power and wisdom.

Medicine throughout the Americas was studied from two orientations. One was the spiritual. Among the Aztec, for example, it was believed that illness and even some forms of injury were the result of having offended the gods. The goal of the shaman was to help the patient determine which god and then to make restitution.

The other orientation was more practical. Ancient Americans knew, of course, that injury could result from wars, accidents, and similar events. Thus, in addition to consulting the gods, they developed practical remedies and treatments. In common with ancient civilizations the world over, they made wide use of herbs and other medicinal plants. One manuscript catalogues 132 medicinal plants the Aztec used. Modern people who think of themselves as addicted to chocolate might take heart in knowing that healers in Mesoamerica recognized the therapeutic benefits of chocolate (derived from the Nahuatl word *chocolatl*) and cocoa (derived from

the Mayan word *cacao*). They used it not only to deliver other medicines but also as a medicine in its own right. They used it to help people gain weight, to stimulate the nervous system, and to improve digestion and elimination. They also used it to treat anemia, poor appetite, gout, kidney stones, fevers, and, in paste form, burns. Interestingly, modern medical researchers have confirmed what the ancient Americans knew. Chocolate has been shown to be an effective cough medicine. More important, consumed in moderation, it is a good source of polyphenols, or chemicals that protect the heart.

Additionally, ancient Americans used medicinal plants to treat fever, infection, skin rashes, urinary and digestive complaints, chest pain, bleeding, anemia, and a host of other ailments. Many of these herbal remedies have a solid scientific basis. For example, the ingredient in aspirin that reduces fever is found in willow bark, and willow bark teas were commonly used to treat fever; sometimes, chewing on the bark accomplished the same goal. Mesoamericans also learned to bind wounds, make casts for broken bones, and perform certain types of surgery. For this purposes, they used extremely sharp scalpels made of obsidian.

ASIA AND THE PACIFIC

BY AMY HACKNEY BLACKWELL

Science was quite well developed in medieval Asia. Scientists in China and India studied chemistry, biology, physics, mathematics, astronomy, and pharmacology. They had well-reasoned medical theories that were based largely on observation and experimentation. Chinese rulers throughout the medieval period encouraged scientific innovation and sponsored court scientists, such as Shen Kua (1030–93), Su Song (1020–1101), and Wei Pu of the Song Dynasty (960–1279). India produced its own important scholars, including Aryabhata (476–ca. 550) and Bhaskara II (1114–ca. 1185). Even in areas with less-sophisticated cultures, science was important. For example, Pacific islanders were excellent astronomers and grew expert at assessing the way ocean currents and wind patterns affected their sailing.

CHEMISTRY AND METALLURGY

Chinese scientists performed a number of experiments on the chemical properties of substances. Chinese chemistry experiments resulted in several useful inventions. It is said that matches were first invented in the seventh century by Chinese court ladies who lacked tinder to start fires for cooking. They took small sticks and coated the ends in sulfur, which, when struck, would ignite.

During the seventh century the Chinese developed a process of making brandy that grew out of a scientific discov-

ery made by central Asian peoples. During the third century these people had observed that when wine froze, parts of it remained liquid. Chinese chemists and winemakers repeated this experiment and determined that the remaining liquid was pure alcohol. They discovered that freezing was a reliable test for the alcohol content of wine and also that the pure alcohol could be skimmed off and sold as distilled wine or brandy.

Indian alchemists experimented with chemistry in their efforts to create various potions and tonics. The 10th-century alchemist Nagarjuna (b. 931) wrote several books in which he describes how to purify metals and how to prepare compounds of mercury; he also provides recipes for Ayurvedic (holistic) medicines. Indian chemists knew how to distill substances, how to make good dyes, and how to make glass.

Medieval Indians knew a great deal about metallurgy and were expert ironworkers. Metalworkers could extract such metals as silver and gold from ores and purify them. Indian iron was famous in the ancient Greek and Roman worlds because it did not rust, and medieval metalworkers retained the secret of quality tempered steel. An iron pillar erected in Delhi during the fifth century still stands today, free of rust.

The Chinese learned how to smelt steel in the third century, but they improved the technique during the medieval period. Ironworks used hydraulic bellows powered by waterwheels to run their furnaces. In the 11th century scientists discovered that bituminous coke, a type of coal, made a good source of fuel for the furnaces. Like their European and Islamic counterparts, Chinese alchemists performed various chemical experiments in their efforts to produce love potions and an elixir of immortality. These experiments eventually led to the invention of one of the most important chemical compounds in history: gunpowder.

Although Chinese alchemists were experimenting with mixtures of saltpeter in the fourth century, most historians agree that gunpowder was invented in China in the ninth century. This invention may have been an unintended result of alchemists' experiments aimed at finding a potion that could make people immortal. Chinese alchemists had been using saltpeter since the first century, and by the late fifth century they had discovered how to identify pure saltpeter by its purple flame. Alchemists also knew sulfur well. The first-known reference to mixing the two together appears in a text from the mid-ninth century. The writer reports that heating sulfur and saltpeter with honey and realgar, an arsenic sulfide commonly used in Chinese medicine, resulted in smoke and flames that could burn down an entire house.

Gunpowder opened the door to a whole new level of military technology. By the 11th century Chinese soldiers had

come up with multiple uses for gunpowder and could make different formulas for different purposes. The military handbook *Wujing zongyao* (Collection of the Most Important Military Techniques), written in 1044, describes different recipes for gunpowder that vary the saltpeter and nitrate content to achieve different effects. Once they understood the chemistry behind the explosions, people began experimenting with the physical properties of different containers. Soldiers learned how to make bombs that would emit poison smoke or incendiary bombs that would explode when flung from a catapult. Soldiers filled cast-iron cylinders with gunpowder to make grenades and land mines.

The first rockets appeared during the 10th century. Archers made what they called fire arrows, wooden arrows wrapped in a casing that contained gunpowder. The archers would light a fuse at the end of the arrow and then fire it. Ideally, the gunpowder would explode on impact. Before long soldiers had begun putting gunpowder into metal casings and firing them from metal tubes. In the 13th century Chinese soldiers used these weapons against the Mongols, creating explosions that reportedly flung shrapnel 2,000 feet.

It did not take Chinese scientists and soldiers long to create machines that could take greater advantage of gunpowder. The *Huolongjing* (Fire Drake Manual), written in the late 14th century, contains numerous descriptions of firearms and gunpowder recipes. It describes weapons, such as several mines joined to single fuses, grenades, and multi-stage rockets. It also describes early firearms. The fire lance was a short-range spear that shot poison darts, shrapnel, and flames. Early cannons could fire metal balls filled with gunpowder that exploded on impact. The first handguns were basically muzzles with fuses that could be lit to fire off the ammunition. The book also describes handguns with locks similar to matchlock guns; these guns could be fired by pulling a trigger.

The Chinese tried to keep their recipe for gunpowder secret, but they had little luck, and the formula for gunpowder rapidly spread throughout medieval Asia, Europe, and the Islamic world. The Mongols were using gunpowder by the 13th century. Gunpowder had entered India by the 14th century. The Koreans developed their own recipe during the late 14th century, using potassium nitrate in the mix. Korean soldiers created their own version of the fire arrow, the *singijeon*, during the 14th century. The *singijeon* came in three sizes. These sizes were calibrated to hit targets at different distances; the archers adjusted fuse lengths so that the missile would explode when it hit its target, not before. During the 15th century the Koreans invented the *hwacha*, a cart with several slots for launching *singijeon*, which functioned as a multiple-rocket launcher.

Gunpowder was not used only for military purposes. One of the most popular uses of the substance was in fireworks. The first fireworks seem to have appeared in China in the 12th century. Fireworks soon became customary at festivals and celebrations, and the art of making them turned into a respected profession. Pyrotechnicians experimented with different chemical compounds to create different colors and used different shells to create different shapes of sparks in the air. Fireworks technology also spread throughout Asia, and fireworks displays became very popular in Japan and India.

Another practical result of scientific experimentation was the invention of paper and the subsequent invention of printing with movable type. Both of these inventions required a good understanding of chemistry, to make the pulp for paper and to create useful inks, and of the physical properties of the equipment involved. Many Asian cultures devised methods of making a sort of paper long before the Chinese wet-pulp method arrived. People in ancient China, India, and Sumatra, for example, made a sort of paper out of bark or bamboo beaten together to form a thin, flat surface. These types of paper were not as strong as pulp paper or Egyptian papyrus.

Paper made from wood pulp was actually invented before the medieval period, probably around 105. The process of making paper was complicated and required a good understanding of the physical properties of fibers and technical skill to build and use the equipment. First the papermaker would shave and crush wood and bark to a fine pulp and dissolve it in water. He would then pour the mixture onto a wooden frame and shake it to level it out. He would lift the frame and shake it to let the water drain out and then turn the new sheet of paper out onto a cloth to dry.

Paper technology continued to evolve and spread during the medieval period. The Chinese began making toilet paper in the sixth century, and by the 14th century they had perfected the technique of making soft, absorbent paper that could even hold perfume. Papermaking spread from China to Korea and Japan around 600, with people there adapting the recipe to use local ingredients, such as mulberry wood in Japan. Papermaking technology arrived in India in the seventh century. In China this technology was applied to the creation of exchange certificates and paper money in the 10th century.

Basic block printing was invented in ancient times, but the more complicated and flexible technique of printing with movable type did not appear until the 11th century in China. Around 1040 the inventor Bi Sheng devised a method of making character types out of fired clay that was described by the contemporary scientist Shen Kua. These types could fit into an iron plate glued to an iron frame with a type of glue that set hard when heated. The types could be reused,

but they were fragile and broke easily, and they did not hold ink well. These defects were somewhat remedied by the invention of wooden type by Wang Zhen (fl. 1290–1333) in the late 13th century. Wooden types, however, wore down easily and had to be carved by hand. Wang Zhen attempted to use the wooden types to make tin casts, but this process did not work well because the tin did not take ink well.

The Korean Chae Yun-ui is often credited with being the first person to create useful metal movable type in the early 13th century. He used bronze-casting methods that were well developed by that time. He first carved characters into wood and then pressed these letters into sand to form negative impressions. He then poured molten bronze over the sand, creating the bronze type. Bronze movable type had made its way to China by 1490.

PHYSICS

Historians do not agree on exactly when and where the compass was invented, but the evidence suggests that the first use of the magnetism to determine direction occurred in the 11th century in China. Scientists had begun experimenting with magnetism much earlier. During the seventh or eighth century Chinese scientists had made iron needles take a magnetic charge by rubbing them with magnetite or by heating them and then holding them in a north-south orientation as they cooled. From there scientists devised ways to make actual compasses by fixing magnetic needles to a device in which they could move freely. The main ways of doing this were floating the needle in water, hanging it from a silk thread, or placing it atop a thin shaft. The first compasses were wet compasses. A book written around 1040 describes a bowl of water in which floated an iron needle that always pointed south; the device was helpful to armies trying to determine direction at night.

The 11th-century scientist Shen Kua is credited with being the first person to discover true north by using a magnetic compass to identify the direction of the North Pole and using this information to determine the actual location of the North Star. This information made it easier for sailors to use magnetic compasses in navigation. Shen Kua describes in his writing how magicians and fortune-tellers in the late 11th century used dry compasses made with needles hung from silk threads to help them in their divinations. In the 11th and 12th centuries engineers used compass technology to improve the existing south-pointing chariot, a type of chariot, invented in the third century, on which a figure always pointed south; engineers added to it an odometer, another old invention that found new life in the medieval period.

By the 12th century people were using compasses to help them navigate at night or when clouds obscured the position

of the sun and stars. Dry compasses with wooden frames shaped like tortoise shells appeared in the 12th or the 13th century. Box compasses, small compasses in wooden boxes with hinged lids, appeared in the 13th century and were small and portable. The faces of compasses were marked with north, south, and other celestial landmarks. Despite the appearance of more convenient dry compasses, Chinese sailors continued to favor wet compasses throughout the medieval period. Compass technology spread west from China through the Mongol world and into India. It is said that Europeans first learned of the compass from Mongols in Persia in the 13th century.

Physics had other applications, some of them frivolous. For example, starting in the fourth century the Chinese understood aerodynamics well enough to build horizontal propellers, like a helicopter's rotors. Toy makers and children made use of this technology throughout the medieval period, creating flying tops called bamboo dragonflies. These devices had blades of bamboo set at the correct angles to make the devices fly. The user would pull a cord to send the rotor spinning up a bamboo pole and fly into the air. The design of medieval Chinese rotors was one of the inspirations to modern pioneers of aeronautics.

Chinese people developed many methods for powering equipment, such as mills. Engineers had already developed gears and waterwheels in the first century. During the medieval period they put this technology to use in mills and blast furnaces. In the 14th century Chinese engineers borrowed windmill technology from the Islamic world. They developed their own version of the design with horizontal instead of vertical blades, using rigging techniques from Chinese boats, or junks, to affix the sails.

Su Song was especially famous for the hydraulic clock tower he designed and built in Kaifeng in 1088. This clock used an escapement mechanism to control its pendulum, using gears to keep the pendulum's motion regular. The hydraulic-powered mechanism used a chain drive to transmit power among the clock's gears. Su Song describes the design of his clock and of clock making in general in a book he wrote on the subject in 1092. Shen Kua also experimented with clock design, creating an improved version of the clepsydra water clock.

Engineers in medieval China spent a good deal of effort designing revolving or rotating bookcases. These bookcases used gears and brakes to allow bookshelves to move in and out of the repository smoothly and with little effort. Civil engineers invented various locks and gates for canals. The most significant of these was the pound lock, invented in 984. This type of lock used gates to regulate the movement of barges on the canals, mainly to prevent bandits from robbing the merchants as they sailed.

MEDICINE

Chinese medical scientists studied human physiology and anatomy and had a good understanding of the position of organs within the human body. They believed that the body needed to be in balance and that all treatments must take into account the whole patient, not just the illness. Though many modern Western scientists disparage traditional Chinese medical practice, Chinese doctors did use a great deal of observation of their patients and of the natural world to reach conclusions, methods that are the foundation of modern scientific theory. For example, early medieval researchers noticed that the urine of some patients tasted sweet, which they determined either by tasting it or by putting some urine in a saucer to see if it attracted ants. This observation enabled them to diagnose the disease diabetes.

Chinese medical theory relied on the assumption that the human body contained 12 pathways, each of which passed through various organs and points on the skin. Each pathway corresponded with an internal organ. Half of the pathways were yin, and half were yang, corresponding to the positive and negative energy sources in Daoist philosophy. Energy called chi moved through each of those pathways in a preordained schedule that took 24 hours to cover the entire body. Chi and blood both nourished the body as they flowed through their respective pathways. Chinese doctors believed that illness and pain resulted from the imbalance or blockage of chi and blood.

Before treating a patient, a Chinese doctor performed a thorough scientific examination to diagnose the causes of illness. He would examine a patient's tongue, listen to the patient's breathing and bodily noises, smell the patient's body odors, feel the patient's pulse, palpate the patient's internal organs, and question the patient thoroughly about his or her symptoms. This information would tell the doctor which energy pathways were blocked and accordingly tell him which acupressure points to stimulate with needles or burning herbs.

Moxibustion and acupuncture were two of the main techniques Chinese doctors used to treat patients. Moxibustion is the practice of using burning mugwort, an herb, on acupressure points in order to stimulate blood flow and relieve various symptoms. Acupuncture uses many small needles to stimulate those same points. Both of these techniques required that the practitioner study anatomy at great length to learn the locations of the many acupressure points in the body. Stimulating acupressure points on a patient's body could restore the proper flow.

Some of the most important developments of acupressure theory and Chinese medicine occurred during the medieval

period. During the seventh century Sun Simiao (581–682), sometimes called China's king of medicine, wrote two major medical texts, the *Beiji qian jin yao fang* (Essential Formulas for Emergencies Worth a Thousand Pieces of Gold) and the *Qian jin yi fang*, a supplement to the previous text. Sun Simiao wrote about the physician's duty to treat all patients equally regardless of class, wealth, education, or beauty. The Song Dynasty physician Wang Wei Yi wrote a treatise on acupuncture and moxibustion. By the 14th century many physicians claimed expertise on the use of acupressure to correct energy imbalances.

Chinese doctors also used herbal concoctions and dietary modifications to treat patients. Instead of using a standard preparation for every patient suffering from a given disease, doctors used their understanding of chemistry and the properties of herbs and bodies to customize herbal treatments for each patient. Doctors classified foods according to their wetness or dryness and their heating or cooling properties, and prescribed foods that would correct their patients' imbalances. Chinese physicians also knew about the medicinal properties of many plants and minerals, both through their own experimentation and from manuals written by scholars in the field. For example, the 11th-century scientist Su Song wrote the *Ben cao tu jing* (Atlas of Materia Medica, 1070), a book on pharmacology and related topics, such as botany and metallurgy. One of the drugs he recommends in this book is the stimulant ephedrine.

The idea of external pathogens causing disease appeared during the Ming Dynasty (1368–1644). The Ming Dynasty scientist Wu You Ke was the first Chinese physician to posit the "warm disease" theory, which held that warm pathogens caused illness after entering the body through the mouth and nose. He describes this theory in the *Wen yi lun* (Treatise on Acute Epidemic Warmth).

In India doctors practiced Ayurvedic medicine, which was quite advanced by the beginning of the medieval period. The 11th-century scholar Chakrapani Dutta was one of the most famous students of Ayurveda; his work *Chakradutta* is still considered a valuable treatise on the topic. Ayurvedic doctors had to train for seven years and pass a test before they could practice on their own. Even after finishing their studies, doctors were expected to continue learning by making observations, by meeting with colleagues, and by talking to local people about their own natural remedies. Ayurvedic medical treatment was based on thorough observation of patients. An Ayurvedic doctor would conduct a detailed examination of his patient, examining the tongue, skin, veins, hair, and pulse. He would then prescribe herbs and other treatments, such as massage, designed to balance the patient's *doshas*.

Like traditional Chinese doctors, Ayurvedic practitioners used herbs, diet, and a holistic approach to treating patients. Ayurveda taught that the human body contained three types of humors, called *doshas*. *Vata* controlled the nervous system, *pitta* controlled digestion and energy, and *kapha* controlled mucus and lubrication. An overabundance of any one of these would create symptoms. Practitioners believed that one of the best ways to keep the *doshas* in balance was through diet. Ayurveda taught that every food had different properties that could increase or decrease particular *doshas*.

ASTRONOMY AND MATHEMATICS

The first treatises on astronomy written in India date to the fifth century, at the beginning of the classical period of Indian astronomy. The astronomer Aryabhata believed that the earth rotated on its axis and determined that the moon was illuminated by the sun. He describes his theories in a book called *Aryabhatiya*. Bhaskara II wrote about gravity and created models of planetary orbits, which he discusses in the *Siddhanta-shiromani*. Both of these works found their way to the Islamic world, where they influenced other astronomers.

The classical period of mathematics in India lasted from 400 to 1200. Aryabhata and Bhaskara II contributed to this field as well as to astronomy. Indian mathematicians studied a number of concepts. They learned about trigonometry from contact with Hellenistic Greeks and expanded the subject themselves. They also worked with the concept of zero, decimal numbers, negative numbers, and algebra.

The Kerala school of astronomy and mathematics was founded in the 14th century to study astronomy and mathematics. It was founded by Madhava of Sangamagrama (1350–1425), a mathematician who specialized in sine and cosine calculations. The school's scholars created a number of formulas to describe infinite series for trigonometric functions and some series expansions of calculus. They worked with geometry, algebra, decimal floating point numbers, and non-linear equations. They also formulated models to define the position of the moon at any given moment and to estimate the orbits of the planets. Notable scholars of this school included Narayanan Pandit (1340–1400), who worked with algebra and higher order equations, and Parameshvaran (1370–1460), an expert on astronomy and one of the creators of the mean value theorem, a fundamental principle in calculus.

The Chinese scientist Shen Kua studied geology and climatic activity during the 11th century. Based on changes he observed in the landscape, he suggested that climate must change over time. Shen Kua also studied the sun, moon, and planets. He observed lunar and solar eclipses and concluded based on their progress that the sun and moon must be round,

not flat. With the astronomer Wei Pu, Shen Kua developed a model of planetary motion which hypothesized correctly that planets undergo some retrograde motion. The pair of scientists spent five years recording the moon's position five times every night and produced a new model describing the movement of the sun and moon. Another contemporary astronomer, Su Song, wrote an atlas of the heavens with detailed maps of the night sky.

Astronomy made it possible for people to colonize the islands of the Pacific Ocean. For many peoples of the Asia and the Pacific region, navigation on the ocean was a critical skill. Compasses and sextants did not exist in much of the region. Chinese and Indian sailors started using compasses in the 11th and 12th centuries, but magnetic compasses never reached the Pacific islands. Before the advent of mechanical navigation devices, sailors everywhere relied on the sun and the stars to tell them where they were. Pacific islanders continued to use these techniques throughout the medieval period. Celestial navigation was entirely adequate for allowing islanders to sail outrigger canoes vast distances across the ocean.

Islanders created star maps through intense observation of the night sky over many years. They also plotted the relative positions of islands and markers around them, such as coral reefs or shoals. They could use this combination of geographical markers to create a kind of artificial compass. Navigators used a "star structure" to divide the horizon into sections. Each star in the night sky would rise and set at a different point, some rotating entirely in a northern arc and some in an arc to the south. A navigator would choose 16 stars to observe, selecting them on the basis of their positions in the sky, in an effort to create a 32-point celestial archway with the North Star at its top. This structure was called a sidereal compass, a structure that allowed an ocean navigator to determine his position relative to stars, islands, and other oceanic markers. He would also take into account weather patterns, such as winds and ocean currents.

In Micronesia, for example, a navigator could stand on an island and revolve in a circle, reciting the islands and stars that lay in any given direction. Good navigators could do this for the entire network of islands. They also knew the stars and landmarks that marked sea-lanes, pathways that lay on the same celestial coordinates. Sailors could use shells and sticks to lay out maps that described the stars and the landmarks on any given route. The Maori were said to take on every voyage one or two men who were expert astronomers, with good vision and a vast knowledge of the positions of the stars. Polynesian sailors knew a tremendous amount about the stars; they had names for a large number of them and knew how they behaved throughout the year.

EUROPE

BY BRADLEY A. SKEEN

Science is a systematic means of investigating nature. Today the scientist asks a question about the natural world, makes a falsifiable prediction in answer to that question (a hypothesis), tests that hypothesis through experiment, and then formulates a theory that explains the results of the experiment. The theory is used to generate more questions (ways of testing the theory's predictions), which then lead to more experiments. Science is constantly changing in its understanding of nature, approaching but never reaching a complete and final description of the world. Science, therefore, has no use for authority or tradition; no theory is so prestigious or accepted that it cannot be challenged and replaced.

Modern science developed in a specific time and place in Europe during the 17th century. There was, strictly speaking, no science in the Middle Ages or in any earlier period. However, many factors that led to the development of science did exist in the Middle Ages, such as Aristotelian formal logic, the idea of mathematical proof, and various forms of natural philosophy. The Latin word *scientia*, from which the word *science* is derived, refers to any systematic body of knowledge or of theology, such as the science of painting or even a pseudoscience, such as astrology; many sciences of this kind were practiced in the Middle Ages. Medieval thought never abandoned the Aristotelian syllogism by which knowledge is derived from deductions based on supposedly self-evident (that is, unexamined) first principles, precisely the opposite of the inductive scientific methodology developed in the 17th century; these later methods set out to disprove theoretical propositions.

In medieval Europe the systematic investigation of nature was undertaken for a religious purpose, to glorify God. Unlike the science of today, it did not serve a practical purpose in terms of producing new technology. The Scholastic philosophers, who used logic to study nature, were not in contact with the workmen who made improvements in milling technology, water pumps, and the design of boats and other devices that advanced considerably during the Middle Ages. This situation was markedly different from the Islamic world or China, where abstract theory and practical design were carried out by the same men. An exception is in the science of optics. In the 13th century Scholastic research into the interaction of light with lenses led directly to the invention of eyeglasses and the magnifying glass; of course, these instruments were used for reading and so were of special interest to the scholars.

BYZANTINE SCIENCE

There was little original philosophical thought in the Byzantine Empire during the Middle Ages. Despite having access

to virtually the whole of Greek scientific literature or perhaps because of that fact, Byzantine intellectuals limited themselves to expounding and commenting on ancient writers of natural philosophy, like Aristotle (384–322 B.C.E.). Perhaps the most original of these was the Christian philosopher John Philoponus (d. ca. 570), who wrote to criticize Aristotle and to prove that he was wrong wherever he disagreed with the authority of the Bible (for example, in Aristotle's belief that the world has existed and will exist forever, compared to the historical context of its creation and destruction according to Christian theology).

Philoponus also made more general attacks on Aristotle's physics, suggesting that Aristotle was wrong by insisting that heavier bodies fall faster than lighter ones (the very issue that most directly led to the development of science in the 17th century). Philoponus suggested that this assertion could easily be disproved by experiment, but it is not clear whether he actually conducted such an experiment. It is certain that his speculation was not widely accepted and did not spark a change in the character of natural historical investigation. While in his writings Philoponus simply appeals to one authority over another, he does suggest to his Islamic and Western readers (his works were quickly suppressed in the Byzantine world because he held heretical theological opinions) that Aristotle was far from infallible and that even so revered an authority could be questioned.

EARLY MEDIEVAL SCIENCE

The political and social collapse of the Western Roman Empire had a devastating effect on scientific knowledge. The chief intellectual language of the Roman Empire had been Greek, and in the West all knowledge of the Greek language and almost all of the information in Greek books were lost. Authors like Boethius (ca. 480–524) translated some Greek philosophical works into Latin. The chief scientific author available in the Latin Middle Ages was Pliny the Elder (23–79), whose encyclopedic *Naturalis historia* (Natural History) gives a systematic account of the physical world hopelessly mixed up with magic, superstition, and pseudoscience. Early medieval authors concerned with nature, like Isidore of Seville (ca. 560–636) or the Venerable Bede (672 or 673–735), could do little but repeat and summarize Pliny. Bede, however, did begin the medieval genre of the *computus*, manuals describing how to calculate the correct date of Easter each year.

The situation for learning improved somewhat under the first Holy Roman Emperor, Charlemagne (r. 800–14), who established a central school at his palace in Aachen and encouraged each bishop in western Europe to found schools. Alcuin (ca. 732–804), the director of the palace school,

oversaw the collection of surviving manuscripts of ancient Latin texts along with their reproduction and distribution to schools and monasteries. One scholar produced by this resurgence of education was John Scotus Erigena (ca. 810–ca. 877). In his *De divisione naturae* (Division of Nature), he describes the creation of the world based on Byzantine theology and the work of Dionysius the Areopagite (ca. 500)—as a pouring out of God and a descent toward a point beyond which creation was no longer possible: physical matter. This work formed the background for all later medieval thought about the physical world.

The first Western scholar to study Arabic science in Spain was Gerbert d'Aurillac (ca. 945–1003), who became Pope Sylvester II in 999. He learned and disseminated in Europe the modern Arabic numerals and the abacus. He also learned enough about engineering to design the first hydraulic pipe organ in western Europe since Roman times. In part because of his ability to carry out mathematical operations in his head, which seemed like a miracle to anyone trained in the cumbersome Roman numerical system, he was widely believed in his lifetime to be a magician; later many medieval magical books falsely circulated under his name. Gerbert's recourse to Arabic culture, which had much better preserved the scientific and scholarly heritage of the Roman Empire, was a foreshadowing of developments in the next few centuries.

PETER ABÉLARD

Peter Abélard (1079–ca. 1142) was the most important philosopher in the period between the founding of the universities in the 10th century and the reception of Arabic science. He was also a prominent poet and composer. He is well known in popular culture today because of his scandalous affair with a student he was tutoring, Héloïse (ca. 1098–1164), with whom he exchanged letters, over 100 of which have been preserved.

Abélard was not directly interested in natural philosophy, but he produced a logical framework that both authorized and limited scientific investigation within the Catholic tradition and that is important in understanding the intellectual foundation of scientific methodology down to the present day. In his book *Sic et non* (Yes and No), Abélard assembles a list of 158 theological questions, such as whether priests should be celibate, and a catalog of relevant biblical texts and patristic texts (works that deal with the writings of the church fathers) on each, some of which seem clearly to give the answer yes and others just as clearly the answer no. The point of the exercise is not to try to reach a conclusion on any individual issue, and Abélard does not attempt to do so. However, in the introduction he summarizes the methods by which such contradictory texts must be treated. Each text must be analyzed: How is language used in each quotation? What is the context?



The Chaucer astrolabe, the earliest-known European astrolabe, Britain, 1326 (© The Trustees of the British Museum)

Is the author speaking in his own voice, or is he perhaps stating a position that he refutes in the next sentence? Abélard shows that the literal meaning of authoritative texts cannot be used to resolve the issue at hand; only a process of rational investigation based on logic can do so. This philosophy provides the Scholastic justification of the investigation of nature through observation and experiment rather than through the acceptance of the revealed texts of the Bible.

In the *Theologia Christiana* (Christian Theology), on the other hand, Abélard sets a clear boundary for the use of human reason within the Catholic intellectual framework that prevailed in the Middle Ages. He attacks the use of dialectic (logic) over and against revelation with arguments that can be applied not only to the investigation of nature in the Middle Ages but even to modern science. He opposes the proposition that everything can be explained by human reason, that we ought to accept only what can be demonstrated by reason and reject appeals to authority unless the authority's position can be validated through reason. He insists that reason is limited and that complete knowledge must depend on revelation, yet he concedes that only authorities who agree with reason as far as reason goes can be trusted when they move beyond it. In his view, reason can reveal the truth about the physical

world, but logic must to yield to authority in such matters as theology, whose premises cannot be investigated by the human senses and reasoning faculty.

THE RECEPTION OF ARABIC SCIENCE

In the 12th century scientific works written in Arabic (including ancient books that had earlier been translated from Greek into Arabic) began to be translated into Latin by Christian scholars working in Spain. Copies of these translations were quickly disseminated all over western Europe and became the standard for scientific learning at the universities. The new philosophical learning posed difficulties for the priests who began to work with it, insofar as its authors were either ancient “pagans” or Islamic “infidels.” Using human reason, this new learning also sought to discover knowledge that could stand apart from the divine revelation that established the church’s privileged position in medieval culture. These problems were soon resolved by Thomas Aquinas (1225–74) in his *Summa theologiae* (Summary of Theology) and other works. In these works, incorporating Aristotelian science, he presents a new philosophical system that was acceptable to the worldview of medieval Christianity. Thomistic science undertakes to examine the world as the work of God.

Aristotle wrote technical treatises on almost every branch of science, from biology to the physics of motion. These now came into Europe together with extensive commentaries by Arabic philosophers. Other ancient works were received also, such as the astronomical writings of Ptolemy (second century) and the medical works of Galen (129–ca. 99). The most important element of the Aristotelian science adopted by the Scholastic thinkers, however, was logic. In his *Prior Analytics*, Aristotle develops a formal system of deductive reasoning that is capable of producing new knowledge and that was adopted as the main method of investigation by medieval philosophers. An Aristotelian syllogism combines two facts (which must be self-evidently true to ensure the validity of the process) to produce a new deduction that is not yet known. A syllogism involves a major premise, a minor premise, and a conclusion: *Major premise*: Socrates is a man. *Minor premise*: All men are mortal. *Synthesis*: Socrates is mortal.

This intellectual procedure is valid if its premises are in fact true, but it tends to produce results that confirm the premises even if they are mistaken. Logic was well suited to medieval thought, which proceeded from premises of divine revelation that by definition could not be examined.

The reception of Greek and Arabic learning brought with it also a host of pseudosciences that enjoyed the same prestige as texts and systems treating the legitimate investigation of nature. These were mostly forms of divination, which is

a system that attempts to foresee future events, particularly whether the outcome of a decision made in the present will be favorable or unfavorable. People turned to divination whenever they had to make decisions whose outcomes could not be rationally predicted—for instance, whether a business venture or a marriage would be successful. These systems of occult science included astrology, which seeks to use the precision of astronomical observation and calculation to support a form of astral divination. During the Middle Ages astrology in particular became an almost universal aid in medical prognosis. Another class of divination was physiognomy, a system that claims to be able to reveal a human being’s character and future based on an analysis of physical appearance. Numerology attempts to understand and even manipulate nature by reducing language to mathematics and carrying out various operations and transformations on the revealed numbers. One of the most important manuals of these kinds of pseudoscience translated from the Arabic into Latin in the 12th century was the *Picatrix*. It also provides information on how to raise and interrogate the spirits of the dead and how to make pacts with demonic beings.

New forms of alchemy also came into Europe from the Arab world through the work of translators in Spain. Even though alchemy’s purpose to transform base metals into gold was impossible to achieve, its emphasis on physical experimentation in a laboratory made alchemy an important precursor to modern science. Such early scientists as Isaac Newton (1642–1727) and Robert Boyle (1627–91) in the 17th century began by working in alchemy and moved beyond it when they found many of its claims fraudulent. However, the real purpose of alchemy was not physical investigation at all but the spiritual transformation of the alchemist in a process akin to mysticism.

ROGER BACON

The Franciscan friar Roger Bacon (ca. 1220–92), who taught at Oxford and Paris and acquired the Scholastic nickname of Doctor Mirabilis (“miraculously learned”), is sometimes called the first scientist, but that title is something of an exaggeration. He was practical minded and wanted to see and understand things for himself, but he did not develop this disposition into scientific methodology as Galileo (1564–1642) later did. Bacon rejected the widely held Scholastic idea that knowledge about the physical world can be achieved through reason without observation and investigation. He opposed contemporary theological methods for the same reason and insisted that analysis of the Bible should start with reading the texts in the original language. (He may have learned Greek himself.) Bacon’s interest in mathematics was also practical rather than theoretical: in its use in physics (his

geometrical description of vision), astronomy and astrology, and cartography.

Bacon's interests made him turn toward practical sciences, like optics and alchemy. He advanced the understanding of optics received from Arabic science, which was just becoming known in Europe during his lifetime. He was the first to understand that the rainbow, which he reproduced by passing sunlight through a beaker of water, was the division of the light into its constituent parts, or spectrum. He also proved for the first time that rainbows could not appear more than 42 degrees above the horizon. Bacon's work with lenses led him to invent the magnifying glass and lay the foundations for the discovery of such later instruments as eyeglasses, the telescope, and the microscope. Much of his work in optics was based on practical experiments with lenses, pinholes, and other devices; he later expressed the results of these experiments in a geometrical form. This practice led him to call for the development of a new method of experimental science for testing the validity of theory, analogous to logic for testing the validity of arguments, but he could not advance a general form of such a method outside of his special field of optics.

Bacon's alchemical investigations led him to examine gunpowder (then newly introduced to Europe from China); he was the first to publish the formula for its manufacture. He was aware of the invention of the steam engine in antiquity and believed that it could probably be adapted to propel vehicles—thoughts that show a remarkable power to imagine beyond the limits of mechanical engineering as it existed in Bacon's lifetime. Bacon laid out the plan to publish a universal encyclopedia that would have undoubtedly been a stimulus to scientific development, as was the work of the encyclopedists in the 17th and 18th centuries, but he never produced more than a few fragments.

Bacon is often portrayed as a martyr to science who was silenced by the church, but in fact his main scientific work, the *Opus maius* (Major Work), was written by the special commission of Pope Clement IV (d. 1268) in 1266 to 1267. It is by no means certain that Bacon was ever actually put under house arrest (and hence forbidden to publish), but if he was, this arrest would likely have been for his sympathies with the radical Spiritual Franciscans or for his insistence on the deterministic influence of astrology rather than for his investigation of nature. Many alchemical and even magical books written during the Middle Ages were published under Bacon's name in an attempt to gain authority for themselves.

WILLIAM OF OCKHAM

William of Ockham (ca. 1285–ca. 1349) taught philosophy at the London Greyfriars Franciscan monastery. (He studied at Oxford but did not take a master's or a doctor's degree.) He is

chiefly remembered now in connection with Ockham's razor. This is a logical principle suggesting that unnecessary steps in reasoning should not be introduced into argument and that simpler arguments are more likely to be true than are more complex ones. As important as this concept is to scientific reasoning, Ockham did not invent what was an inevitable part of the practice of philosophy going back to ancient times. The attribution to Ockham was made in the 19th century, probably because of the particularly ruthless and effective way he used it to dismantle and to simplify Aristotle's arguments.

NICOLE ORESME

Scholastic philosophers were often drawn to problems in physics because they considered them inseparable from problems in theology. For instance, the problem of how force causes a body to move and how the body remains in motion after it has no further contact with that force seemed to these philosophers intimately connected to the problem of how divine grace is carried in the Eucharistic host. Similarly, investigation of the problem of whether and how the quality of love (*caritas*) varies at different times in an individual (that is, how love is increased by the Holy Spirit) led to quite remarkable advances in the understanding of motion (both require the understanding of the degree of change over time) and even to the mathematicization of science.

Nicole Oresme (ca. 1325–82) studied at the University in Paris and briefly served as a professor there before becoming the bishop of Lisieux in Normandy. He was also a courtier to the kings of France and to the popes in Avignon. He was one of the first scholars to write extensively in a vernacular language (French, in his case) rather than in Latin, an important step away from medieval and toward modern practices. Oresme became interested in the work of a group of scholars at Merton College, Oxford, had carried out from around 1325 to 50. They had realized that the velocity of an object could be represented as a ratio between the force that impelled it and the factors that caused resistance to its motion (such as friction). Although no one in the Middle Ages used the notation of modern algebraic equations, this discovery was the first time that a physical property had been defined in mathematical terms and could be represented in modern signs as $V=F/R$. The very idea of finding the velocity of an object in motion, rather than the force that propelled it, which was all that had interested Aristotle, arose from the Scholastic interest in changing qualities in general, such as love, health, age, virtue, or warmth.

Several scholars quickly realized that this new discovery could be represented geometrically. The earliest such system (1351) was developed by Giovanni di Casali (d. ca. 1375). However, a more complete system, and the one that influenced the

later development of science, was made by Oresme. He began with a simple example: Suppose one has a rod anchored by a pin at one end and begins to rotate it. Different sections of the rod will move different distances in the same time and so have different velocities. If one rotates the rod and marks its old and new positions by lines, the resulting figure will be a triangle whose height is proportional to the velocity. Thus, the end near the pin will have moved hardly at all, and the height of the triangle at that point will be low. The more distant end will have moved much farther and therefore faster, so the height of the triangle will be greater. The hypotenuse of the triangle will slope upward, indicating the increase in velocity uniformly from one end of the rod to the other.

Oresme realized that a more powerful form of representation could be had if the baseline were not the position of some physical object like a rod but an abstract representation of the passage of time. This theory in itself is not startling since Aristotle had often represented time through the use of a straight line passing through various temporal points. However, Oresme's innovation was to plot velocity as a function of time perpendicular to the baseline. In this way an object traveling at a constant speed would also have a velocity the same height above the time line and produce the geometric form of a rectangle. An object that was constantly accelerating at a uniform rate, however, would have ever higher velocities and so make a right triangle, just as in the original example.

Oresme's geometric representation contained the same key features as the system of graphic representation developed by René Descartes (1596–1650) in the 17th century; Descartes' system became an indispensable tool of the scientific revolution, the plotting of velocity against time. It was precisely identical to the graphical system that Galileo used to prove the validity of his own theories, by showing through experiment that the slope of the line representing acceleration was the same for heavier and lighter objects. Oresme's work, then, helped to lay the foundation for the scientific revolution. Oresme is often said to have anticipated Galileo's proof that acceleration due to gravity is uniform regardless of the mass of the falling objects (thus disproving a key Aristotelian proposition). It did not occur to Oresme, however, to apply the results of his abstract geometrical diagrams to real-world objects, and it would hardly have been possible for him to do so for technical reasons, such as the lack of any practical timekeeping device that could have taken the necessary measurements. While Oresme was able to represent continuous acceleration through his geometrical illustration, he did not apply his theories to the study of falling bodies.

Oresme did challenge Aristotle in the area of astronomy, though. He disproved Aristotle's arguments against the possibility that the earth was moving and showed, using Ockham's

razor, that the heliocentric theory (the belief that the sun is at the center of the solar system) was simpler and therefore more likely to be true than Aristotle's geocentric theory (the belief that the sun, moon, planets, and stars revolve around the earth). Even here, however, Oresme wished only to show that Aristotle's logic was faulty; he did not move from this logical demonstration to the suggestion that the heliocentric model of the solar system was a physical fact. Copernicus (1473–1543) in the 16th century did not actually suggest that his defense of the heliocentric theory was anything more than a simpler and more accurate way of calculating celestial motion. The difference in the reception of the two thinkers (the former went unnoticed, and the latter helped to start the scientific revolution) was that the scholarly community in general had in the meantime become interested in the scientific investigation of nature through observation and experiment.

NICHOLAS OF CUSA

Nicholas of Cusa (1401–64), generally known as Cusanus, was a German bishop and cardinal who worked to restore the prestige of the Papacy after the end of the Babylonian captivity in Avignon and the period of rival popes. He also acted as a papal ambassador to the patriarch of Constantinople, working to reunite Catholic and Orthodox Christianity. His chief scientific work was *De docta ingnorantia* (On Learned Ignorance, 1440).

Cusanus argued that the earth and the heavenly bodies of the sun, moon, planets, and fixed stars were made of material substances. Since they consisted of matter, they would be subject to the Fall, that is, the punishment of Adam and Eve when they were expelled from the Garden of Eden. Indeed, Scholastic teaching held that the Fall applied to the whole physical world. Cusanus thought that Aristotle's generally accepted opinion that the earth was at the precise center of the universe and that the heavenly bodies moved in perfect circles must be wrong. Those qualities represented perfect forms, but if the earth and stars were fallen in the Christian sense, they could not be perfect. While this argument is interesting within the context of the history of Scholastic philosophy, it does not contain any persuasive scientific proof of the claims made.

Much of Cusanus's detailed argument consisted of numerical (pseudoscientific number mysticism) calculations. Nevertheless, when such early scientists as Copernicus, Galileo, Brahe (1546–1601), and Kepler (1571–1630) began to offer mathematical and observational proofs of the heliocentric model of the solar system, the physical imperfections of heavenly bodies, such as sunspots and lunar craters, and the elliptical nature of the orbits of the planets, these scientists all pointed to Cusanus's theories as their starting point, in

part to help make their ideas acceptable to ecclesiastical authorities. In the more practical sphere of optics, Cusanus was the first to use concave lenses to correct myopic eyesight. His work on infinitesimal motion contributed to the later development of calculus.

THE ISLAMIC WORLD

BY KATELIN MASON

A historical account of science in the Islamic world could be arranged according to individual scientist or by discipline, yet both methods are unable to express fully the spirit of scientific inquiry during the rise of the Islamic Empire. Scientists did not live in vacuums—they were in isolation neither from one another nor from other fields of study. Often engaged in numerous disciplines, these scholars were diverse in their interests and talents. Abu ar-Rayhan al-Biruni (973–1048), a renowned astronomer, was also a gifted astrologer, geographer, historian, mathematician, and scientist of the physical and natural sciences. Ibn Sina (980–1037), the physician known in the West as Avicenna and who composed *Al-qanun fi al-tibb* (The Canon of Medicine), was an Aristotelian philosopher, mathematician, astronomer, and metaphysician. Mercantile cities became centers of scientific exchange and development, while vast libraries, centers of learning, and translation and travel enabled exchange of the vibrant thought emerging with the rise of Islam. This exchange of ideas suggests division by discipline rather than by scientist, facilitating a discourse that considers these scholars in relation to one another. It should be kept in mind, though, that most of the scientists mentioned were masters of several sciences. Only the most historically significant personages of each discipline are mentioned, while countless others provided the framework, data, and theory informing their thought and discoveries. A particular scientist may have been the most prominent in a field in which he is mentioned here, such as physics, yet also have been significant, but not historically critical, to the field of mathematics.

The phrase *Islamic science* has been scrutinized extensively because of the ambiguity of its terms. Today *science* refers to the physical and natural sciences, and the word *Islamic* implies something intrinsically Muslim. In fact, Islamic science is Islamic only insofar as it is science occurring within the sphere of influence of Islam (Morocco to China), regardless of religion or ethnicity. The phrase *Arab science* is often used to designate the same subject. Here, *Arab* replaces *Islamic* because of the dominant use of the Arabic language in the majority of scientific writings. While the term no longer implies science exclusively by Muslims, it is similarly flawed in its exclusionary properties. *Arab science* implies that the

scientific tradition of the Islamic world was developed alone by Arabs—conceptually more contentious and inaccurate than the implication that all science within these regions was practiced by people of the Islamic faith. This is because these regions, including the Arab world itself, are made up of highly diverse ethnic populations. Finally, Islamic science would be inconceivable without the contributions of the Persian and Indian civilizations.

The linguistic nature of the Koran is nuanced and sophisticated, such that it is viewed as having inevitably sparked an intellectual revolution in the Islamic world. It enabled the growth of science by providing a rich vocabulary with which to detail the theory and practice of science. Furthermore, the Koran sparked the founding of the Islamic religious sciences, such as theology and jurisprudence, which, in turn, gave rise to the other branches of Islamic science. The sayings of the Prophet (Hadith) also propelled Islamic science by establishing several foundational branches of knowledge, including *ilm al-rijal* (science of biographies of narrators of Hadith), and the related *ilm al-ansab* (science of genealogy) and *ilm al-tarikh* (science of history). These religious sciences helped create the epistemological framework of Islamic science.

Science was a major part of society in the Islamic world, thriving in its most vibrant cities, such as Baghdad, Cairo, Córdoba, and Gundishapur. The Koran and Hadith ask Muslims to seek knowledge and truth, which they did with fervor. These religious messages encouraged and allowed Islamic rulers to support scientific endeavors. One of the greatest sources of pride of an urban center was its claim to scientific knowledge, as this implied adherence to Islam and intellectual and societal prowess vis-à-vis other cities. The prominent position of science in society is evidenced by the establishment of schools of translation, medicine, and science.

The synthesizing of Indian, Persian, and Greek knowledge into the corpus of Islamic thought allowed it to flourish. This knowledge entered the arena of Islamic thought through translation efforts, the most notable being that of ninth-century Abbasid Baghdad under the caliph Abu al-Abbas al-Ma'mun (r. 813–33). This initiative was continued by later caliphs and, to a lesser extent, throughout the Islamic world. In Baghdad the Abbasid caliph Harun ar-Rashid (r. 786–809) established the House of Wisdom (Bayt al-hikmah), while in 1005 the Fatimid caliph Abu Ali al-Hakim (r. 996–?1021) founded Dar al-ilm (House of Knowledge), housing approximately 1 million volumes. There were a number of great translators, but the most prolific was the Nestorian Christian Hunayn ibn Ishaq al-Ibadi (808–73), who translated an enormous volume of Greek medical, philosophical, and scientific works into Syriac and Arabic in the school of Baghdad. Through their knowledge of Arabic and extensive translations, scientists of

all ethnic and cultural backgrounds could communicate with one another, in person or through text, across thousands of miles or hundreds of years.

Any division of the intellectual sciences of the Islamic world is somewhat limited insofar as these sciences must be understood as parts of a whole—reinforcing, assessing, critiquing, and informing one another. The divisions listed are primarily for clarity of understanding. The philosopher Abu Nasr al-Farabi (ca. 87–ca. 950) and the historian Ibn Khaldun (1332–1406), among others, divided the sciences into several branches. Still, this should not be understood as anything more than classification for the purpose of positioning the sciences in relation to one another and tracking their maturity. In anatomy one may classify the parts of the body, but the complete separation of its parts would render each incomprehensible and meaningless. Similarly, science in the Islamic world, while divided rhetorically into disciplines, remains an integral whole whose parts continue to nurture one another.

ASTRONOMY

While pre-Islamic Arabs had some familiarity with astronomy for creating calendars, it was not until the incorporation of Greek, Indian, and Persian astronomy that this developed formally into a science. The pursuit of astronomy in the Islamic world was dictated by interest in both the predictive study of astrology as well as in the application of astronomical data. Astrological prediction was sought particularly by rulers seeking strategic guidance, although many viewed this as heretical, implying lack of faith in God. While astronomy was used for finding the direction of the *qibla* (which Muslims face to pray) and travel, it was also motivated by that enchantment with the heavens felt by virtually all before the modern era. Despite their close relationship, astronomy and astrology were maintained, at least in rhetoric, as separate disciplines.

Indian and Persian astronomical texts were first translated into Arabic in the eighth century. Most notably, Ibrahim al-Fazari (d. 777); his son, Muhammad al-Fazari (d. ca. 796–806); and Yaqub ibn Tariq (d. 796) compiled the *Zij al-sindhind*, the crown of Indian achievement in astronomy, from the *Surya siddhanta* and the works of the Indian astronomer Brahmagupta (598–668). It would remain the most important work of astronomy until the ninth century. The Persian *Zij al-shah* (555), a collection of astronomical tables compiled over two centuries and representing the height of Persian astronomy, was translated into Arabic by Abu al-Hasan al-Tamimi. Both of the latter were critical texts that helped inform Islamic astronomical thought. Ultimately, Greek texts, in particular Ptolemy's *Almagest*, were most utilized by Islamic astronomers. Translated, commentated upon, and revised

continuously, the *Almagest* also served as a primer and starting point for original astronomical thought.

Muhammad al-Fazari was also the inventor of the astrolabe, a scientific instrument used for calculating the data found through astronomical observation. Al-Fazari and Yaqub ibn Tariq applied the Indian sine function to astronomy, making calculations far easier, yet these men are most significant for their introduction of the major Indian and Persian astronomy texts into Islamic thought. It was not until the ninth century that the Hellenistic tradition would be added to the now-thriving field of astronomy in the Islamic world.

The full translations of the *Almagest* that began to appear in the ninth century provided a wealth of astronomical techniques, theory, and data of utmost importance for the formulation of Islamic astronomy. The first of these translations was



The Wonders of Creation and the Oddities of Existence, page from a manuscript, Egypt or Syria, ca. 1375–1425; this book, compiled in 1270 by Zakariya Qazwini, covers the fields of geography, astronomy, astrology, and natural history, in a mixture of science and superstition. (© The Trustees of the British Museum)

completed by al-Hajjaj ibn Matar (ca. 800), followed by that of a non-Muslim member of the Sabian sect of Harran, Thabit ibn Qurra (ca. 836–901), in the latter part of the century. Ibn Qurra's was a substantial improvement from the first rendition of the *Almagest*, utilizing the blossoming vocabulary of Arabic. In addition to his translation efforts, Thabit ibn Qurra is noted for expounding the theory of trepidation (oscillation of the equinoxes) first proposed by Theon of Alexandria (fourth century C.E.), which he explained by adding a ninth planet to the Ptolemaic model. In addition to these great achievements, Thabit ibn Qurra used Euclid's *Elements* to demonstrate Ptolemy's model of the motion of a planetary body on an eccentric course. He is also considered the first to discuss the velocity of a moving object at a particular point.

Abu Abd Allah al-Battani (ca. 858–929), an associate of Thabit ibn Qurra, continued the latter's pursuits in general while abandoning trepidation theory. Al-Battani's keen observational skills enabled him to discover the behavior of the solar apsides. He created a new method of establishing the sighting of the new moon and a detailed study of eclipses. Al-Battani's works remained important throughout medieval Islamic astronomy and were utilized in Europe as late as the 18th century.

Muhammad Ibn Musa al-Khwarizmi's (ca. 780–ca. 850) *Zij al-sindhind* (not to be confused with the Sanskrit text translated under the same title in the earlier 700s) is the first original text of Islamic astronomy, with solar, lunar, and planetary tables and commentary. Here al-Khwarizmi makes use both of Indian and Greek elements. Insofar as al-Khwarizmi does not merge these elements fluidly, this work represents the early stage of the synthesizing of pre-Islamic sciences into the corpus of Islamic science.

The verification of Greek, Indian, and pre-Islamic Persian astronomy coupled with the avid pursuit of new data led to the formation of a collective astronomy project with centers in Baghdad and Damascus through the patronage of the caliph al-Mamun. This resulted in the *Zij al-mumtahan*, which contained critical corrections of Ptolemaic data, most notably the demonstration that the apogee of the sun moves with the fixed stars. With increased production of commentaries on and revisions of pre-Islamic astronomical texts came an awareness of problematic data therein. As Hellenistic astronomy propounded theories constructed upon data, the demonstrated variance of this data with new observations led to the pursuit of new theories. Habash al-Hasib's (d. ca. 870) *al-Zij al-damashqi* represents one such work, in which, while revising Ptolemy, he made trigonometry an essential component of astronomical science.

Progress in 10th- and 11th-century trigonometry combined with the founding of several large observatories led to

increases both in corrections of Ptolemaic astronomy as well as to an expansion of original astronomical thought. During this period Abd al-Rahman al-Sufi of Rayy produced the *Kitab suwar al-kuwakib al-thabita* (Book of the Fixed Stars), which refined the cataloging of stars in the *Almagest*. Also during this time, Abu al-Hassan Ali bin Yunus (d. 1009) of Cairo helped to fully synthesize pre-Islamic astronomical thought into the body of Islamic astronomy. *Al-zij al-hakim al-kabirun* contains a history of astronomy until his times, along with revisions and new observational data. The 10th century was also important for instrument building and writing on instruments of observation by figures such as Abu Mahmud Hamid al-Khujandi (d. 1000), who wrote on astronomical instruments and built a sextant at Rayy.

Abu ar-Rayhan al-Biruni of Khwarizmi was a master scientist for whom astronomy was just one of several subjects in which he excelled. He mentions Abu al-Wafa al-Buzjani (d. 998) and Abu Nasr Mansur Ibn Iraq (960–1036) as his teachers. Following the tradition of these researchers, al-Biruni was a mathematical astronomer, making expert use of applied trigonometry. Al-Biruni used his linguistic skills to access the Persian, Greek, Syriac, Indian, and Arabic astronomical traditions, producing more than 150 works on almost all branches of science and philosophy. His *al-Qanun al-masudi* (Masudi Canon) is most notable for its simultaneous depth and comprehensiveness concurrent with its synthesis of pre-Islamic astronomy. Al-Biruni was a scholar of many fields of science but was primarily an astronomer and astrologer. His role as astronomer was intimately connected with his love of mathematics, which he made use of in his formulation of treatises on such critical subjects as shadows, astrolabes, and geographic coordinates. In addition to al-Biruni's immense scientific achievements was his establishment of astronomy and the mathematical sciences as distinct from metaphysics and philosophy, particularly Aristotelian presuppositions. The points that al-Biruni raised, such as a lack of "natural" reasons why the heavenly bodies must move on a particular course is demonstrative of his epistemologically revolutionary attitude. Al-Biruni's *Al-asila wa al-ajwaba* provides the content of his exchanges with Ibn Sina, the foremost Aristotelian philosopher of the Islamic world. In this text al-Biruni clearly asserts himself as a mathematician and not a philosopher. This conscientious decision colored al-Biruni's thought and shaped the future of the Islamic scientific tradition.

New elements of Indian astronomy and astronomical discoveries in the 10th and 11th centuries led to the solidification of Islamic astronomy as a discipline unto itself. Astrology was increasingly condemned, moving the patronage of astronomy from royal courts to mosques and observatories. Greater interest in astronomical precision for religious pur-

poses, such as prayer times and the direction of prayer, also encouraged this shift of patronage.

The 11th century was shaped by more questioning of Aristotelian and Ptolemaic presuppositions. These critics and astronomers included Abu Ubayd al-Juzjani (d. 1070) who in his *Tarkib al-aflak* questions the equant problem of the Ptolemaic model. An anonymous work from Andalusia titled *Al-istidrak ala batlamyus* lists further objections to Ptolemaic astronomy. Pointed critiques also came from Abu Ali al-Hasan ibn al-Haytham (965–1039), often known by his Latinized name of Alhazen, in his *Al-shukuk ala batlamyus* (Doubts concerning Ptolemy), which listed his concerns with the Hellenistic philosophical and astronomical traditions, in particular, the questions he held in regard to the Ptolemaic models and their alleged inconsistencies. The inconsistencies laid out by Ibn al-Haytham were taken up readily by such towering scientific figures as Muayyad al-Din al-Urdi (d. 1266), Nasir ad-Din at-Tusi (1201–74), Qutb al-Din al-Shirazi (d. 1311), Sadr al-Sharia al-Bukhari (d. 1374), Ibn al-Shatir (d. 1375), to name only a few of those who rigorously investigated and refined the Ptolemaic astronomical tradition and in turn fortified Islamic astronomy.

The 12th century witnessed the growth of planetary theory by Western astronomers, including Ibn Bajjah (ca. 1095–1138); Muhammad ibn Abd al-Malik ibn Tufayl (d. ca. 1185); Abu al-Walid ibn Rushd (1126–98), known in the West as Averroës; and Abu Ishaq al-Bitruji (d. 1204). These theorists sought to resuscitate Aristotelian astronomy after rejecting aspects of Ptolemaic thought, in particular, eccentrics and epicycles. Al-Bitruji created an alternative model, which still adhered to Aristotelian motion theory.

The 13th and 14th centuries witnessed the favoring of philosophy over astronomy in the Western lands of Islam, while in the Eastern lands it continued to flourish with such scholars as Nasir ad-Din at-Tusi, Qutb al-Din al-Shirazi, and Ibn al-Shatir. At-Tusi's "Tusi Couple" was an alternative to Ptolemy's problematic equant theory. Al-Shirazi, the student of at-Tusi, discussed the possibility of a heliocentric model extensively, while Ibn al-Shatir brought astronomy further from the equant problem of Ptolemaic astronomy by adding another epicycle. Ibn al-Shatir was also able to show through trigonometric demonstration that the earth is not located precisely at the center of the universe.

MATHEMATICS

The incorporation of the Indian numerical system into Islamic science brought about solutions to many difficult mathematical questions and made arithmetic a substantially easier enterprise than it had been. Yet preexisting modes of arithmetic such as the Babylonian sexagesimal system that

was based on the number 60 remained in use, particularly for astronomy where the Indian and Babylonian modes were both used.

The development of algebra was aided by the translation of Diophantus's *Arithmetica*. This translation was produced at approximately the same time that al-Khwarizmi was writing the first significant work of Islamic mathematics during the early ninth century, *Kitab al-jabr wa al-muqabalah* (Book of Compulsion and Comparison). Here al-Khwarizmi's quest for a comprehensive system for solving linear and quadratic equations is achieved, earning him the title that he shares with Diophantus, "Father of Algebra." The word *algebra*, in fact, derives from the title of this text, "*al-jabr*" ("compulsion"), used in his solution of quadratic equations by this mathematical principle.

The interrelationship of arithmetic, algebra, and geometry helped each of these grow further in the fertile intellectual climate established by Islam. Abu Bakr al-Karaji was focused on extrapolating arithmetical laws and applying these to algebra. Thabit ibn Qurra used geometry as a lens for his conception algebra, while others, such as Abu Abd Allah Muhammad ibn Isa al-Mahani (d. 880) used algebra for volumetric quantification in geometry. The use of conic sections to solve cubic equations was another significant development whereby geometric solutions were applied to algebraic problems, thus enabling the finding of roots more efficaciously than through the traditional route of algebraic solutions. It was with Omar Khayyam (1048?–1131), however, that the use of conic sections would be used to solve third-order equations.

Algebraic geometry was furthered by Sharaf al-Din al-Tusi (d. 1213), through the process of expressing the intersection of two lines algebraically. Additionally, al-Tusi developed the concept of a maximum and introduced the notion of derivatives. This relationship of arithmetic, algebra, and geometry helped Islamic mathematics extend the knowledge transmitted by Greek civilization. When trigonometry from India was added to this body of knowledge, its development quickened. New branches of mathematics emerged, including those devoted to asymptotic behavior, infinitesimal objects, and intermediate analysis.

OPTICS

Greek knowledge of optics was conveyed to the Islamic world during the early translation movements of the eighth century. These translations included research on vision, rays, reflection, mirrors, the atmosphere, and burning mirrors, to name only a few. Along with this transmission of optics texts were the production of original works by Islamic scientists, including Ibn Masawaih (d. 857), Hunayn ibn Ishaq al-Ibadi, Qusta ibn Luqa

al-Balabakki (fl. 860–900), and Thabit ibn Qurra. Yaqub ibn Ishaq al-Kindi (d. ca. 870) also wrote texts on an array of subjects pertaining to optics from an Aristotelian and Euclidean perspective. During the 10th century Abu Sad al-Ala ibn Sahl contributed substantially to the field of dioptrics, refracting and focusing light using burning lenses and mirrors. He also wrote on the science of refraction and developed the constant ratio. Ibn al-Haytham's work is inconceivable without the developments advanced by this important predecessor.

Ibn al-Haytham, in his *Kitab fi al-manazir* (Book of Optics), dated 1270, created the foremost text and achievement of Islamic optical research. Ibn al-Haytham essentially deconstructed Hellenistic optics and rewrote many of its principles. Euclid and Ptolemy had propounded the view of extramission, where a ray extends from the eye to the perceived object, while Aristotle had supported the notion of intromission that involves a form passing from the object to the eye. Rejecting both of these views, Ibn al-Haytham introduced an original theory of vision, holding that light reflected by the object is received by the eye. Ibn al-Haytham is also responsible for the so-called Alhazen's problem, after his Western name, which involves locating the point of reflection on a concave or convex spherical mirror in relation to the positioning of the visible object and eye. Making use of physiological, mathematical and medical advances, Ibn al-Haytham was able to transform optics fundamentally. His use of controlled experimentation was adopted by Kamal al-Din al-Farisi (d. 1319), who further revised optics and wrote commentaries on Ibn al-Haytham's works. Al-Farisi is responsible for having demonstrated the refractory causes underlying the shapes of the first and second arcs of rainbows.

PHYSICS

While the Aristotelian scientific tradition was essential to the formulation of all Islamic science, it was particularly true of the physical sciences. Even where Aristotle's theories were rejected, as was the case with the physics of motion, this rejection and reformulation was innately tied to its starting point in Aristotle. The field of physics developed in tandem with other fields, especially astronomy and optics. Several major achievements of Islamic physics stand out as particularly noteworthy, including the theory of inclination and the laying of the foundation for the discovery of the concepts of impetus and momentum in later centuries. Some of the outstanding physicists include Ibn Bajjah (Avempace) (d. 1138) who made great strides in his efforts to quantify projectile motion. Ibn al-Haytham, in addition to his successes in optics, was also responsible for discovering the principle of inertia.

Al-Biruni, in addition to his other accomplishments, was also an exceptional theoretical and experimental physi-

cist, evidenced in his exchange with Ibn Sina that included debate on the Aristotelian theories of motion. Al-Biruni critiqued these theories on the basis of analytical reasoning and experimentation. His commitment to physics resulted in his final objection to the heliocentric system, an objection based not on philosophy but physics. Al-Biruni and al-Khazini (fl. 1115–30) used the works of Archimedes to develop the science of measuring specific weights as well as of balance. Al-Khazini's research on centers of gravity, mechanics, and hydrostatics (the study of liquids at rest and the pressures exerted by or on them) culminated in his text *Kitab mizan al-hikma* (The Book of the Balance of Wisdom).

A fascinating branch of Islamic physics was *ilm al-hiya*, or the science of useful devices. This forerunner of technology was essentially playful in nature, yet it led to some significant technological developments and discoveries of physical principles. While such figures as the Banu Musa brothers (ninth century) and al-Biruni had an interest in mechanics and in simple machines, it was al-Khazini who took this interest in a new direction. With his studies of mechanics, hydrostatics, and the center of gravity in relation to the subject of balance, al-Khazini helped to establish the quirky yet intellectually rigorous science of ingenious devices. This branch of physics reached fruition with al-Khazini's successor, Abu al-Izz al-Jazari (fl. ca. 1200) in his *Al-jami bain al-ilm wal-amal al-nafi fi sinatat al-hiyal* (The Book of Knowledge of Ingenious Mechanical Devices). Al-Khazini's most substantial contribution, however, lies in his research on the measurement of specific weights and his research on balance. This research was continued by such scholars as Qaysar al-Hanafi (b. 1178 or 1179), who applied his expertise to the making of celestial globes and waterwheels based on the principles of physics.

CHEMISTRY

The word *chemistry* derives from the Arabic word *al-kimiya*, which means "alchemy," the predecessor of chemistry as it is understood in the 21st century. The study of alchemy in the Islamic world was shaped by its roots in Alexandria and China. Almost from the inception of Islam, alchemy was a science whose significance was found in its three component functions. The original goal of alchemy was to turn base metal into gold. This material function became entwined with a second symbolic function that was, to mystics, fundamentally more real. This symbolic function of alchemy was that of spiritual alchemy, intimately connected with and in many aspects inseparable from the science of the conversion of metals. The spiritual function refers to the transformation of the soul of the practitioner from base metal into gold; in other words, the attempt to convert one's base instincts and nature into the purest substance through spiritual purifica-

tion and unification with God. The third type of alchemy refers to what is today known as chemistry.

Muhammad ibn Zakariya ar-Razi (ca. 865–d. ca. 923–25), known in the West as Rhazes, developed chemistry from its alchemical father, Jabir ibn Hayyan (ca. 721–ca. 815). One of ar-Razi's most significant contributions to this field is his categorical distinction of the classes of animal, vegetable, and mineral. Another important discovery of Islamic chemistry was the mercury-sulfur theory, which prepared the path for the development of acid-base theory.

MEDICINE

Islamic medicine is the combination of the primarily theoretical tradition of Galen and the primarily observational tradition of Hippocrates with the theoretical light and applied practice of Indian and Persian medicine. Medicine was connected to both philosophy and to alchemy—to philosophy in its link between the wise man and the physician, both known in Arabic as *hakim*, and to the alchemical tradition through the relation between body and soul, both of which fell within the sphere of alchemy.

The historical background of Islamic medicine originates in the schools of Gundishapur and of Alexandria. The Gundishapur tradition was influenced deeply by the Hippocratic, Zoroastrian Persian, and Indian medical traditions. The physicians and rulers of Gundishapur actively sought to incorporate foreign medical knowledge, sending scholars to India to bring back texts and physicians who could train those of Gundishapur. The Alexandrian tradition was primarily the merging of Greek and Egyptian medicine. This school was most important for transmitting the works of Hippocrates, Galen, Rufus of Ephesus, Paul of Aegina, and Dioscorides to Muslim physicians for study and assimilation into the corpus of Islamic medical knowledge.

The first physician of Islam, al-Harith ibn Kaladah (sixth to seventh centuries), who was educated in Gundishapur, lived at the time of the Prophet. Initially, Arabs considered this science suspect, with its roots in so many other traditions. According to prophetic instruction to “seek knowledge, even in China,” however, it soon became acceptable to learn from all known medical traditions. Their foreign nature was ameliorated by their total absorption into the Islamic tradition. What could not be reconciled with the Islamic faith was ignored or practiced by certain physicians while not being incorporated into the popular corpus of Islamic medicine.

The essential sources informing Islamic medicine are the Koran and Hadith. The Koran contains both the principles of Islamic medicine and certain specific instructions, while the medical knowledge of the Hadith, (*al-Tibb al-nabawi*, or “prophetic medicine”) contains principles as well as extensive

detail on health and hygienic practices. These are the bases of Islamic medicine, which were conjoined with Greek, Indian, and Persian elements.

In the nascent years of the Islamic Empire, physicians were often of Christian or Zoroastrian origin. When the caliph al-Mamun was suffering from dyspepsia, he called upon the most renowned Christian doctor of Gundishapur, Jirgis Bukhtyishu (fl. eighth century). The caliph was impressed with Jirjis's facility as a physician and sought to bring the Persian physicians of Gundishapur to Baghdad to establish a school of medicine. The Christian Masawaih family also moved to Baghdad, where Ibn al-Masawaih flourished as a leading physician.

The translation of Greek texts that began with the Umayyad Dynasty was launched into full force with the coming of the Abbasids. Ibn Muqaffa (d. 760) translated several Pahlavi medical texts of critical importance to Islamic medicine. Hunayn ibn-Ishaq al-Idbadi is the most significant translator of this period. He immigrated to Gundishapur to study with Ibn Masawaih (before the latter's move to Baghdad), but Ibn Masawaih discouraged al-Idbadi's pursuit of medical knowledge. Al-Idbadi was not deterred from his studies, however, and developed into one of the most significant founders of the Islamic scientific tradition.

The *Firdaws al-hikmah* (Paradise of Wisdom) of Ali ibn Rabban al-Tabbari (fl. ninth century) was a true synthesis of Hippocratic, Galenic, Indian, and Persian medicine. This text prepared the way for al-Tabbari's student Muhammad ibn Zakariya ar-Razi (Rhazes) who, while conducting limited theoretical critiques, is most significant for the clinical and applied knowledge that he used to construct his book on smallpox and measles, *Kitab fi al-jadari wa al-hasba* (Smallpox and Measles). Other key works of ar-Razi include treatises on diabetes and hay fever as well as the *Kitab al-tibb al-mansuri* (Manuri Book of Medicine), which provided a valuable overview of medical theory. Ar-Razi's *Al-hawi fi al-tibb* (Comprehensive Book of Medicine) is a voluminous work filling some 21 volumes. In this work ar-Razi produced a compendium of clinical observation in which he makes some critiques of Galen based on his own clinical experience. Rather than relying on theoretical medicine and inference, as in the Galenic tradition, ar-Razi's primary mode of acquiring knowledge was through a series of controlled experiments. Ali ibn Abbas al-Majusi (d. 994) sought in his *Kitab al-malaki* (The Royal Book, also known as the Complete Book of the Medical Art) to provide the theoretical and structural gaps present in ar-Razi's *Al-hawi*. The *Kitab al-tasrif li-man ajaz an at-ta'lim* (Book for Medical Practitioners), by Abu al-Qasim (d. 1013), is a 30-volume set that collects all known medical knowledge at his time. While focusing on clinical medicine, this text is most valuable for its section on surgical practices.

ABU ALI AL-HUSAYN IBN ABD ALLAH IBN SINA (980–1037)

Known as Avicenna in Europe, Ibn Sina was one of the greatest scientists in history. He wrote about astronomy, chemistry, mathematics, medicine, philosophy, physics, and theology. Of his more than 450 publications about 240 survive, mostly about medicine and philosophy. He is often called part of the Hellenistic Islamic scientific tradition because his work often included the ideas and discoveries of ancient Greek philosophers, especially Aristotle.

His most influential book was *Al-qanun fi al-tibb*, or the Canon of Medicine (published ca. 1020). This was an encyclopedia of medical knowledge that was commonly used as a textbook in the Islamic world and Europe in the 1700s. Among the book's many important contributions to the study of medicine was Ibn Sina's pointing out that to make someone healthy, a physician needs to know what a healthy body is. He introduced the idea of experimenting with physiology as part of learning how a healthy body functions. Ibn Sina contributed to public health by identifying infectious diseases and trying to determine how they were transmitted. He noted that diseases could be spread by water and soil as well as by air.

Ibn Sina was born in the town of Balkh in what was then Khorasan, now in Afghanistan. His father was a scholar who saw to it that his son had a good education. Ibn Sina had memorized the Koran by age seven, and he was said to have surpassed his teachers by age 14. In his teens he found the writings of Aristotle to be particularly absorbing. By age 18, he had become a well-known physician. During much of his adult life he migrated from place to place, hoping to settle down, and he even held important government posts, but wars and political intrigues usually caused him to move. In the course of his moves he was attended by many students, some of whom helped him with his research and writing. He dictated much of the Canon of Medicine to students, sometimes while on horseback. The last 12 years of his life he spent as the physician and scientific adviser in the court of the emir Ala al-Dawla of Isfahan. He died on June 18, 1037, while accompanying al-Dawla on a military campaign.

The foremost text of Islamic medicine, however, is Ibn Sina's *Qanun fi al-tibb*. This grand work of synthesis includes text that is rich in theoretical knowledge on anatomy, physiology, pathology, and therapy. The *Qanun* remained the primary work of medical knowledge in the Islamic world and the West until the 17th century. Like all texts, and especially those that are the greatest, the *Qunan* received criticism, particularly by pharmacologists, including Ibn al-Jazzar (d. 980) and Ibn Zuhr (ca. 1090–1162), known in the West as Avenzoar or Abumeron, who viewed this text as ineffective because of its theoretical rather than applied nature. Other important texts include the anatomical work on the pulmonary circulation of blood of Ibn an-Nafis (d. 1288) and one on experimental anatomy by Abd al-Latif al-Baghdadi (d. 1231). The full incorporation of medicine into society during the 12th and 13th centuries led to the development of advanced medical facilities, clinical research, and endowments for medical study.

BOTANY AND ZOOLOGY

The 12th-century scientist of Spain, al-Ghafiqi (d. 1165) produced highly detailed botanical accounts, considered by the historian of science George Sarton to be the most precise in Islamic history. Also significant is Abu Zakariyya Yahya's (12th century) *Kitab al-falahah* (Book of Agriculture), which

contains detailed descriptions of almost 600 plants and advice for the cultivation of trees and vines, listing their diseases, cures, and preferred soil composition.

Zoology in the Islamic world reached its peak with such scholars as al-Jawaliqi (12th century), al-Jahiz with his *Kitab al-haywan* (Book of Animals) and al-Damiri (d. 1405) who wrote *al-Hayat haywarz* (Life of Animals), the most prominent work of Islamic zoological thought. These authors focused primarily on classification, description, and behavior. Other zoologists pursued scientific zoology along with the allegorical and religious connotations of certain animals, exemplified by the text *Ajaih al-makhluqat* (The Wonders of Creation) of Abu Yahya al-Qazwini (14th century).

See also AGRICULTURE; ALCHEMY AND MAGIC; ARCHITECTURE; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; CLIMATE AND GEOGRAPHY; ECONOMY; EDUCATION; FESTIVALS; FOOD AND DIET; FORESTS AND FORESTRY; HEALTH AND DISEASE; INVENTIONS; LANGUAGE; METALLURGY; MILLS AND MILLING; MINING, QUARRYING, AND SALT MAKING; NUMBERS AND COUNTING; OCCUPATIONS; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SHIPS AND SHIPBUILDING; STORAGE AND PRESERVATION; TRADE AND EXCHANGE; WEAPONRY AND ARMOR; WEIGHTS AND MEASURES; WRITING.

Africa

~ Excerpt from the Emerald Tablet
of Hermes (undated) ~

This is true and remote from all cover of falsehood.
 Whatever is below is similar to that which is above.
 Through this the marvels of the work of one thing are
 procured and perfected.
 Also, as all things are made from one, by the
 consideration of one, so all things were made from this
 one, by conjunction.
 The father of it is the sun, the mother the moon.
 The wind bore it in the womb. Its nurse is the earth, the
 mother of all perfection.
 Its power is perfected.
 If it is turned into earth,
 separate the earth from the fire, the subtle and thin
 from the crude and course, prudently, with modesty and
 wisdom.
 This ascends from the earth into the sky and again
 descends from the sky to the earth, and receives the
 power and efficacy of things above and of things below.
 By this means you will acquire the glory of the whole

world, and so you will drive away all shadows and
 blindness.
 For this by its fortitude snatches the palm from all
 other fortitude and power. For it is able to penetrate and
 subdue everything subtle and everything crude and hard.
 By this means the world was founded
 and hence the marvelous conjunctions of it and
 admirable effects, since this is the way by which these
 marvels may be brought about.
 And because of this they have called me Hermes
 Trismegistus since I have the three parts of the wisdom
 and Philosophy of the whole universe.
 My speech is finished which I have spoken concerning the
 solar work.

From: Tenny L. Davis, "The Emerald Tablet
 of Hermes Trismegistus: Three Latin
 Versions Which Were Current among Later
 Alchemists," *Journal of Chemical Education* 3,
 no. 8 (1926): 863–875.

Europe

~ Roger Bacon: "On Experimental Science" (1268) ~

Having laid down the main points of the wisdom of the
 Latins as regards language, mathematics and optics,
 I wish now to review the principles of wisdom from
 the point of view of experimental science, because
 without experiment it is impossible to know anything
 thoroughly.

There are two ways of acquiring knowledge, one through
 reason, the other by experiment. Argument reaches a
 conclusion and compels us to admit it, but it neither
 makes us certain nor so annihilates doubt that the
 mind rests calm in the intuition of truth, unless it
 finds this certitude by way of experience. Thus many
 have arguments toward attainable facts, but because
 they have not experienced them, they overlook them
 and neither avoid a harmful nor follow a beneficial
 course. Even if a man that has never seen fire, proves
 by good reasoning that fire burns, and devours and

destroys things, nevertheless the mind of one hearing
 his arguments would never be convinced, nor would he
 avoid fire until he puts his hand or some combustible
 thing into it in order to prove by experiment what the
 argument taught. But after the fact of combustion is
 experienced, the mind is satisfied and lies calm in the
 certainty of truth. Hence argument is not enough, but
 experience is.

This is evident even in mathematics, where
 demonstration is the surest. The mind of a man that
 receives that clearest of demonstrations concerning
 the equilateral triangle without experiment will never
 stick to the conclusion nor act upon it till confirmed by
 experiment by means of the intersection of two circles
 from either section of which two lines are drawn to the
 ends of a given line. Then one receives the conclusion
 without doubt. . . .

(continued)

(continues)

Whoever wishes without proof to revel in the truths of things need only know how to neglect experience. This is evident from examples. Authors write many things and the people cling to them through arguments which they make without experiment, that are utterly false. It is commonly believed among all classes that one can break adamant only with the blood of a goat, and philosophers and theologians strengthen this myth. But it is not yet proved by adamant being broken by blood of this kind, as much as it is argued to this conclusion. And yet, even without the blood it can be broken with ease. I have seen this with my eyes; and this must needs be because gems cannot be cut out save by the breaking of the stone. . . . Again it is popularly said that cold water in a vase freezes more quickly than hot; and the argument for this is that contrary is excited by the contrary, like enemies running together. . . .

Experience is of two kinds. One is through the external senses: such are the experiments that are made upon the heaven through instruments in regard to facts there, and the facts on earth that we prove in various ways to be certain in our own sight. And facts that are not true in places where we are, we know through other wise

men that have experienced them. Thus Aristotle with the authority of Alexander sent 2,000 men throughout various parts of the earth in order to learn at first hand everything on the surface of the world, as Pliny says in his *Natural History*. And this experience is human and philosophical just as far as a man is able to make use of the beneficent grace given to him, but such experience is not enough for man, because it does not give full certainty as regards corporeal things because of their complexity and touches the spiritual not at all. Hence man's intellect must be aided in another way, and thus the patriarchs and prophets who first gave science to the world secured inner light and did not rest entirely on the senses. So also many of the faithful since Christ. For grace makes many things clear to the faithful, and there is divine inspiration not alone concerning spiritual but even about corporeal things. In accordance with which Ptolemy says in the *Centilogium* that there is a double way of coming to the knowledge of things, one through the experiments of science, the other through divine inspiration, which latter is far the better as he says.

From: Oliver J. Thatcher, ed., *The Library of Original Sources*, Vol. 5: *The Early Medieval World* (Milwaukee, Wis.: University Research Extension Co., 1901).

The Islamic World

~ Adelard of Bath: Excerpt from *Natural Questions* (ca. 1137) ~

ADELARD: You will remember, Nephew, how seven years ago when you were almost a child in the learning of the French, and I sent you along with the rest of my hearers to study with a man of high reputation, it was agreed between us that I should devote myself to the best of my ability to the study of Arabic, while you on your part were to acquire the inconsistencies of French ideas.

NEPHEW: I remember, and all the more because, when departing, you bound me under a solemn promise to be a diligent student of philosophy.

The result was that I applied myself with great diligence to this study. Whether what I have said is correct, the present occasion will give you an opportunity of

discovering; since when you have often set them forth, I, as hearer only, have marked the opinions of the Saracens, and many of them seem to me quite absurd; I shall, therefore, for a time cease to exercise this patience, and when you utter these views, shall attack them where it seems good to me to do so.

To me it seems that you go too far in your praise of the Arabs, and show prejudice in your disparagement of the learning of our philosophers. Our reward will be that you will have gained some fruit of your toil; if you give good answers, and I make a good showing as your opponent, you will see that my promise has been well kept.

ADELARD: You perhaps take a little more on you than you ought; but as this arrangement will be profitable

not only to you but to many others, I will pardon your forwardness, making however this one stipulation, that when I adduce something unfamiliar, people are to think not that I am putting forward an idea of my own, but am giving the views of the Arabs. If anything I say displeases the less educated, I do not want them to be displeased with me also: I know too well what is the fate which attends upon the teachers of the truth with the common herd, and consequently shall plead the case of the Arabs, not my own. . . .

How the Globe Is Supported in the Middle of the Air

NEPHEW: . . . I will put the first question that comes into my head: How is it that this earth of ours which supports all weights (I am speaking not of simples, but of compounds), how is it that it remains in the same place, or by what is it supported? If all heavy bodies, such as stone, wood, etc., require support, and cannot through their weight be supported by the air, then much more does the earth, which is heavier than everything else put together, require to be supported, nor can it be held in position by so unstable a body as the air. Hence it is contrary to reason that it should maintain its position.

ADELARD: Certainly it is inexpedient that it should fall, and that we also shall not fall along with it. I will show that its remaining in its position is in accordance with reason. From the character of its primary qualities, we know that the earth has weight; that which has weight is more secure in the lowest position; and everything is naturally fond of that which preserves its life, and tends towards that for which it has a liking. It follows therefore that everything which is earthy tends towards the lowest possible position. But in the case of anything

round, it is clear that the middle and the lowest are the same, and therefore all earthy things tend towards the middle position. Now the middle position is a simple and indivisible middle point, and it is therefore clear that all earthy things tend towards a local and simple point. But this local point is not several but one, and must necessarily be occupied by one thing, not by several; but to it, as has been said, all things tend: consequently each one thing presses on something else, since all and sundry are hastening to the same point. Now the point to which all weighty bodies are hastening is that to which they are falling, for the fall of weighty bodies is merely a hastening to a middle point. By the point to which they are falling I mean the fixed middle point. The place to which they are falling-the middle point -remains fixed; and therefore, while falling into a stable position, they yet remain fixed, unless some force be impressed on them as a result of which they are diverted from their natural course. The very opposite then is the case to what you thought; and you will now see clearly that it is what you thought to be a reason for falling which gives stability and coherence to heavy bodies. They are, therefore, in some way supported by the point to which they are hastening; and if it should move in any direction, all the things which are affected towards it would also of necessity move, though of course in that selfsame spot we have not the first but the second cause of stability: for, in accordance with the reason previously given, the first cause of this equilibrium is the property of the subject, the second the stability of the point which it makes for.

From: Adelard of Bath, *Dodi Ve-Nechdi*,
ed. and trans. H. Gollancz (London:
Oxford University Press, 1920).

FURTHER READING

- Marcia Ascher and Robert Ascher, *Mathematics of the Incas: Code of the Quipu* (Mineola, N.Y.: Dover, 1997).
Osman Bakr, *Classification of Knowledge in Islam* (Kuala Lumpur, Malaysia: Institute for Policy Research, 1992).
Hans Dieter Betz, ed. *The Greek Magical Papyri in Translation, Including the Demotic Spells* (Chicago: University of Chicago Press, 1992).
Sally Anderson Chappell, *Cahokia: Mirror of the Universe* (Chicago: University of Chicago Press, 2002).
Terry S. Childs, "After All, a Hoe Bought a Wife": The Social Dimensions of Ironworking among the Toro of East Africa." In *The*

- Social Dynamics of Technology: Practice, Politics, and World Views*, ed. Marcia-Anne Dobres and Christopher R. Hoffman (Washington, D.C.: Smithsonian Institution Press, 1999).
Eduard J. Dijksterhuis, *The Mechanization of the World Picture: Pythagoras to Newton*, trans. C. Dikshoorn (Oxford, U.K.: Clarendon Press, 1961).
Chris Hardaker, "Native American Geometry." Available online. URL: <http://www.earthmeasure.com/Anthro/Past/pastindex.html>. Downloaded on February 25, 2008.
Eric John Holmyard, *Alchemy* (Baltimore, Md.: Penguin, 1968).
Toby E. Huff, *The Rise of Early Modern Science: Islam, China, and the West*, 2nd ed. (Cambridge, U.K.: Cambridge University Press, 2003).

- E. Isaac, trans., "I (Ethiopic Apocalypse of) Enoch." In *The Old Testament Pseudepigrapha*, ed. James H. Charlesworth (Garden City, N.Y.: Doubleday, 1983–1985).
- Muzaffar Iqbal, *Islam and Science* (Aldershot, U.K.: Ashgate, 2002).
- Abdul Hai Khalid, *Maya Math, Maya Indians, and Indian Maya: Reflections on Numbers, History and Religion*. Available online. URL: http://math.mohawkcollege.ca/ocma/conf05/Post_Conf05/Abdul_MAYA_MATH.doc. Downloaded on December 7, 2007.
- David C. Lindberg, *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450*, 2nd ed. (Chicago: University of Chicago Press, 2007).
- Seyyed Hossein Nasr, *Science and Civilization in Islam* (Cambridge, Mass.: Harvard University Press, 1968).
- Joseph Needham, *Science and Civilisation in China* (Cambridge, U.K.: Cambridge University Press, 1954).
- Otto Neugebauer, "Notes on Ethiopic Astronomy." In his *Astronomy and History: Selected Essays* (New York: Springer-Verlag, 1983).
- Patricia J. O'Brien and Hanne D. Christiansen, "An Ancient Maya Measurement System," *American Antiquity* 51, no. 1 (1986): 136–151.
- George Saliba, *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam* (New York: New York University Press, 1994).
- Peter R. Schmidt, *Iron Technology in East Africa: Symbolism, Science, and Archaeology* (Bloomington: Indiana University Press, 1997).
- René Taton, ed., *History of Science: Ancient and Medieval Science from the Beginning to 1450*, trans. A. J. Pomerans (New York: Basic Books, 1964).
- Lynn Thorndike, *A History of Magic and Experimental Science* (New York: MacMillan, 1923).

► seafaring and navigation

INTRODUCTION

It seems as though every culture that lived beside the sea ventured out into the sea. Even when they had only small boats, people made daring voyages to other lands. Sometimes the voyages were accidental. Fishermen were occasionally blown by storms to unfamiliar shores. If they made it home, their stories could interest other sailors, who might try to visit the newly discovered land.

Such voyages were not necessarily made with big ships capable of withstanding great storms. In the Americas people sailed the seas in dugout canoes and kayaks. The Inuit of the north were masters at sailing far from shore to hunt whales and other prey, using only kayaks and paddles. Other coastal Americans found boating along shores to be faster than walking across land. In some places, they may have been safer traveling in dugouts than they would have been crossing land. For instance, Mayan traders often voyaged by ca-

noe along the coasts of Mesoamerica to carry trade goods to coastal cities; otherwise they might have had to make their way through dense forest or across open lands of kingdoms that were at war.

The Polynesians are often cited as history's most amazing seafarers. They used canoes to explore almost all of the Pacific Ocean, voyaging across thousands of miles of ocean. Their boats were often double-hulled with a platform that could carry about a dozen people plus livestock, such as pigs. Theirs was a hit-or-miss strategy of exploration, with no guarantees that they would find land on which to settle. There is no telling how many Polynesians perished in attempts to discover uninhabited lands. Once they knew where they were going, they used constellations at night and the motion of waves to determine where they were in the ocean. The Polynesian navigator knew the direction and size of waves for various parts of the ocean and through them could determine what direction his boat should go.

Danger was always part of seafaring. Even the gigantic ships of China in the 1400s could be capsized by a large wave or by a severe storm. Medieval societies tried to improve safety by building beacons along the shore to serve as guides for navigators, who often remained close to the shoreline instead of venturing out into trackless sea. In Europe and the Near East sailors sometimes wrote guidebooks for sailing where they had sailed. These books were often dry affairs, recounting little of the exotic places the sailors had visited and instead describing how to determine where one was by the sort of land nearby, the prevailing winds, and the currents.

The compass was developed in China, probably during the Han Dynasty. It consisted of spoon-shaped magnetized iron hung from a string to tell miners which direction they were going when mining for metal ore or digging tunnels. In the mid-1000s a Chinese writer described a magnetized needle used for navigation. It was an iron needle on wood that floated in water, allowing the needle to orient itself to magnetic north. The compass was not a perfect solution for navigating, because it pointed to magnetic north rather than true north; a navigator still had to know the stars of the night sky and other indications of where the ship was. Even so, the Islamic world took to navigating with magnetized iron embedded in wood and set afloat, and Europeans were using such a compass by the 1240s.

There were human hazards as well as natural ones. Pirates often sailed in the major trade routes of the sea, sometimes becoming powerful enough to conquer coast land and establish kingdoms. A particularly nettlesome lot preyed on ships in the sea lane that passed north of Borneo and Sumatra and south of Malaysia. The pirates were bold enough to try attacking one of the great Chinese fleets of the 1400s and were

nearly destroyed. Keeping shipping lanes open was a priority for any seafaring culture, and governments often built navies just to keep pirates away. Even after it destroyed its remarkable navy of oceangoing vessels, China maintained a navy to protect its coasts from pirates. Thus it was that medieval peoples had several reasons for seafaring that mattered enough to them to bear the risks of going out to sea, whether it was northwestern South Americans using balsa wood boats to venture into the rich fishing grounds of the open sea to their west or traders sailing the Indian Ocean to find riches from trade or exploration.

AFRICA

BY CHARLES W. ABBOTT

Seafaring in medieval Africa was most visible on the Swahili coast of East Africa, where Swahili sailors made their homes in a variety of small cities stretching along 2,000 miles of coastline from Mogadishu in present-day Somalia south to Sofala in present-day Mozambique. These regional and long-distance traders used sailing ships driven by the monsoon winds. The East African ships might sail as far as Persia (Iran) or India.

Seafaring existed in western Africa as well, where sail power was less utilized and where the preferred vessel was the large dugout canoe. In contrast to the East African voyages, western African sea routes never circled fully north around the “bulge” of Africa (current-day Mauritania and Morocco) to reach Europe. Strong ocean currents prevented such travel, and there was no effective maritime link between western Africa and Europe until Portuguese mariners improved Atlantic sailing expertise after 1400. Until that time, western African coastal trade routes turned from the ocean waters to travel up rivers and inland to meet caravans tied to the camel-based trans-Saharan trade.

Moving farther south, seafaring on the coastline between the Congo River and Mozambique was limited to fishing and local and regional trade. Seafaring was less developed than in western or eastern Africa, and evidence suggests little or no linkage to trade networks with Europe or Asia. South of the Congo River’s mouth at the Atlantic Ocean, the environment for maritime trade was not favorable. Parts of southern Africa (such as current-day Namibia) consisted of deserts. Elsewhere the coast fronted narrow beaches isolated from the continental interior by high escarpments. Travel upriver by canoe was interrupted near the coast by high waterfalls where interior rivers plunged over cliffs on their way to the sea.

The Swahili coast trade is the best-documented instance of African seafaring in medieval times. It linked Africans with literate and largely Muslim communities in Arabia, the

Red Sea, the Gulf of Aden, and the coast of India. The trade is thus documented by abundant written records (largely in Arabic) as well as by archaeological and linguistic evidence.

Seafaring on the Swahili Coast relied on the seasonally alternating monsoon winds. These winds blew from the southwest toward India from April to October; they then reversed and blew from the northeast from November to March. Relying on the monsoons, Africans could sail northward in the spring and return to their home port within the year. Navigation and travel was facilitated by the relatively calm seas and by a variety of coastal islands (such as Zanzibar, Pemba, and Lamu) that provided sites for berthing ships. Sailors navigated their ships into sheltered inlets for trade, and the coast possessed many calm beaches on which ships could be safely landed at high tide and then unloaded when the tide ran out. Offshore coral reefs posed a hazard but were easily avoided, and they sheltered beaches and ports from the open sea.

Navigation was largely accomplished by remaining close to the coast when possible, by orienting with the sun and stars, and through careful observation of currents and plants that were characteristic of different portions of the Indian Ocean. African skill and the favorable environment combined to make journeys common between the African coast and the Comoros Islands (200 miles east of present-day Mozambique) and Madagascar (300 miles offshore). Africans knew these islands well, sailed to them regularly, and traded with their inhabitants.

Seafaring has a long tradition in western Africa, but the historical record is more obscure. The dugout canoe, constructed by hollowing out a single log and sharpening the prow, was the craft of choice. Such canoes varied widely in size: the largest ones were big enough to hold 40 sailors and considerable cargo or 100 men and minimal cargo if fitted for war. Such large canoes, sometimes equipped with sails or outriggers, were used for fishing five or more miles off the coast. Canoe trade upriver from the coast was important along such rivers as the Niger, Senegal, and Gambia. Canoe routes typically hugged the shoreline. In other areas—especially from present-day Ghana east to Cameroon—the heaviest traveled routes often threaded a path behind coastal sandbars. Heavily laden canoes full of cargo could follow lagoons and a maze of creeks, sometimes traveling parallel to the coastline but away from the open sea for dozens of miles at a time.

In the eastern half of the African continent, coastal regions were linked to the rest of the world by the Indian Ocean. In the western half of the African continent, coastal regions were isolated by the Atlantic Ocean. The Atlantic was a barrier to the wider world, with formidable winds and currents that made Europe inaccessible by sea. Coastal Africans of the west were good mariners, but prudence and technology

dictated that they stay closer to the coast than the Swahili did, though fishing 5 or more miles offshore was common.

In contrast to Swahili contact with the Comoros Islands and Madagascar, many islands off the coast of western Africa were uninhabited until European discovery. The Cape Verde Archipelago, 300 miles west of the Cape Verde Peninsula, was uninhabited until Portuguese discovery in the 1450s. Other islands such as São Tomé (180 miles west of Gabon, discovered in 1470) and Príncipe (150 miles west of Gabon) have similar histories of isolation until Portuguese discovery and settlement after 1450. The island of Bioko (also known as Fernando Póo) is much closer to the African mainland and was settled by Africans centuries earlier. About 60 miles southwest of the Cameroon coast the island's 9,000-foot peak is visible from the African mainland. Bantu-speaking Africans sailed to it and settled it from the mainland long before Portuguese contact in 1472.

One key factor in western Africa's maritime isolation from Europe was the Canary Current, a strong, swift, cold-water current flowing south past present-day Morocco and Mauritania. The current is strongest north of the Cape Verde Peninsula, which deflects part of the current west toward the Cape Verde Islands and the Americas. Europeans who sailed coastwise south with the current were unable, even in their large sailing ships, to return the same way against the prevailing winds and waters. Only by first sailing hundreds of miles west into the open sea could they avoid the Canary Current and return to Europe under sail. For Africans, canoe travel north of the Cape Verde Peninsula was physically grueling and economically pointless. The Canary Current opposed their progress, and the wind blew toward the open sea. African mariners exploring in that direction would have paddled furiously against the current in order to advance slowly past an empty desert of fog-shrouded beaches and dangerous reefs. The isolation imposed by the Canary Current is a key reason medieval western Africa was linked to Europe not by oceanic routes around the bulge of Africa but through the Sahara Desert via camel-based caravans.

The way in which western African seafarers in Senegambia and the Upper Guinea coast (present-day Guinea-Bissau, Guinea, Sierra Leone, Liberia, and Ivory Coast) linked their canoe-based networks to the trans-Saharan trade has been detailed. The sailors knew the coast well, fishing miles off the coast during the day and coming back to shore at night. The coast was characterized by daunting currents, dangerous reefs, sharp volcanic rocks, and shifting sandbars. The strong Guinea Current pushed consistently southeast, but during the rainy season it weakened and the winds reversed, making coastwise travel to the northwest easier. African merchants in this region would travel southeast to secure cargos

of kola nuts and then journey back northwest, turning inland up rivers such as the Gambia or Senegal to network with the Sahara-based trade.

On the Upper Guinea coast the canoe men were from a variety of small ethnic groups such as the Biafada and Kru, and they traveled upriver to trade with Mande-speaking caravan merchants. Farther west along the coast, in modern-day Ghana, the canoe men were Fante. Still farther west, in modern-day Nigeria, the creeks of the Niger Delta were inhabited by Ijaw. Ijaw in the Niger Delta specialized in fishing and salt boiling in coastal mangrove swamps unsuitable for agriculture. They then exchanged salt fish for agricultural products that traders brought down the Niger River in large canoes from hundreds of miles in the interior.

South of the Congo River there is less evidence for seafaring in the service of long-distance trade. Along a vast extent of central and southern Africa, extending from the Congo River on the Atlantic Coast around the Cape of Good Hope (in present-day South Africa) to present-day Mozambique, where the Swahili trade begins, evidence of seafaring generally is more modest. Here, seafaring seems to have served primarily fishing and local and regional trade. Coastal peoples made salt and fished, exchanging these products for farm produce from the interior.

In much of southern Africa high escarpments impede movement to the interior. River navigation is interrupted by waterfalls within 30 miles of the ocean on the Congo and on most rivers south of it. Congo River canoe traffic resumed upriver above the falls to serve the inland trade, but cargo had to be portaged around the falls. With few exceptions, coastal plains in southern Africa are narrow and hemmed in by mountain escarpments, which quickly climb several thousand feet. Eventually, the coastal scene becomes inhospitable desert. In parts of southern Africa much of the population lived inland, and much of the economic activity was centered there.

Events after 1400 foreshadowed changes to come. The Chinese fleet under Admiral Zheng He made seven journeys to the outside world in the 1400s—the fourth voyage of 1413 to 1415 reached the Swahili coast. But the Chinese presence was short-lived. Portuguese exploration in the 1400s had a more durable impact, because Portuguese trading ships identified profitable markets and began to appear regularly on the African coast. As the Portuguese presence grew, the contact resulted in new trade relationships, with some Portuguese traders marrying into local communities. The children of these marriages, fluent in local languages and with kinship ties to coastal African communities, were well suited to sail and trade on the African coast.

Historians have never confirmed the Arab historian al-Umari's report of a large Malian sea voyage in the early

1300s. In al-Umari's histories the Malian ruler Mansa (king) Musa asserted that his own predecessor on the throne had dispatched a convoy of 200 ships to explore the sea off the coast of western Africa. After a single ship came back, the king assembled an even larger convoy and joined it on a second exploration, from which no one returned. Al-Umari's history recounts this event, but no evidence has been found to corroborate it.

THE AMERICAS

BY LAWRENCE WALDRON

In ancient times Amerindians had proved themselves the ablest of small-craft mariners. They traveled enormous distances in simple canoes without so much as outriggers or sails. American geography may have aided in their coverage of such vast areas in that the Pacific Coast of the Americas presented an almost unbroken line from Alaska to Argentina. Only occasionally would choppy seas and powerful currents have impeded the exploration and settlement of the Americas by sea. Paleo-Indians, the first settlers from Asia, traveled the entire length of America in the early centuries after their arrival. Knowledge of coastal features, routes, and seasonal variations gained on these ancient journeys would have been retained in oral, ritual, and practical traditions. Some of these may have been passed down well into the Common Era.

Modern archaeologists have discovered widespread contacts between different Common Era cultures up and down the western regions of the Americas. Ethnicities along the coast of the Pacific Northwest, western Mexico, and Pacific South America have all left archaeological evidence that they traveled far beyond their territories in search of whaling, fishing, and trading opportunities and were aware of one another. With land almost always in their sight and with the sun, moon, and stars as their guide, Native American seamen in swift and maneuverable vessels were able to ply the Pacific and the Atlantic coastlines. Coastal boating was often circuitous, with travelers going back and forth along known littoral, or seashore, passages in response to seasonal needs.

While their small watercraft were never used for carrying them beyond the American landmasses out into the high seas, Common Era Amerindians established a widespread network of maritime trade that reached from arctic Alaska to tropical Guatemala to alpine Bolivia and many regions between. Thanks to river travel and maritime seafaring, the people of the Americas were afforded at least intermittent access to resources from one of the widest varieties of natural environments on earth. Kingdoms and empires that had never met face to face were thus able to export and import

animal and marine products, semiprecious stones and precious metals, herbal and mineral medicines alongside various cultural, religious, and social influences.

Although the Indians on the coast of British Columbia, the Jalisco in western Mexico, and the Maya in Yucatán all developed distinct seafaring strategies, most water travel in the Americas was confined to inland freshwater. Rivers, lakes, marshes, and swamps were the most common freshwater and mixed-water environments. A range of watercraft was developed in response to the varied conditions of these waters, from vessels made of skin to dugout canoes, log rafts, and wooden boats.

Navigation on rivers was often merely a matter of maintaining mental maps of river courses, whereas wider-ranging open-water travel employed stellar, solar, lunar, and barometric navigation. Knowledge of the various constellations and their positions in the sky from season to season was a customary part of many native religious and seafaring traditions. Likewise, the movements of the sun and phases of the moon were expertly tracked by both landlocked and aquatic travelers. Awareness—sometimes used in the hunt—of seasonal changes in wind direction and of the varieties, speeds, and densities of cloud cover were also part of the seaman's toolkit. The keen observation and memorization of all these factors enabled seafarers to maintain their orientation amid powerful tides and currents, disorienting battles with large ocean mammals and rough seas, and even bad weather.

Since both the Maya and, later, the Aztec used paper for making books and other documents, it is possible that their mariners drew maps and star charts. However, no such examples seem to have survived the book burnings of the Spanish conquest. Colonial era Christian friars would have appreciated immediately the link between Indian astronomy and native religion and thus destroyed these symbols of the ideological systems they were competing with. In destroying them, they also erased any inscribed evidence of the specifics of Amerindian navigation. Nevertheless, cave art, stelae, ceramics, textiles, folktales, and monumental architecture all retain a partial record of Amerindian stellar constellations and their cultural significance to groups such as the Inuit, Chumash, Anasazi, Maya, Tupinamba, and Inca, among dozens of other ethnicities.

Navigation on the North American Great Lakes, the swamps and estuaries of Mexico, Andean lakes and ponds, and other bodies of inland water was accomplished by simple sighting of landmarks. However, when navigating on long trips out to sea in search of whales and fish, Northwest Coast and Andean mariners used their intimate familiarity with the species of marine and avian life that marked certain distances from land as well as key latitudes, water depths, and

water temperatures, all of which helped them approximate their bearings.

With the growth of such massive civilizations as the Mississippian, Maya, Toltec, and Aztec, there was an increased need for conquest, tribute, and long-distance trade. While much of this trade was done on foot, a large part was also done by boat, whether up and down the great rivers or along the coasts of the Gulf of Mexico and around the Caribbean. Large dugout canoes, able to carry dozens of people and tons of goods, were the favored vessels. Depending on their size, dugout canoes were equally well suited to the many turns and tangles of eastern Mexico's estuaries as to the open-water ferrying of passengers and goods between Yucatán and its offshore islands. Smaller canoes were favored for passage on the great Central American rivers, especially in areas where water depth varied with the seasons or because of rocks and rapids.

While Maya contact with the Mississippian cultures from Louisiana to Florida remains largely unproved, Maya canoeists have left evidence of their seafaring in most other regions around the Caribbean. Maya trading canoes occasionally ventured far into the Caribbean, and there is evidence of contact between Yucatán Maya traders and the Taíno kingdoms of the Greater Antilles. In order to cross the Yucatán Channel into the Caribbean islands, Maya canoe traders braved powerful currents, which threatened to sweep them north and trap them in circular tides between North America and northern Cuba. Their expertise at open-water canoeing is borne out by the various jade objects, honeycombs, and other uniquely Central American objects found on islands from Cuba to Antigua, all appearing to have arrived there from Guatemala and Yucatán. Likewise, Taíno objects have been found in Mesoamerica, including a carved spatula found at Altun-Ha in a Maya grave in Belize. This means that canoe travel between Yucatán Maya and the Caribbean Taíno was bilateral.

The Caribbean objects found in Mesoamerica testify to a much wider maritime connection between three separate regions of the Americas, namely Central and South America and the Antilles. As Maya traders disembarked from their dugout canoes on the coasts of western Cuba sometime in the first millennium, they united most of the Americas through maritime trade for a brief moment in history. In this encounter formidable canoeists from Mesoamerica would have encountered their counterparts from the Caribbean kingdoms. These Caribbean Indians were, in fact, the descendants of accustomed seafarers who had arrived in these islands three millennia before from South America and who had maintained indirect trade contact with the South American mainland.

The Taíno and Maya were not the only boaters plying the Caribbean. In the latter days of the great Taíno kingdoms, Carib canoeists arrived in the Caribbean from the Guianas, paddling the largest canoes in the region around the Caribbean. According to Columbus and other early Spanish explorers, some Carib canoes held up to 100 people. It was no comfort to the Taíno *caciques* (chiefs) that many of these canoeists were, in fact, fearsome warriors intent on making inroads into their territory. The Carib expansion out of the Orinoco-Amazon littoral was the last major marine migration of Indians before the conquest of the Americas and in the Greater Antilles; their arrival predated that of the Spaniards by only two centuries.

Although many parts of the Andes and coastal portions of eastern South America are known to be among the driest areas on earth, the people in these regions of present-day Ecuador, Peru, and Bolivia became adept seafarers in order to search for food. While their landscape could be arid and precipitous, the cool waters off the coasts of these countries provided the best fishing resources in the Americas. Towns and cities located far inland maintained either direct political control over fishermen on the coast or otherwise sought to establish long-term trade partnerships that gave them access to rich coastal food sources, such as anchovies, shellfish, turtle meat, and eggs.

The Manteño and Huancavilca seafarers of Ecuador used balsa-wood boats to sail far out to sea in search of spondylus shells for use in their religious rituals. The Ecuadorian mariners were also known to have sailed as far north as western Mexico on trade expeditions for their imperial lords in Moche and Inca Peru. Moche boaters or seafaring ethnicities in Moche employ often facilitated long-distance pilgrimages up and down the Pacific Coast with their cleverly bundled reed boats. Such vessels were also used on shorter runs to the islands off the coasts where bird and bat droppings (guano) were gathered to be used as fertilizer back on the farms in the mountains and foothills. Before European contact, the Inca inherited many customs and overseas pilgrimage routes from the seventh-century Moche and earlier civilizations. Throughout their empire, royal entourages arrived at the traditional holy sites (*huacas*) with offerings of shells, ceramics, and other materials they had brought down the coast from Cuzco in reed boats.

ASIA AND THE PACIFIC

BY ROBERT BOLLT

In the Middle Ages, China was a world leader in seafaring and navigation. During the Han Dynasty (202 B.C.E.–220 C.E.) the Chinese developed their own type of sailing ves-

sel, known as the junk, and began making long-distance ocean voyages in the first centuries of the Common Era. The stern-mounted rudder seems to have been invented around the first century; the device was more effective for steering than using oarsmen for that purpose. These sturdy sailing ships employed stern-mounted rudders long before the Western world adopted them. Before the development of the compass in the 11th century, Chinese seafaring relied, as it had for thousands of years, upon the monsoon winds, which blow north in the summer months and south in the winter months. Dead reckoning was a principal means of navigation. It is the process of estimating one's present position by keeping a record of the ship's movement, that is, the course and speed from its last position. The ship's initial position usually was obtained by a fix on an object on land. Dead reckoning also was used to predict future positions by projecting course and speed from its present position. It provides only an approximate position, as it does not take into account the effects of currents, errors, and other external factors. The scientist Shen Kuo (1031–95) first described a magnetic needle compass and its importance for navigation by the discovery of true north. Slightly later we have descriptions of a new type of junk that contained separate watertight bulkhead compartments, which safeguarded the ship against sinking if one compartment happened to be breached.

The medieval Chinese Tang (618–907) and Song (960–1279) dynasties saw considerable seafaring activity. Prior to that time Chinese seafarers had been venturing into Southeast Asia and even the Indian Ocean for centuries. (In insular Southeast Asia seafaring had, of course, been a way of life for many thousands of years.) Chinese merchants would travel first to Southeast Asia and then into the Indian Ocean, even venturing as far as the Middle East and the Red Sea. China traded with Malaysia, India, Sri Lanka, the Arabian Peninsula, Egypt, and Ethiopia. Chinese descriptions of trade routes into East Africa date from the eighth century. In turn, Chinese ports hosted mariners from all over, as far west as Morocco; Muslim travelers visited China in the late first millennium.

It was the Ming Dynasty (1388–1644), however, that saw the most dramatic advances in Chinese exploration. From 1405 to 1433 the government sent out a series of the largest exploratory expeditions the world had ever seen. The Chinese admiral Zheng He commanded these fleets, which consisted of hundreds of ships and thousands of sailors. Zheng He sailed to the Indian Ocean seven times, with the goal of establishing a Chinese presence abroad and securing imperial control over trade. The massive nine-masted treasure ships that comprised much of his fleets were the largest vessels ever developed on earth up until that time.

The first three voyages visited Southeast Asia, India, and Sri Lanka (then called Ceylon), the fourth went as far as the Persian Gulf and the Arabian Peninsula, and the remainder ventured into East Africa. Zheng He brought back to China such exotic animals as giraffes to adorn the Ming gardens as well as emissaries from foreign lands. With the seventh voyage of the treasure fleet, Ming exploration abruptly ceased. Zheng He himself died during the expedition and was buried at sea. While these missions could have resulted in unprecedented Chinese expansion abroad, the Ming Dynasty did not find much of value outside China and was content to maintain trade with its nearest neighbors (Southeast Asia and Japan) instead, as the country had for centuries. The ships were left to rot and fall to pieces in harbor. In fact, many of Zheng He's charts were deliberately destroyed; eventually, the technology of the ships was forgotten as well.

In the Middle Ages trade between Japan and China was well documented. In the mid-first millennium the Japanese had little experience in long-distance voyaging and navigation, but they gradually improved their skills and technology to trade items such as silk, porcelain, sandalwood, and tea. Chinese ports with trading links to Japan were Ningbo and Hangzhou; Japan also traded with Korea during the Three Kingdoms Period (ca. 300–670) and with the Ryukyu Islands. (Influence from both China and Japan have shaped the unique Ryukyu culture.) Japan continued active trade with its neighbors until the advent of the Tokugawa Shogunate in 1600, when the country effectively shut itself off from the outside world—though limited exchange did occur, especially with the Ryukyu Islands.

Piracy was another form of Japanese seafaring that was prevalent from the 13th century until the Japanese invasions of Korea in the late 1500s. During this turbulent period of civil strife Japanese pirates raided Chinese, Koreans, and even Japanese coastlines and ships. These pirates, known as *Wōkō* (Japanese bandits), flourished for more than 100 years. Pirate activity concentrated on the Korean peninsula. Japanese piracy became enough of a problem for the Chinese Ming Dynasty to construct coastal fortifications, develop divisions of antipirate troops, and impose sanctions on trade with Japan. They were also a major incentive for Korea to maintain a navy.

Another important player in the medieval world of seafaring was India. Indian ports and merchants were a vital link in the spice trade between the Middle East and Southeast Asia in the late first millennium. Important spices included musk, ambergris, camphor, and sandalwood. Indian cultural influence on the islands of Java and Borneo fueled the demand there for incense. The Moluccas of northern Indonesia and the southern Philippines were known as the Spice

Islands. In the Middle Ages they were the sole source of such valuable goods as mace, clove, and nutmeg, commodities that had been circulating into India and the Arabian Peninsula for centuries, dating to ancient times. Arabic influence there became stronger after the 1300s, as China's Ming Dynasty interest in long-distance trade waned. In addition to Islam, Arabic influence also brought with it the sultanate form of government, which replaced local chiefdoms. Spice Islands products first passed through India and Sri Lanka before making their way to the Arabian peninsula and the Persian Gulf and then sometimes into East Africa.

By around 1000 the last great human expansion on Earth was taking place—the colonization of the eastern Pacific by the Polynesians. Originating in western Polynesia (Samoa, Tonga, and Fiji), which had been colonized by around 1000 B.C.E., the Polynesians, for reasons that are unknown, expanded into the eastern Pacific and colonized the islands there only around 2,000 years later. They then proceeded to settle virtually every island in the eastern Pacific. At the margins they settled remote Hawaii, New Zealand, and Easter Island. The South American sweet potato throughout eastern Polynesia in prehistory is one line of proof that Polynesians reached the continent and brought this tuber back with them, and it is possible that they reached North America as well.

The Polynesians were remarkable because they navigated throughout the vast eastern Pacific Ocean using only natural means (the sun, stars, waves, currents, birds, and winds), in what were probably large double-hulled sailing canoes equipped with cultigens and domesticated animals (pigs, dogs, and chickens) for settlement. It is due to their incredible skill in traversing long distances of empty ocean that the Polynesian are often considered to have been the greatest seafarers and navigators ever.

No one island or archipelago in eastern Polynesia can be proved to have been the earliest settled. Dates from the earliest sites are nearly identical. The period of around 1000 to 1450 is generally known as the Archaic Period, during which similar artifacts, such as fishhooks, ornaments, and adzes, were made and used throughout East Polynesia. This homogeneity is attributed to exchange via long-distance voyaging, when settlers would try to obtain as many necessities as possible from their original homes and elsewhere. Oral traditions speak of long-distance voyages between islands and archipelagos, and archaeological evidence continues to confirm this. Long-distance voyaging was essential not only for survival but also to maintain a sense of identity with one's ancestral place of origin. However, after about 1450 archaeologists note a distinct drop in exotic goods and believe that interaction gradually declined as populations became more self-sufficient.

While we do not have written documentation for these events, archaeologists can trace stone tool material to its parent source, which is sometimes hundreds and sometimes thousands of miles from where it was later found. By the time of European contact many islands of Polynesia had completely lost touch with even their nearest neighbors. Elsewhere in the Pacific, the Torres Strait Islands off the coast of Australia link the continent with New Guinea. The islands around the northernmost tip of Australia, Cape York, have been home to aboriginal seafarers since time immemorial. The many islands of Melanesia and Micronesia have similarly been practicing long-distance seafaring and traditional navigation for thousands of years, for which there is archaeological evidence of trade before, during, and after what we refer to as the Middle Ages.

EUROPE

BY DETLEV ELLMERS

Seafaring is the use of boats and ships on the ocean for fishing, for transport of goods or passengers, for hostile actions, or for combinations of several purposes. Ports and harbors along the coasts act as interfaces, which on the one hand are connected by sea routes and on the other hand provide access into their hinterlands by rivers and roads. Navigation is the method of getting from place to place across water that seems to be featureless.

On the coast of western Europe seaports were urban, but along the North Sea and Baltic coasts harbors were rural. Angles and Saxons from the southern shores of the North Sea raided and settled in England from the third to fifth centuries using mere rowing boats. The Vikings, using sailing vessels, raided nearly all European shores beginning in the eighth century. Seagoing ships were the most cost-effective means of transportation, and maritime trade became increasingly the motive for medieval seafaring. By the eighth century seasonal beach markets in rural areas had grown into maritime trading centers. By the 12th and 13th centuries many of these maritime centers had become the urban seaports of the Hanseatic League (an alliance of trading guilds), and in these northern regions seafaring was an urban profession.

The men who sailed the ships or cared for them settled their families at the seaports. Skippers had their ships built to order and hired their crews. A typical crew for a Bremen (Germany) ship in the late 14th century consisted of 10 men: a helmsman, a cook, and eight sailors, working in two watches. Such a ship was provisioned with rusk, a kind of hard and crisp bread, as the main food, along with salted meat, smoked bacon, salted herring, stockfish, dried legumes, groat, and beer for the crew, with better beer reserved for any officers

and guests. French and Mediterranean crews drank wine instead of beer. Fresh water and fresh vegetables could be taken on at intermediate harbors that were reachable within a few days. Originally the skipper and merchant were the same person; by about 1300, however, merchants began to stay at home, ordering merchandise by letter from many different places at the same time, and skippers were turned into mere carriers.

Fishing and trading ships gradually extended their voyages. In the 13th century Hanseatic ships sailed the North Sea and Baltic, and Italian ships stayed in the Mediterranean. A century later Hanseatic ships voyaged out to Iceland and down to Vizcaya in Spain, while Venice and Genoa sent great galleys north to Flanders. Also in the 14th century urban Dutch fishermen began using bigger ships to engage in deep-sea fishing for herring. By the 15th century the Portuguese, seeking trade with India, sailed along the western coast of Africa and reached their aim in 1498, while the Spaniards crossed the Atlantic in 1492 and established trade with America.

In general, medieval ships sailed within sight of the coastline. Sailors recognized where they were by means of natural landmarks on the shore, such as promontories, hills of specific shape, trees, or the mouths of rivers. Man-made landmarks—grave mounds in early medieval Scandinavia and England and church towers in Christian Europe—served the same purpose. Sailors also added special marks. In Scan-

dinavia they built stone piles, and in the late Viking Age wooden beacons marked inlets to harbors. On the Continent the first wooden beacons appeared in 1225. Later, stone towers were erected. In the Mediterranean lighthouses seem to have been used without interruption since Roman times. Farther north, coastal beacons and towers got lanterns—in England in the 13th century and in the Baltic in the 14th century. At this same time, floating seamarks were added as navigational aids. To maintain these seamarks port authorities collected taxes from incoming ships.

On the ship itself the lead remained the most indispensable nautical instrument. It was used for measuring the depth of the water and for bringing samples up from the seabed as additional clues to orientation. Along the Atlantic coast and in the English Channel and the North Sea, sailors carefully watched the tidal streams and waited until these streams could carry them into or out of harbors, most of which were situated upstream of rivers. Medieval ships, which could not cruise very well against the wind, had to wait until it blew in the necessary direction. When a storm threatened, the skipper had to find a safe berth as quickly as possible in the shelter of a promontory, island, or river inlet. It was necessary for him to know all the berths along his course that could give shelter against a gale approaching from any possible direction. Knowledge was passed down orally to younger sailors.



Brass trumpet, thought to have been used for signaling ship to ship at sea, 14th century (© Museum of London)

Early medieval ships could reach coasts beyond the horizon only by watching the North Star on starlit nights. This limited their distance to what they could sail in one night. Those who wanted to sail from Jutland or Norway to the British Isles could not cross the North Sea directly but had to follow the Frisian coast. It was the Irish hermits who managed to move from one island to another far out into the Atlantic and in so doing started deep-sea navigation. In the late eighth century Norwegian Vikings for the first time directly crossed the North Sea to raid coastal settlements in northern England. In contact with Irishmen they developed deep-sea navigation, settled Iceland (in 870) and Greenland (in 985), and about 1000 reached America.

To cover the long distances between the islands, they needed a favorable wind that would direct them to their aim. This meant that the weather vane on top of the mast became a necessary nautical instrument. Before starting, they had to estimate that the wind would blow constantly in the same direction for 12 to 24 hours in small seas and up to seven days in wide seas. About 1240 the first mention is recorded of using a magnetic stone to navigate to Iceland. An iron needle was inserted in a straw, magnetized by the stone, and left to float in a water-filled bowl, where it would always point to the north. With this rough compass sailors knew where north was even in the daytime or on cloudy nights when the North Star was not visible.

Italian sailors in the 13th century combined three elements into a more advanced system of navigation. First, they converted the magnetic needle into a real compass, with a compass card divided into 32 directions that was fixed to the needle to turn with it. By watching this compass the helmsman could steer a straight course in any of the 32 directions. While steering with 32 directions is less precise than using the modern compass of 360 degrees, in European waters this lack of precision did not matter, since after a few days land became visible and the course could be corrected. Second, the Italians used written sailing instructions with compass courses and distances from one harbor to the other. Third, the multitude of compass courses enabled them to transfer these sailing instructions to the first nautical charts, the so-called portolan (from the Latin *portus*, meaning "port") charts of the Mediterranean, which show a spiderweb of compass courses instead of latitudes and longitudes. This three-part system turned out to be a most important step forward in navigation. In the 15th century the Portuguese and Spanish used the system as the basis for the deep-sea navigation of their discovery expeditions. At the same time, in the North Sea and Baltic Sea only two elements of the system were adopted: the compass and written sailing instructions. The first nautical chart was not created there before 1543.

THE ISLAMIC WORLD

BY MUHAMMED HASSAN ALI

Ships had sailed the Mediterranean Sea since ancient times. The Romans had controlled virtually all the lands surrounding it, turning it into a highway of commercial activity. But by the Middle Ages this control had divided, with Muslims influencing the lands east of the Mediterranean while Europe held sway over the lands west of the Mediterranean. This dynamic turned the Mediterranean highway into a frontier. The early Muslims lacked seafaring knowledge and relied on the Copts, Syrians, and Greeks recruited from the coastlands of the conquered provinces to sail their ships.

In early medieval time the Fatimids built a new capital Cairo to rival Baghdad. Cairo was not only a strategic center but also an inland port providing the Nile traffic a gateway into the Mediterranean. It also became a major transshipment point between the Mediterranean and the Southern Seas, eventually overshadowing the port at Alexandria. At the beginning of the first millennium, the Fatimid navy controlled both the Red Sea (as far south as Yemen) and the eastern Mediterranean seaways. At its height Fatimid naval power was respected from Sicily to Sind.

Muslim conquest consolidated the lands around the Red Sea and Arabian Sea, thus bringing stability to that region. The Tang Dynasty (618–907) brought stability to China, and as a result commercial activity in the Indian Ocean benefited. Muslim and Chinese ships plied the sea so regularly that a number of handbooks were written that provided detailed accounts of ports, sea routes, navigational references, and information about the cultures of the various inhabitants that might be encountered. Ships brought goods from as far away as India and China to the Muslim capital of Baghdad along the Tigris.

Initially the ships sailed close to land, always keeping the shoreline in sight. While this is a relatively safe practice, it results in a longer voyage than a straight ocean passage. The Muslims were familiar with using the stars to navigate across the featureless desert and brought similar techniques to seafaring. Their contributions opened the way to sailing across the ocean and greatly reduced the time it took to get from one point to another. Scheduling the voyage to coincide with favorable monsoon winds reduced the time even further.

Relying on the monsoon winds of the Indian Ocean, Muslim merchants sailed regularly from Arabia to China and back. From October to May the favorable northeast trade wind and strong southwesterly current sent many Arabian dhows south with date harvests. When the strong southwest trade wind blew from June to September, the dhows sailed home again to Arabia on the northern current. The ships carried peanuts and sesame from Sudan; textiles and vegetables

from Egypt; sheep from Somalia; and coffee, wheat, sorghum, and raisins from Yemen. Hundreds of dhows docked every day to unload or transship goods at ports like Al Hudaydah (northern Yemen), Hadramawt (southern Yemen), Mogadishu (Somalia), and Suez.

The Arabian Gulf, which was relatively easy to navigate, provided another route linking Arabia to India. Small boats could sail along the coastline, always keeping the shore in sight. The voyage could be made without knowledge of the stars and was not dependent on the monsoon winds. The discovery of the sea route between the Arabian Gulf and China was an event equal in importance to the discovery by the Portuguese of the sea route to India. It was one thing to cross the Indian Ocean with the monsoon to Gujarat or the Malabar coast or even to sail south of Sri Lanka and turn north to the Bay of Bengal or east to Malaya—but it was quite another to make the far longer voyage to Canton through a lesser-known sea with its own pattern of winds, to say nothing of the perpetual danger of piracy and the typhoons of the South China Sea. Still, in early Islamic times, direct sailing to Canton via the Arabian Gulf seems to have been common practice. The *bahr al-hind* (Sea of India) or the *bahr al-sin* (Sea of China), as the Indian Ocean was often called, was thought to have been made up of several different seas, each with its own unique characteristics.

The first full description of the use of the magnetic compass for navigation in the Muslim world was by Baylak al-Qibjaqi in his *Kitab kanz al-tujjar fi marifat al-ahjar* (Treasure Book of Merchants in Travels), written in Egypt in 1282. He describes the floating compass, which was a magnet embedded in wood in an assembly typically shaped like a fish. The “fish” was put in a bowl of water, whereupon it would align with the meridian. These designs were often sealed with tar or wax to make them waterproof as they floated on water. There was also the dry compass, which consisted of two magnetic needles attached to opposite sides of a disk. The disk rested on a funnel in a way that allowed it to pivot about its axis. The disk and funnel were placed in a box, which was then sealed by a plate of glass that prevented the disk from dropping.

Fixing a position at sea and setting a course out of sight of land was done by determining the ship’s latitude. Another method of measuring the polestar’s height above the horizon was by using the *kamal*. The *kamal* was a small rectangle of wood attached to a cord that was calibrated by knots along its length. Each knot represented the latitude of a particular port. The navigator held the cord in his teeth at a certain knot and held the *kamal* at eye level at the cord’s full length, aligning the lower edge of the rectangular plaque with the horizon. When the upper edge intersected the polestar, the ship was on the latitude of the desired port. Distance east and west was

SINBAD’S WORLD

There are seven adventures of Sinbad the sailor in *One Thousand and One Nights*, often called *The Arabian Nights*. Much of the content of the tales about Sinbad derives from other literary sources, primarily from Greek literature, but other aspects of the tales reflect the seafaring of the medieval Islamic world. The locations in the tales suggest the city-states of East Africa and the seas of southern Asia. Sinbad’s home was Basra, a city on the river Shatt-al-Arab, about 75 miles north of the Persian Gulf. An island in the river is still called Jazirat as-Sindibad, meaning Sinbad’s Island, where he supposedly lived when he was not at sea. The plot of the fourth voyage of Sinbad seems to be taken from a couple of Greek sources, but its descriptions of a narcotic that could have been made from hemp suggest that its locale was India. In the fifth voyage the Old Man of the Sea rides Sinbad with his legs twisted around Sinbad’s neck, a practice derived from masters’ riding of slaves in Africa. Sinbad also encounters apes, suggesting the locale is Africa. In the sixth voyage Sinbad visits Serendib, or Sri Lanka.

Basra was a city of wonders in medieval times. Most of its residents were Shia Muslims, but there were sizable minorities of Sunni Muslims, Orthodox Christians, and Madean Gnostics. On any day one could venture into the city’s markets and see people from Christian Europe, al-Andalus, North Africa, sub-Saharan Africa, Bulgaria, India, Sri Lanka, Malaysia, Indonesia, and China, each garbed in his or her national dress. Local agriculture brought livestock, dates, rice, wheat, millet, and barley to the city. Sinbad was a wealthy man, because of the riches he brought home with him from his voyages, and he would have lived in a tall city house of stone and brick, with high ceilings of brick on the first floor and of wood on the others. The outside would be plain except for a door of fine wood opening on an alley. His living quarters on the second and third floors would have been filled with rugs, pillows, and other textiles, where he and his wife from the seventh voyage would have had privacy. The fourth floor would have entertained guests, and its windows would have opened on narrow streets teeming with activity.

measured by time, not in hours but in *zam*, three-hour increments—the length of a watch on board—measured by the burning of a standardized stick of incense.

Astrolabes (also called “the mathematical jewel”) could take altitude measurements of the sun, tell time during the day or night, or find the time of a celestial event (like sunrise, sunset, or the culminant or zenith of a star). These astronomical and analogue computers of their time are two-dimensional models of the heavens. A highly sophisticated form of the astrolabe was developed in the 11th century in Toledo, Spain. The universal astrolabe was a breakthrough because it could be used in any location (previous ones had been designed for a specific latitude and longitude locations).

The earliest evidence for the existence of a navigational calendar is an almanac compiled in 1271 by al-Malik al-Ashraf. It is an example of how knowledge from disparate lands was amalgamated into a coherent whole. The almanac contains Syriac months as well as Persian months. The equinoxes, solstices, and prominent stars are designated according to the Bedouin system. Measurements of shadow lengths throughout the year are included. The days are marked to allow correlation with the Roman Julian calendar. It also has useful information on times to sow and reap, on insect pests,

healthy and unhealthy seasons, and so on. It included the dates of departure and arrival of ships from India, Qalhat, Hormoz, al-Shihr, Mogadishu, and Egypt. The entries in the almanac reveal a highly synchronized system of regular shipping and interregional trade that was also tied in with the oceangoing merchant convoys.

Ahmad ibn Majid (b. ca. 1432) was a master navigator and knew virtually all the sea routes from the Red Sea to East Africa and from East Africa to China. His navigational knowledge was compiled in his book *Kitab al-fawaid fi usul ilm al-bahr wa l-qawaid* (Book of Useful Information on the Principles and Rules of Navigation), written in 1490. Among the topics addressed is the history and basic principles of navigation, the difference between coastal and open-sea sailing, star positions, accounts of the monsoon and other seasonal winds and typhoons.

See also ASTRONOMY; CALENDARS AND CLOCKS; CLIMATE AND GEOGRAPHY; ECONOMY; EXPLORATION; HUNTING, FISHING, AND GATHERING; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MINING, QUARRYING, AND SALT MAKING; SHIPS AND SHIPBUILDING; STORAGE AND PRESERVATION; TRADE AND EXCHANGE; WAR AND CONQUEST.

Europe

Excerpt from *The Travels of John de Marignolli* (1339–53)

There is ZAYTUN also, a wondrous fine seaport and a city of incredible size, where our Minor Friars have, three very fine churches, passing rich and elegant; and they have a bath also and a *fondaco* which serves as a depot for all the merchants. They have also some fine bells of the best quality, two of which were made to my order, and set up with all due form in the very middle of the Saracen community. One of these we ordered to be called Johannina, and the other Antonina.

We quitted Zaytun on St. Stephen's day, and on the Wednesday of Holy Week we arrived at Columbum. Wishing then to visit the Shrine of St. Thomas the Apostle, and to sail thence to the Holy Land, we embarked on board certain junks, from Lower India which is called Minubar. We encountered so many storms, commencing from St. George's Eve, and were so dashed about by them, that sixty times and more we were all but swamped in the depths of the sea, and it

was only by divine miracle that we escaped. And such wondrous things we beheld! The sea as if in flames, and fire-spitting dragons flying by, and as they passed they slew persons on board the other junks, whilst ours remained untouched, by God's grace, and by virtue of the body of Christ which I carried with me, and through the merits of the glorious Virgin and St. Clare. And having brought all the Christians to penitential mourning, even whilst the gale still blew we made sail, committing ourselves to the Divine guidance, and caring only for the safety of souls. Thus led by the Divine mercy, on the morrow of the Invention of the Holy Cross we found ourselves brought safely into port in a harbour of Seyllan, called PERVILIS, over against Paradise.

From: Sir Henry Yule, *Cathay and the Way Thither: Being a Collection of Medieval Notices of China* (London: Hakluyt Society, 1913–1916).

The Islamic World

~ *The Seven Voyages of Sinbad the Sailor: Excerpt*
from the Sixth Voyage (ca. 800–ca. 1400) ~

Compelled by Fate and Fortune, I resolved to undertake another voyage, and, buying me fine and costly merchandise meet for foreign trade, made it up into bales, with which I journeyed from Baghdad to Bassorah.

Here I found a great ship ready for sea and full of merchants and notables, who had with them goods of price, so I embarked my bales therein. And we left Bassorah in safety and good spirits under the safeguard of the King, the Preserver, and continued our voyage from place to place and from city to city, buying and selling and profiting and diverting ourselves with the sight of countries where strange folk dwell. And Fortune and the voyage smiled upon us till one day, as we went along, behold, the captain suddenly cried with a great cry and cast his turban on the deck. Then he buffeted his face like a woman and plucked out his beard and fell down in the waist of the ship well-nigh fainting for stress of grief and rage, and crying, "Oh, and alas for the ruin of my house and the orphanship of my poor children!" So all the merchants and sailors came round about him and asked him, "O master, what is the matter?" For the light had become night before, their sight. And he answered, saying: "Know, O folk, that we have wandered from our course and left the sea whose ways we wot, and come into a sea whose ways I know not, and unless Allah vouchsafe us a means of escape, we are all dead men. Wherefore pray ye to the Most High that He deliver us from this strait. Haply amongst you is one righteous whose prayers the Lord will accept." Then he arose and clomb the mast to see an there were any escape from that strait. And he would have loosed the sails, but the wind redoubled upon the ship and whirled her round thrice and drave her backward, whereupon her rudder brake and she fell off toward a high mountain.

With this the captain came down from the mast, saying: "There is no Majesty and there is no Might save in Allah, the Glorious, the Great, nor can man prevent that which is foreordained of Fate! By Allah, we are fallen on a place of sure destruction, and there is no way of escape for us, nor can any of us be saved!" Then we all fill a-weeping over ourselves and bidding one another farewell for that our days were come to an end, and

we had lost an hopes of life. Presently the ship struck the mountain and broke up, and all and everything on board of her were plunged into the sea. Some of the merchants were drowned and others made shift to reach the shore and save themselves upon the mountain, I amongst the number. And when we got ashore, we found a great island, or rather peninsula, whose base was strewn with wreckage and crafts and goods and gear cast up by the sea from broken ships whose passengers had been drowned, and the quantity confounded count and calculation. So I climbed the cliffs into the inward of the isle and walked on inland till I came to a stream of sweet water that welled up at the nearest foot of the mountains and disappeared in the earth under the range of hills on the opposite side. But all the other passengers went over the mountains to the inner tracts, and, dispersing hither and thither, were confounded at what they saw and became like madmen at the sight of the wealth and treasures wherewith the shores were strewn. . . .

Then I fell to reproaching myself for my little wit in leaving my native land and betaking me again to travel after all I had suffered during my first five voyages, and when I had not made a single one without suffering more horrible perils and more terrible hardships than in its forerunners, and having no hope of escape from my present stress. . . . Then, sighing for myself, I set to work collecting a number of pieces of Chinese and Comorin aloes wood and I bound them together with ropes from the wreckage. Then I chose out from the broken-up ships straight planks of even size and fixed them firmly upon the aloes wood, making me a boat raft a little narrower than the channel of the stream, and I tied it tightly and firmly as though it were nailed. Then I loaded it with the goods, precious ores and jewels, and the union pearls which were like gravel, and the best of the ambergris crude and pure, together with what I had collected on the island and what was left me of victual and wild herbs. Lastly I lashed a piece of wood on either side, to serve me as oars, and launched it.

From: Richard F. Burton, trans.,
The Book of the Thousand Nights and a Night
 (Kamashastra Society of Benares, 1885).

FURTHER READING

- Ahmad al-Hassani and Donald Hill, *Islamic Technology: An Illustrated History* (New York: Cambridge University Press, 1992).
- Salim al-Hassani, *1001 Inventions: Muslim Heritage in Our World* (Manchester, U.K.: Foundation for Science Technology and Civilization, 2006).
- George E. Brooks, *Landlords and Strangers: Ecology, Society, and Trade in Western Africa, 1000–1630* (Boulder, Colo.: Westview Press, 1993).
- John F. Haslett and Cameron M. Smith, “In the Wake of the Ancient Mariners,” *Archaeology Magazine* (March/April 2002). Available online. URL: <http://www.archaeology.org/0203/abstracts/mariners.html>. Downloaded on September 27, 2007.
- George Hourani, *Arab Seafaring: In the Indian Ocean in Ancient and Early Medieval Times* (Princeton, N.J.: Princeton University Press, 1995).
- Archibald R. Lewis and Timothy J. Runyan, *European Naval and Maritime History, 300–1500* (Bloomington: Indiana University Press, 1985).
- John Middleton, *The World of the Swahili: An African Mercantile Civilization* (New Haven, Conn., and London: Yale University Press, 1992).
- Saudi Aramco World, *The Indian Ocean and Global Trade* (July–August 2005). Available online. URL: <http://www.saudiaramcoworld.com/issue/200504/default.htm>. Downloaded on October 9, 2007.
- Robert Smith, “The Canoe in West African History,” *Journal of African History* 11 (4) (1970): 515–533.
- Eva G. R. Taylor, *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook*, 2nd ed. (London: Hollis and Carter, 1971).
- Richard W. Unger, *The Ship in the Medieval Economy 600–1600* (London: Croom Helm, 1980).

► settlement patterns

INTRODUCTION

Settlement patterns are the expression on the landscape of societies’ ideas and values. They speak of what people valued in their economies, which sometimes is driven more by custom than by environment. For instance, lands in North Africa that for hundreds of years in the ancient world produced large crops of grains, vegetables, and fruits were changed from farmland to pastureland by Arab nomads, who valued their mobile pattern of life focused on the economics of herding, selling, and trading of domesticated animals, such as sheep, goats, and camels.

Settlement patterns further speak of social organization and shared social values. In some cultures the dominant settlement pattern was one of small settlements scattered across the land. Sometimes these settlements were composed of family groups, who lived in small clusters of houses near farmlands that they worked or pasturelands that they tended. Occasionally, the scattering was even less dense, with single

homes on land tended by a single family. In early medieval England the single homestead, standing apart from other homesteads, was the preferred pattern of people who had resisted the Roman emphasis on city life. At times, settlements consisted of several families who jointly controlled the land around the settlement, with individual people being apportioned control but not ownership of part of the land according to their need and often according to their social standing. Such was the custom in most of medieval central Africa and many of the rural areas of the Near East.

In addition to economic and social reasons, religion and politics played significant roles in drawing people to live in towns and cities. The economic concerns may be the plainest, because they were often stark. In times of famine, natural disasters, or epidemic disease, people often abandoned their rural dwellings to go to a city in the hope of finding work that would earn them food to eat and a place to live. In one of the ironies of settlement patterns, economics could cause the opposite to happen. For example, in much of early medieval Europe many towns and cities of the Roman Empire were almost abandoned because of an economic collapse that resulted in urban dwellers having no means of earning what they needed in order to survive. They fled to the countryside to try to farm to support themselves. Even the city of Rome, which had millions of inhabitants in the Roman Empire, fell to a population of thousands.

Towns and cities had significant social advantages over villages and other small settlements. One was that large settlements tended to attract more consumer goods than did small, scattered settlements. If a person were a specialist in a craft, living where traders and others congregated on market day could increase demands for his or her products. Further, a large settlement usually offered better defense than did rural areas, where it could take days or even weeks to pull enough people together to form an effective military force. There were cultures in the medieval world that survived primarily by stealing the results of the labor of others, and a walled city was a common recourse for defense against such cultures. In a densely populated settlement professional, full-time soldiers could congregate and be supported by some of the surplus of goods produced by town or city dwellers and nearby farmlands, usually extracted in the form of taxes. Sometimes a central government took care of the maintenance of the troops, as was usually the case in the Islamic world, but sometimes communities took it upon themselves to pay for a small group of warriors, as was sometimes the case in medieval Japan and in parts of Arabia in Muhammad’s time.

People also often congregated at centers of power. Centers of power could derive their authority from religion, politics, or both. In Europe and China monasteries and convents

could attract large numbers of monks and nuns and appeal to even larger numbers of pilgrims, attracted to the spiritual teachings of the monasteries and convents or by sacred relics housed in the religious complexes. The settlements built around religious centers could become prosperous. Some settlements became political centers of power. On occasion they were established, as Cairo was, to be an administrative center; in other instances a burgeoning population center became the logical place for people to meet to discuss matters such as mutual defense and law and order. Not only national capitals but provincial ones as well could attract people to work for the people in power, to serve in government posts, and to provide services for the government officials and other residents. Medieval Mesoamerica has examples of how some settlements combined both religious and political power, often in the form of kings who had supernatural abilities. The mix was dangerous, and one reason the Maya left their cities may have been that they believed that their monarchs had lost their supernatural powers.

AFRICA

BY JUSTIN CORFIELD

In the medieval period people speaking Afro-Asiatic and Nilo-Saharan languages inhabited the areas of northern Africa; Saharan Africa west of Chad; the Songhai Empire in what is today central Mali; and present-day Ethiopia, Eritrea, Somalia, Sudan, and northern Uganda. People speaking Niger-Kordofanian languages most of whom were Bantu, lived in western Africa, central Africa, and much of southern Africa, excluding modern-day Namibia, Botswana, and South Africa. The Khoisan people lived in the Kalahari Desert, South Africa, and isolated pockets in present-day Burundi and central Angola.

In northern Africa before the arrival of Islam, many Roman, Greek, and Phoenician influences were adopted in the towns and cities along the Mediterranean coast of Africa. These were all permanent settlements that either became more prosperous or declined as a result of politics or trade. The influence of the Romans is evident in the layout of most large cities in this region, with major civic buildings located in the center along with the market and often the military command post. Many of the Roman temples were replaced by or converted into Christian churches during the medieval period. Although in ancient times the cities typically had walls, by the fifth century Rome's control of the Mediterranean had been unchallenged for so many centuries that many of the walls had either crumbled from neglect or, because of urban expansion, no longer represented a line of defense. The Vandals' emergence as a power in what is today Morocco and

Algeria and their capture of Carthage in 439 prompted the refortification of many cities and the abandonment of more outlying areas as people sought refuge in walled cities. The Romans finally launched an effort to retake the region, and their defeat of the Vandals at the battle of Ad Decimum in 533 led to the decline of numerous cities and towns. Timgad and Bagai were abandoned, and Leptis Magna succumbed to the encroaching desert. The decline of these cities is evident by only one major civic building, the baths at Tunes (modern-day Tunis), being dated to the period of Vandal rule from the 430s to the 530s.

From the 530s the Romans tried to rebuild their former settlements, with their work focusing on the churches and civic buildings. A large church was constructed at Leptis Magna, and baths were built at Carthage in honor of the Empress Theodora (d. 548), marking a new confidence in urban life. That confidence lasted only slightly more than a century. As Islam spread throughout North Africa in the seventh century, the cities were remodeled.

Inland settlements were isolated and invariably located near oases along trade routes, with camel tracks linking many of them. More remote yet were settlements in the Sahara Desert near salt-mining areas, like Taghaza and Taodeni, around the borders of present-day Algeria, Mauritania, and Mali. Other remote settlements became prosperous in new ways. Zawila in the Fezzan of southern Libya, a place of refuge for the Islamic Ibadites, soon emerged as a center of the slave trade. These settlements tended to be made from stone or mud brick, with all the villagers living within a strong outer wall, making the place capable of withstanding an attack by parties of bandits, brigands, or people from neighboring settlements. The oasis or well was in the center of the settlement, along with a small market. The use of date palms to provide shade in these settlements is evidenced by a painting found at a site near the banks of Wadi Oua Molin. The Arab writer Abu Abdullah al-Bakri (fl. 1068), who traveled through the region, describes some of these settlements, especially Awda-ghurst, as having orchards, fig trees, vines, and fields of henna and gourds. He also mentions land devoted to sorghum and cotton around the settlement at Silla in the western African state of Tekrur.

The medieval kingdoms of Ghana (located in modern-day Mauritania), Mali, Kanem-Bornu, and Songhai had similar settlement patterns, with townships located at oases along trade routes or rivers. The kingdom of Ghana had grown rich from the alluvial gold found at Galam and Bure (present-day Guinea). Salt and gold were sold to Berber traders, who in return brought goods from the Mediterranean. This led to villages being built along the trade routes and also where supplies could be grown for sale to the traders.

Al-Bakri describes the capital of ancient Ghana as being surrounded by vegetable gardens, although he does not mention what was grown in them. However, many people in the region remained nomadic.

In Nubia in northeast Africa, almost all settlements were along the Nile River. Among the few more-isolated townships was Abu Negila, in northern Kordofan in hills that became known as the Abu Negila Hills. The major change in the settlements during the medieval period was the building of impressive churches and cathedrals in many of the towns. The most impressive was perhaps the cathedral at Faras, built on top of what is believed to have been a palace and dominating the township. Many churches date from 707, and the Faras cathedral dates from about 930. Other towns such as Aydhab, Suakin, and Badi, were built along the Red Sea. In the early medieval period Aydhab was an important location for Christian pilgrims heading to Jerusalem, but the town soon became just as important for Muslim making their pilgrimage, or hajj, to Mecca. The hajj led to the proliferation of settlements along the coast of the Red Sea.

In central Ethiopia settlements were located where the Funj Empire flourished during the 1400s. In Darfur in modern-day Sudan the main settlement of al-Fashir was located at the foot of the mountains in the west. Many people in the Darfur region remained nomadic, rearing camels and sheep on lands from the Nile to northern Darfur. Goods arrived in Darfur by caravan from Asyut in Upper Egypt and Kharga in southern Egypt, leading to some isolated settlements in northern Kordofan in central Sudan. Indeed Kharga, on the caravan route to Al Kufrah in southwest Libya and western Sudan that appears to have been largely abandoned during the early medieval period, managed to survive only because of the trade with Darfur.

In western Africa most settlements were located along rivers, with Koumbi Saleh, Kano, Old Oyo, and Kong being significant exceptions. By the late 13th century the Mali Empire, which grew rich on the trade of gold and salt, dominated the northern inland area of western Africa, centered on its great capital at Timbuktu. In the areas of modern-day Senegal and Gambia, settlements were known to have been built primarily along the coast, and a significant coastal trade with Morocco began. The lack of settlements from the region of Sierra Leone to the Komoé River was largely because of the density of the Guinea forest. Settlements like Axim and Mouri were built to take advantage of the gold around the Ankobra River, and other cities of modern-day Ghana—Begho, Bouna, and Bono-Manso—were established north of the forest region. The city of Benin in present-day Nigeria also appears to be of medieval foundation. In eastern Nigeria and Cameroon the Warri and Ijaw peoples established many settlements around

the Niger Delta, while farther up the Niger River settlements like Idah were established by the Igala people.

Because much of central Africa is forested, little is known about the pattern of settlements in the region. However, the Bobangi people, and farther inland the Ngbandi, Binza, and Mangbetu peoples, did establish villages along the Ubangi River. Additionally, the Kongo people occupied the plains and hills just south of the mouth of the river. In modern-day Zambia the Kalomo people built their settlements in clearings and constructed mounds to protect them not only from marauders but also from flooding from the nearby marshland. Over time old buildings were dismantled and the rubble added to the height of the mounds. However, despite the work involved in building their settlements, the Kalomo apparently did not live in one place continuously but stayed only until the fertility of the land was exhausted and then moved to another region, often returning to former mound villages a century or so later. By contrast, the Lozi people living along the east bank of the Zambezi River in modern-day western Zambia took advantage of the new topsoil provided by river floods to establish permanent settlements. On the coast of present-day Kenya, the settlement of Manda had elaborate sea and land walls.

The increase in coastal trade in southwestern Africa led to the establishment of some permanent townships, such as Benguela and Luanda in Angola. The increase in Arab traders also led to more settlements along the Africa's southeastern coast, such as Inhambane, Sofala, Quelimane, and Angoche in modern-day Mozambique. Because the structures in most of these settlements were made entirely from wood that has perished, information on the layouts of these settlements is mostly speculative. The exceptions are the stone buildings of the inland kingdom of Great Zimbabwe, which flourished between 1100 and 1500, and more than 150 other settlements across modern-day Zimbabwe and Mozambique. Raised platforms built of granite in the centers of many of these settlements may have been places of worship. Given its size, Great Zimbabwe may have been a royal palace, and its towers may have held large supplies of grain and other crops. Farther south, Khoisan people continued to live a nomadic existence, moving with changes in climate and locations of animals to hunt.

THE AMERICAS

BY J. J. GEORGE

Settlement patterns have been defined as the ways humans have disposed of themselves over the landscape on which they live. In other words, settlements are archaeologically discernible sites characterized by structures in relation to one another and forming patterns on the landscape with vary-

ing degrees of scale and complexity. The range of settlements in the Americas during the medieval period included camps, farmsteads, ceremonial clusters, villages, and cities.

North American settlement varied by region and time and never achieved the type of state-level urbanism seen in Mesoamerica and South America. Settlements of the Mississippian culture, most of which were developed along the floodplains of the Mississippi River and its tributaries, are consistent with chiefdom-level societies, with evidence of two or three levels of social hierarchy and monumental architecture. The largest center was usually a capital with subordinate centers. Cahokia (ca. 900–ca. 1100), for instance, near modern East Saint Louis, Illinois, was the largest Mississippian settlement, covering 5 square miles and containing more than 100 mounds. Located nearby were smaller subordinate sites, perhaps with a single mound and covering only a few acres. The Moundville, Big Ben, and Powers Phase settlements, which had emerged by the 11th century and were small polity centers with affiliated villages, hamlets, or farmsteads in outlying areas.

Southwest settlement development began roughly 6,000 years ago with the Anasazi, Mogolion, and Hohokam cultures beginning in the first millennium of the Common Era and extending, in related forms, to current times. Farmstead and hamlet communities consisting of four or five circular or rectangular pit houses with a total population of between 25 and 30 people developed by the sixth century. Between 750 and 1150 the Hohokam developed settlements with ball courts, platform mounds, and populations of up to 100 people. At about this time settlement groups in Chaco Canyon, New Mexico, centralized into apartment-like walled adobe compounds and broadly coalesced into some form of organized interaction sphere whose nature is debated. The period from 1250 to 1450 witnessed dramatic change. Irrigation canals reached their maximum extent and connected numerous communities. The Hohokam continued dispersed settlement patterns at some sites, but at other sites rectangular compounds enclosed several households and open-plaza work areas. In the Mogolion and Anasazi areas regional abandonment and population aggregation brought about by drought forced communities to join together. Contemporary pueblos such as the one at Taos, New Mexico, ultimately were derived from these trends.

In the Northeast, ceremonial centers appeared, followed by large villages covering one to several acres of elevated ground. The villages contained semipermanent houses and storage pits, and archaeologists have found evidence of maize agriculture. A typical house was a circular lodge 12 to 15 feet in diameter, presumably of the wigwam type, with a central hearth and enclosed by a palisade. In the Great Plains region hunter-gatherer complexes existed until the arrival of

the Europeans, suggesting the temporary and recurrent occupations of a migratory culture. Loosely arranged village sites throughout the central Midwest show traces of bean and maize agriculture and earth-covered or rectangular lodges clustered together.

Central Mexico was distinguished early in the medieval period by peoples practicing agriculture, which resulted in the most intensive development of urbanism in Mesoamerica. Villages, towns, and cities were common. By the Postclassic Period (ca. 900–1530) innumerable small polities from towns to kingdoms to city-states dotted the landscape. Cities and feuding city-states came to define settlement in central Mexico. The collapse of Teotihuacán (ca. 100–ca. 750) led to the rise of Tula (ca. 850–ca. 1150), Cholula (ca. 400–ca. 800), and Xochicalco (ca. 700–ca. 1000). Tenochtitlán, which became Mexico City, was the center of power in the 15th and 16th centuries until the Spanish arrived in 1521. These cities and city-states not only dominated but also coordinated regional agricultural, trade, and tribute economies and localized political, economic, social, and ritual functions. The results were dynamic civic spaces to which local and regional tributaries were often subordinate. Affluent production zones ruled by dynasties of Mixtec and Zapotec origin in the Oaxaca region, to the south of the Aztec, demonstrated close social interaction. City-states also developed in the region, possibly in response to Aztec incursion.

Mayan settlements are grouped into highland and lowland developments. Highland settlements developed in mountainous regions running from Mexico through Guatemala to Honduras. Lowland regions, typically below 2,600 feet and covered in tropical forest, include the Petén region of northern Guatemala, the Yucatán Peninsula, and a transitional zone between the highland and lowland. Classic Period (ca. 200–ca. 900) lowland sites are the most studied. Mayan centers represented larger and more complex versions of residential clusters, which consisted of two or more residential groups separated by open space. A group averaged two to six units, with each unit comprising a family household. These centers varied greatly in size. The smallest may have covered less than half a square mile, whereas others, such as Tikal, extended over an area of some 50 square miles. Regardless of their function, Mayan centers and their residential clusters defined the community and became administrative centers of religious, economic, political, and social significance. The distance between the larger sites averaged 12 to 18 miles, whereas a whole range of smaller centers have been found at smaller intervals. Differences in size suggest different levels of political affiliation or control.

Overall, the location and prosperity of Mayan sites, as for human settlements generally, were determined by access

to essential resources such as water and food. The centers in the Petén region, such as Tikal, El Mirador, and Uaxactun, are at or near the divide between drainage basins, indicating they controlled the portages for canoes across the Petén. Centers also developed along rivers; for example, among the centers near the Usumacinta River included Seibal, Yaxchilan, Piedras Negras, and Palenque. Seacoast trade determined the location of Cerros, Lamanai, and Tulum. Often a center would be located at the source of a resource with widespread demand; for example, Dzibilchaltun in northern Yucatán had access to coastal salt; Colha in Belize, good-quality flint; and Kaminaljuyu in the southern lowlands, obsidian. Centers established during the Postclassic Period (ca. 900–1530) in the Yucatán, including Uxmal, Chichén Itzá, and Mayapán, show the influence of the Toltec culture of central Mexico.

Although the most advanced civilizations in South America developed in the Andean region, scholars reanalyzing older work suggest a long indigenous sequence of settlement in the Amazon and Orinoco river basins, with populations clustering along floodplains in northeastern Brazil and Venezuela. Between the fifth and 15th centuries indigenous societies of considerable scale and cultural complexity developed. Most Amazon Basin sites were not urban and seem comparable to chiefs' domains, stratified chiefdoms, or small states. Many occupation sites are several miles long and densely packed with deep refuse piles. Among the best-known societies are the Marajoara culture (ca. 400–ca. 1100) of Marajó Island, the vast floodplain at the mouth of the Amazon in Brazil, and the Tapajós chiefdom on the lower Amazon, which occupied a large area of savanna, forest, and floodplain from 10th to the 16th centuries.

Scholars have subdivided Andean settlement into broad historical trends called the Horizon and Intermediate periods (ca. 500–1530). The Horizon Period features widespread similarities in the art and culture of various areas that may be associated with the power of a cult, state, or empire. Regional diversity, by contrast, is more characteristic of the intermediate periods. Together these periods help define settlement patterns and the manner in which various settlements interacted or related to one another.

The Wari and Tiwanaku cultures defined the Middle Horizon Period from the sixth to 11th centuries. Wari expansionism relied on militarism. Its original sphere was the area of Ayacucho, Peru, a sierran basin occupied previously by the Huarpa, who lived in villages and hamlets scattered over the mountain slopes. Initial Wari development was closely tied to Tiwanaku, but toward the end of the sixth century it broke completely free from Tiwanaku settlement patterns, establishing strategic valley sites such as Cerro Baúl and Cerro Mejía. Wari imperial strategy subsequently focused on ag-

ricultural areas. Ultimately the Wari composed an urban culture whose characteristic settlements were hierarchically arranged around a capital city connected by a series of roads and a strong army. After the Wari fell, towns of differing sizes and types appeared in the Cuzco Valley on slopes and in the Lucre Valley on hilltops, organized along local urban types.

Initial Tiwanakan settlement occurred south of Wari territory adjacent to Lake Titicaca, the richest agricultural area of the highlands. Expansion during the sixth through 11th centuries took various forms. Colonization brought people with stable occupations to low-lying agricultural zones, like the coastal towns of Arica and Tacna. In other areas expansion depended on a stable network of trade and exchange linking local settlement clusters. One theory suggests that unlike the Wari, the Tiwanaka settled in unifying complementary zones. Given the extreme ranges of the Andean topography, this theory implies that vertically integrated zones with various levels of productivity helped forge a coherent state entity.

The Chimú was a post-Wari society arising in northern Peru, in territory earlier occupied by the Moche, and spreading south and north between the 12th and 15th centuries. The great urban experiments of Chan Chan and Pikillakta define the Chimú culture, but most of the population lived outside those urban settlements in villages and hamlets. The Inca conquered the Chimú in the 15th century.

Historians generally agree that the Inca state began modestly, as a confederation of social groups under the rule of warrior leaders. The ascension of the ruler Pachacuti in 1438 signaled their greatest period of expansion. A victory over the Chanca catapulted the Inca on their imperial course, incorporating multitudes of polities, chiefdoms, and communities by force, diplomacy, and reciprocity. In less than 100 years the Inca consolidated all the territory from Santiago, Chile, to Quito, Ecuador—more than 3,400 miles—into the empire. The Spanish arrived in 1532 and soon thereafter defeated the Inca, thus ending purely indigenous development.

ASIA AND THE PACIFIC

BY LAURA LEE JUNKER

A *settlement system* is usually defined as the way in which a human population arranges itself over its regional landscape for the purpose of social, political, economic, and religious activities. Settlement patterns often are influenced by geographic and environmental features (for example, the distribution of critical resources and transport routes such as rivers), demographic factors (like population densities), political exigencies (for instance, whether political authority is concentrated or dispersed and the need to create borderlands with hostile neighbors), social factors (that is, ideas about

segregation versus interaction of social classes, kin units, or ethnic groups), or cosmological ideals (such as determining the location and layout of settlements according to the directives of deities or worldviews). In such complex societies as empires, states, and chiefdoms, settlement systems are always hierarchical and often tied to the process of urbanization, with larger “central places” (that is, regional cities or “capitals”) having specialized roles as administrative, commercial, or religious centers or all three.

Geographers and anthropologists have developed an ideal model of the spatial relationships between settlements in state-level societies, known as central place theory. They note that economies of scale in commodities production, efficiencies in transporting and distributing goods, and the need for political control of distant and potentially rebellious groups favor a lattice-like settlement pattern in which secondary centers are evenly spaced and equidistant from the capital. While this is an abstract model, settlement-pattern studies have shown that many medieval Asian states conformed at least loosely to this settlement arrangement.

Medieval India had a strongly urbanized landscape in which political, economic, military, and ideological power was concentrated in large cities like Bijapur, Delhi, Gaur, Madurai, and Vijayanagar, with populations in the hundreds of thousands spread over areas up to 15 square miles. These capital cities at the core of Hindu, Buddhist, and Islamic kingdoms and empires were the center of state administrative hierarchies; they supported industrial-level production of goods such as silk and cotton cloth, iron and steel, and stone beads; they had large international markets and served as the primary nodes for foreign trade; they had the state’s finest military defenses and large artilleries for warfare; and they emphasized the spiritually based power of kings through elaborate temple complexes.

The necessity for homogeneous residential neighborhoods based on social caste and religion meant that medieval cities (as well as towns and villages) were rigidly ordered into differentiated housing zones. Secondary urban centers (smaller-scale and subordinate cities) tended to conform to central place theory with respect to location, particularly if they were prominent trade centers. However, archaeologists and historians studying this urbanized landscape emphasize that these secondary and tertiary cities in the settlement hierarchy did not usually start out as miniaturized versions of the capital, with its walled royal residences and sacred temple complexes at the center. Instead, secondary cities tended to form as centers with functionally specialized roles, including military camps, market centers, and religious pilgrimage sites, which became more functionally diverse as they took on new political, economic, and religious roles. Settlement in the

rural countryside consisted of dispersed, small-scale villages close to cultivated fields with houses built of perishable materials. These villages at the lower end of the regional settlement hierarchy were characterized by less residential segregation by caste than urban centers, household craft workshops oriented toward production of mundane domestic goods, and smaller-scale religious architecture and religious functionaries serving the immediate community.

In China it was in the medieval period, particularly during the Tang Dynasty (618–907), that an enduring model emerged for highly ordered and pragmatically designed cities and their accompanying regional hierarchy of outlying administrative centers. This model, epitomized by the seventh-century Tang imperial capital at Xi’an (known then as Ch’angan), persisted in later Chinese dynasties and served as a template for emerging urbanism and highly integrated states in Korea and Japan. Housing more than 1 million inhabitants within a 52-square-mile area, Xi’an was the largest city in the world in the seventh century. A 23-mile wall surrounded the neatly gridded city, which had numerous functionally distinguished “inner cities” all with gated walls, including an imperial palace complex in the center, government buildings directly to the south, nine enormous markets to the east and west (three specializing in international commerce), military armories to the south, and Buddhist and Daoist monasteries and temple complexes scattered throughout the city. The city was divided by streets laid in a grid into 108 discrete residential and commercial wards, also individually walled and gated, that functioned as administrative units for the urban peasantry serving the city in various economic roles. The ideal of walled enclosures around specialized areas of the city was copied on a smaller scale in the provincial capitals and other second-tier cities of the empire.

As in medieval India, these secondary political and commercial centers tended to conform spatially to the hexagonal lattices of central place theory, with roughly even spacing across the landscape to facilitate collection of taxes, transport of commodities, and the strict state surveillance necessary to quell rebellious populations. The vast majority of Tang people, however, were rural peasants occupying dispersed towns and villages of about 100 to 1,000 inhabitants who worked their own nearby fields or, more often, were tenants or virtual “serfs” to nearby aristocratic landlords living in extensive walled manor houses or land-owning monasteries.

While the general pattern of hierarchically ranked walled cities with this highly regimented layout persisted in China until the 17th century, significant changes in agricultural and industrial technologies in the later medieval period (beginning with in the Song Dynasty during the 10th–13th centuries and accelerating in the succeeding Yuan and Ming) led to

massive overall population growth, the expansion of secondary cities in size and complexity, and a marked increase in the proportion of Chinese living in cities relative to rural areas. These settlement changes had profound social effects on the Chinese peasantry, who increasingly gained access to education, civil service and religious positions, and new opportunities for lucrative economic pursuits owing to their greater proximity to urban institutions.

Korean and Japanese societies of the early medieval period were influenced by Chinese forms of Buddhism, political administrative concepts such as merit-based civil service, written record keeping, and military organization, and Tang-style gridded and walled cities at the apex of highly ordered regional settlement hierarchies. Nara and Heian, the capitals and cores of two sequential centralized states in Japan between the eighth and 11th centuries, as well as the capitals of medieval Korean states like Silla were also laid out in the Chinese-style grid pattern, with walled and spatially segregated areas of the cities for imperial court ritual, state administration, commerce, Buddhist religious structures, and commoner residences. Secondary provincial capitals radiating out from Nara and Heian and reached by a well-constructed system of roads were smaller-scale versions of the dynastic capital. Regional planning ensured that these provincial centers were well situated to facilitate trade, taxation, labor and military conscription, and other aspects of state administration that flowed from the imperial center outward to the scattered hamlets of rice-farming peasants. Thus, regional settlement systems tended to conform relatively closely to an ideal lattice-like “central place” hierarchical pattern.

Perhaps the best historic description of village structure is that for the Korean state of Unified Silla in the seventh and eighth centuries. Villages or hamlets known as *ch'on*, consisting of about 10 houses with kin-related families who cooperated in agricultural labor and other economic activities, were the smallest administrative group in the settlement hierarchy. Several of these nearby villages were clustered for administration under a single local headman who kept the local census, collected taxes, and drafted family members for corvée labor (including farming or stock raising on government-owned lands, construction work, or other state projects).

By the 12th century, however, peasant uprisings, court intrigue, external military threats, and other factors had begun to unravel the strongly centralized state structures of both Korea and Japan. This process of political fragmentation and the consequent establishment of a radically different settlement system were particularly pronounced in Japan, where political, military, and economic authority was largely transferred from the weak imperial court into the hands of independent warlords (shoguns). For the first time large-scale

cities like Kamakura and Kyoto rivaled the imperial capital in size and complexity, with some topping 200,000 inhabitants and no longer subordinate within a hierarchical settlement system. These new cities were focused less on political administration than on commercial activities by freewheeling merchants and seagoing “pirates” under the protection of shoguns, who overlooked the commercial cities they largely ruled from massive, heavily fortified, multistoried palaces similar to the castles of feudal period lords in Europe during the medieval period. Surrounding small towns and villages comprised the residences and commercial establishments of the peasantry, who depended on the protection and patronage of the warlords and their attached warriors (samurai) for their economic livelihood and personal safety. While they were not as extreme as the late medieval Japanese polities, the once highly-centralized Korean states did become somewhat politically fragmented into similarly localized seats of power centered on “castle towns” in this period.

In Southeast Asia the great significance of maritime commerce and river-based transport routes into the island interiors meant that regional settlement patterns tended to be dendritic (meaning that they were linear and branching) rather than lattice-like in nature, with single large primate “centers” or cities located at the mouths of large rivers and in areas of good anchorage. Strategically located coastal trade ports, like Palembang (the capital of the Buddhist Srivijaya kingdom on Sumatra during the seventh to 11th centuries), Melaka (the capital of Melaka, Malay Peninsula, during the 15th–16th centuries), and Cotabato (the capital of the Magindanao Sultanate on the island of Mindanao in the Philippines during the 15th through 19th centuries) dominated the regional landscape in terms of size and complexity. These large trade entrepôts, housing up to 100,000 people, had palaces and administrative buildings, bustling international markets and craft-production areas, and the walled mansions of the aristocracy and wealthy foreign traders.

However, religious architecture was the most visible component of these urban centers, such as the spectacular Buddhist stupas and temples of Ayutthaya (Thailand) and Pegu (present-day Myanmar), the immense Hindu temple complex of Angkor Wat (modern-day Cambodia), and the brick mosques of Melaka and Aceh (Malay Peninsula).

“Secondary centers,” used for bulking trade goods along interior rivers, were significantly smaller but had specialized craft activity, markets, and the presence of commercial administrators and aristocracy connected to the polity capital. Owing to the generally land-extensive nature of tropical agricultural systems and the household production of most domestic goods, the bulk of the farming population was scattered in small-scale villages organized around kin groups

who relied on the middlemen economic brokers and political patrons at the secondary centers.

In the Pacific island chiefdoms, settlements tended to consist of small villages of closely related kinsmen scattered over the landscape in close proximity to coastal fishing resources and agricultural fields where taro, yams, banana, coconut, and breadfruit were intercropped. Unlike many complex polities, there were no large “towns” or “cities” with concentrated populations, but there were specialized settlements where chiefs resided (often with several wives, retainers, and artisans producing elite goods) or where community religious activities took place. At the center of the Tonga chiefdom between 1200 and 1500 was the large ceremonial and political center at Mu’a on the island of Tongatapu, consisting of an earthen fortification enclosing an area of almost 22,000 square miles, within which were large open spaces for ritual activities, coral-faced and stone-faced earthen tombs of chiefs, and numerous stepped earthen platforms (as high as about 16 feet) that probably supported perishable structures which were the aristocratic residences of chiefs, their kinsmen, priests and retainers.

In Tahiti these enclosed chiefs’ ceremonial centers, known across the Pacific as *ahu* or *marae*, had stepped platforms more than 260 by 65 feet at their base and reaching a height of some 50 feet. Captain Cook described them as places of animal and human sacrifice by the high chiefs to propitiate the deities. On the northern island of New Zealand, Maori chiefs, their close associates, their wealth, and their precious stores of sweet potatoes and yams were housed in hilltop or ring-ditch fortified settlements known as *pa* (of which almost 6,000 have been recorded historically and archaeologically), while the vast majority of commoners lived undefended in scattered villages next to agricultural fields.

In focusing on settlement patterns in the large-scale empires, kingdoms, and chiefdoms of Asia and the Pacific, it is important to recognize that in many of the regions discussed, there was a mosaic of cultural groups that included smaller-scale tribal peoples, both swidden agriculturalists and hunter-gatherers, who lived in different types of ecological zones (mountainous areas or interior tropical or temperate forests) and had quite different settlement systems lacking the central place structures and specialized settlements of the complex polities that were their neighbors. Because many of these societies on the periphery of states were illiterate, we primarily rely on archaeological evidence and historic accounts of adjacent groups to construct a picture of their settlement systems in the medieval period.

In the Philippines (as elsewhere in Southeast Asia), upland tribal swidden agriculturalists like the Hanunoo and Magahat lived in small, one-roomed bamboo houses in semi-

permanent villages of similar size (often less than 15 houses) scattered over the landscape near agricultural fields, with each village largely politically autonomous and providing for its own economic needs. Mobile rather than sedentary hunter-gatherer groups in the Philippines (such as the Agta) as well as the Ainu of northern Japan (an area marginal to the medieval shogunates farther south) and the whole continent of Australian aborigines had impermanent settlements that were moved periodically to different ecological zones to take advantage of the seasonal availability of resources. While the storable resources (for example, salmon and nuts) of the temperate zone Ainu allowed them to congregate in larger groups (as many as 100–150 people) and remain sedentary for most of the year, the tropical Southeast Asian hunter-gatherers and the Australian aborigines typically lived in small extended family groups (25–50) and sometimes moved their small settlements more than 12 times per year.

EUROPE

BY CHARLES W. ABBOTT

A full discussion of settlement patterns covers several phenomena. One is rural settlement structure: the arrangement of farmhouses relative to fields. Farmers can live clustered in villages and go out to their fields to work, or they can live isolated on individual farms, traveling into town to shop and meet friends. The rural settlement structure influences the texture of rural life. Combined with factors such as topography and vegetation, it contributes to a farming landscape’s characteristic appearance—the way the landscape looks.

Another phenomenon is the size and spatial distribution of settlements: the structure of the urban system. (This is sometimes called “the urban system.” The term *urban structure* refers to a separate topic: how a city is organized internally.) Economic geographers have analyzed and described such urban systems since the 1930s. The structure of the urban system is closely associated with still another phenomenon: patterns of urban dominance and the zones in which particular cities have their influence. A country can be dominated by one gigantic town (as France now is by Paris or Mexico by Mexico City). Alternatively, a country can be characterized by a larger number of medium-sized cities, more like contemporary Germany.

To fully characterize Europe’s settlement patterns, we would need two types of data: periodic censuses of population over the entire continent, and periodic cadastral surveys (which show property boundaries and related information). With few exceptions we have neither of those data sets. In some cases we have fragmentary cadastral surveys, often reporting the value of holdings for tax purposes but without

much care to describe their exact location. A great data set bequeathed from the Middle Ages is the *Domesday Book*, which exhaustively surveyed the land assets, population, and mills of England in 1086.

Despite shortcomings in data, we can sketch out basic stylized facts. Let us begin with a historic contrast. At the dawn of the Middle Ages, around 500 C.E., most of Europe was thinly populated, and the total population was perhaps 25 million. Mediterranean city populations had shrunk from their earlier peaks. Over most of Europe farmers lived in small clusters of homesteads or in farm hamlets. Settlements were often separated from one another by forest, marsh, and all the unused land known as waste. Trade and travel were perilous, and many local communities were largely self-sufficient.

Europe by 1300 looked very different. It was richer and more urbanized. Its population had probably tripled, and its urban population had doubled from 10 percent to 20 percent. In many areas of northwest Europe scattered farm hamlets had been replaced by nucleated village settlements surrounded by open fields, with the land cultivated by heavy plows into long, narrow strips (rather than rectangular farm fields).

A time traveler to 1300 from Imperial Rome might not have been surprised to see the cities of northern Italy but would have been stunned by the almost equally dense network of cities in Flanders (the region around today's northern Belgium and southern Netherlands). The rough parity of wealth between northern Europe and Mediterranean lands would have been a surprise as well. Northern lands had long been a Roman frontier, but by 1300 most of western Europe was fully occupied. The salient frontier was to the east, where German colonists had been settling. Areas in western Europe that in 500 had been undeveloped border regions or waste now hosted monasteries. Europe's forests had shrunk massively from 500, the land put to pasture or to the plow.

In 1300 medieval Europe was near its peak of development; the population made full use of arable land for crops and of forests for firewood. Climatic shifts after the 1310s brought colder, wetter weather, with recurrent famines after 1315. The three years from 1348 to 1351 saw the Black Death, or plague, kill roughly a third of Europe's population, resulting in pervasive changes in wage rates as well as more subtle changes in culture and politics. There was no social collapse after the plague, but many marginal farm settlements shrank or were abandoned—in Britain, Italy, France, and more peripheral areas. Marginal farmland might be converted to pasture, with survivors migrating to better lands or to towns, where high mortality rates opened up opportunities for those who were still alive.

During our entire time of interest medieval Europe was largely a land of peasant farmers, and the overall urbanization rate never topped 20 percent. The average family was intimately engaged in agriculture and produced a small surplus to support those who lived in cities and did not farm. The average family produced most of its goods and services itself or bought them from nearby specialists, such as the village blacksmith. Still, within these constraints patterns of human settlement varied widely from one European region or locale to the next. Herders spent much of the year in rustic camps with their flocks. Miners, fishermen, and woodsmen had their own settlements oriented to their resources. Different forms of agriculture and production generated their own characteristic landscapes, landscapes that often varied within 10 to 20 miles because of soils and topography. In addition, the lands of southern Europe close to the Mediterranean (especially Italy) were more heavily urbanized than the lands farther north. Urbanization was more deeply rooted there, as were traditions of urban governance; trade was facilitated by the Mediterranean Sea.

In parts of northwest Europe in the centuries between 800 and 1200 farmers gathered themselves (or were gathered by their lords) from scattered homesteads into nucleated villages surrounded by open fields. This landscape was associated with heavy clay soils and gentle topography, where mounted knights could operate easily and where feudal institutions became deeply rooted. Parts of southern England and the Midlands exhibited this pattern, as did portions of northern France and the Rhineland. Four key features went together: the nucleated village, the open fields surrounding it, feudal lords as rulers or managers, and soils requiring the heavy plow.

Much has been written about the "open field" system: individual strips lay side by side but were owned and cultivated by different households, without any fencing to separate them. Strips were cultivated individually, but in synchrony with a communal calendar. With the spread of the "three-field system," one field had spring-sown crops, one had fall-sown crops, and one was fallowed for the year and used for pasture. An economically viable household owned strips in all three fields. Farmers were forced to follow the general calendar. After harvest, cattle and sheep were turned out on the entire field.

Some scholars have discerned in the open-field system the goal of reduced individual inequality or have perceived it as a form of communal production. Most current interpretations stress greater individualism: strips were owned and managed privately, and households did not always own equal amounts of land. Those who stress the role of private enterprise (rather than communal labor) note that a market for



Medieval Europe's peripheries, characterized by relatively low population density, included Spain, Scandinavia, most Alpine regions, Scotland, the Baltic, and eastern Europe more generally. People in these areas were engaged in economic activities that used land extensively, such as herding, stock raising, and growing grain for export. Some peripheral areas, such as the Baltic, eventually became large grain- and timber-exporting regions. This map shows the medieval settlements around the Baltic Sea and along key river routes in Russia.

plowing services and oxen hire was crucial in assembling the plow, team, and driver. The best interpretation of the open-field system is that it did not reflect communal production but was an elegant mix of public (grazing) and private (cultivation) property rights.

The open-field system, paradigmatic of the High Middle Ages, is characteristic of only parts of Europe. Not every place in Europe had them, nor did every place have the

nucleated village—forested and hilly areas often did not, nor did regions with light and sandy soils. While Italy was full of cities, in some parts of Italy villages were absent, and farmhouses were in the fields. Many forest villages in Germany were “street villages,” with houses spread out along a single street. If such a village enclosed a common grazing area, it took on a spindle shape and was known as an *Angerdorf*. As the German colonization of the east proceeded, settlers often

established *Rundling*, or ring-fence, villages—houses facing outward in a ring, their backs defining a common grazing area for penning and keeping the livestock.

The difference between a village and town is not simply size but also function. A village might have been small, but in addition it was largely undifferentiated, a settlement of farmers. The mark of a town was not simply its larger size but its specialized tasks. Networks of towns existed in part to market agricultural products to urban inhabitants and to provide urban-based goods and services to farmers and rural dwellers. An architect might focus on a town's layout, and a demographer will ask how many people live there. An economic geographer will inquire how many different goods and services are sold in the town, how far people travel to do business there, and where the grain is shipped when it leaves the town market.

Farming villages blanketed the landscape with a certain regularity. A hierarchy of larger settlements emerged as well, especially as market exchange grew in importance. Nearby settlements provided a few basic services, while larger urban centers supplied a greater variety of services (including higher levels of government and ritual functions from specialized sites such as cathedrals).

Roads, canals, and seaborne shipping were the sinews of the urban system, and through them the 20 percent of Europeans who lived in cities and towns received their food. Europe thus possessed a network of towns that facilitated the marketing of food to feed lords, bishops, and other elites as well as urban-based craft workers. Urban crafts flowed in the other direction, from cities and towns to farm villages. The same basic arrangement held even if cities were parasitic on the peasantry, with urban elites commandeering food and returning little in exchange. It was only in the depths of the Viking Period (ca. 850–ca. 1050) that elites commonly imposed taxes in part by visiting various rural outposts in rotation with their retainers, eating their tax revenue from storehouses and then moving on to dine at another town.

Geographers characterize regions in terms of “core and periphery.” Regional cores are characterized by high population densities, high incomes, concentrations of capital, the intensive use of land, and the presence of urban elites with considerable power and wealth. Peripheral areas are characterized by the opposite: lower populations, lower incomes (and also lower costs), and the extensive use of land relative to capital (grazing for meat and wool rather than market gardening or dairying, for example). Medieval Europe's core was centered on a line between its two most developed regions: northern Italy and Flanders. After 1114 seasonal trade fairs boomed midway between Italy and Flanders in Champagne, gradually fading after 1275 when seaborne trade linked Italian cities directly to the ports of the Atlantic.

The peripheries included Spain, Scandinavia, most Alpine regions, Scotland, the Baltic, and eastern Europe more generally. In the peripheral regions the population was much lower and engaged in economic activities that used land extensively, such as herding, stock raising, and growing grain for export. Some peripheral areas also came to specialize in activities such as labor migration—well before 1500, for example, Swiss men began leaving their mountain valleys to serve Italian counts as mercenaries. Much of Spain was devoted to the raising of sheep, with the wool manufactured into cloth in Flanders or Italy. Still other areas, such as the Baltic, eventually became large grain- and timber-exporting regions.

In Europe's core-periphery system, the network of towns and large cities grew sparser, and the towns grew smaller as one left Flanders or Lombardy and moved toward the periphery. Some researchers subscribe to the theory that dense farms, butter, and dairy production were near the core, while grains and lumber were produced in far regions accessible by sea. Cows, like Swiss mercenaries, could move out of the mountains on their own feet. A final factor worth noting is that cities had a higher mortality rate than rural areas and were not demographically self-sustaining until roughly the year 1800. Flows of food and raw wool were also matched by flows of young people moving toward towns and cities—only continual migration to towns enabled urban areas to maintain a constant population, let alone to grow in size.

THE ISLAMIC WORLD

BY BRADLEY A. SKEEN

In its origin Islam had a twin heritage of settlement patterns. Muhammad, the founder of Islam, was urban. He came from the Arabian city of Mecca and began to spread the new religion in the neighboring city of Medina. He also lived in exile for a time in the Ethiopian city of Axum. At the same time, the bulk of the population of the Arabian Peninsula, the first generation of converts, were nomadic tribesmen who lived by transhumance with herds kept on the Arabian plateau. Muhammad's ancestral occupation as a merchant took him to the Byzantine cities of the Mediterranean coast but also familiarized him with the camel caravans that crossed the Arabian deserts and that depended on the nomadic cultures of the region. The later history of Islam in the Middle Ages took place among both nomads and urbanites and was propagated, in part, through the interactions of the two ways of life. Muhammad also laid the ideological foundation for a third type of settlement pattern, the slave plantation. While these came about in the Islamic world as a result of the astounding military conquests of the seventh and eighth centuries,

Muhammad not only permitted slavery (as evidenced in the Koran) but also engaged in slave trading himself.

The homeland of Islam was in the Arabian Peninsula. Arabia, at more than 1.2 million square miles, is more than five times the size of California. Most of it is desert with huge expanses of dune seas, but the Nejd central plateau provided pasturage for horses, camels, sheep, and goats. At the beginning of the Middle Ages most Arabs lived in tribal groups devoted to nomadic animal husbandry in this area. Since the end of the last ice age more than 9,000 years earlier, the tropical regions of North Africa and Arabia had been undergoing increasing desertification. At the same time, the relatively rich agricultural system of Arabia produced an ever-growing population. Because of these two trends, waves of out-migration from Arabia have helped to shape the Near East since the earliest historical times. Migrants regularly moved, sometimes as conquerors, into the settled areas to the north, Mesopotamia and the Levant. The Semitic language group originated in Arabia but eventually became dominant throughout the Near East because of the out-migration. The Islamic conquests may be seen as the last out-migration of this kind.

Some Arab nomads worked in the caravan trade that crossed the northern part of the Arabian desert, trading goods between Mesopotamia and the Mediterranean coast and along the Red Sea coast, where frankincense, myrrh, and spices grew. There was also a trade in dates grown at desert oases. There were a string of small cities around the coast of the Arabian Peninsula that thrived on the overland trade of the peninsula and on the Indian Ocean trade between East and West. Mecca and Medina were among these cities.

The Arabia unified under Muhammad's rule (632 c.e.) was essentially a pastoral society. Within 10 years the Islamic Caliphate found itself in possession of the entire Near East, from Thebes in Egypt to the mouth of the Tigris-Euphrates on the Persian Gulf, one of the most densely populated areas on earth. The region contained several large cities with populations of half a million or more (Alexandria, Antioch, and Babylon, among them). The bulk of the population, however, lived in small villages devoted to settled agriculture. The population represented a variety of language groups and ethnicities and was also religiously diverse, including Orthodox, Monophysite, and Nestorian Christians, "pagans," Jews, Manicheans, Zoroastrians, and small minority groups such as the Mandaeans. Under those circumstances there was some uncertainty about how to proceed.

The way of life of the conquered peoples seemed completely alien to the Arabian nomads. Their experience did not prepare them to understand the use of cities and farmland.

Moreover, the Arabs' new subjects did not practice the same religion that the Arabs themselves had fervently and recently adopted. Just as when the nomadic Mongols conquered urban and agricultural areas in northern China, serious thought was given to simply slaughtering or enslaving the population and clearing the land for pasturage. Cooler heads prevailed, however, and it was decided to let the peasants keep their land but as tenants, paying taxes to the Islamic state. In fact, very heavy taxes were imposed on the conquered people as non-Muslims, and they were often exacted in an unnecessarily brutal manner, through tax collectors and other officials insisting on bribes above the legally required payments and with the payment of taxes accompanied by public beatings—to remind the subjects that they were conquered people. The kind of oppressive treatment that the *dhimmi* or "peoples of the book" (Christians and Jews) suffered naturally led to frequent revolts in the first century or so of the Islamic conquest, especially in Egypt.

The conquered populations nevertheless presented still other problems. They were still not Muslims, and it was not immediately apparent whether compelling or even allowing them to convert was desirable. The compromise worked out to solve this problem was to found special garrison towns in the conquered territories that would allow Arab soldiers to live in isolation among the conquered populations. These garrisons included Kufa and Basra in Iraq and Fustat in Egypt, which was eventually incorporated into the later foundation of Cairo. These towns initially allowed the Arab population to maintain their traditional tribe and clan structures without their social cohesion being dissolved into the larger group of the conquered populations of the cities. Fustat was purposely built out of the remains of looted antiquities, such as the limestone facing of the pyramids, in order to emphasize the triumph of the new Islamic civilization. For the same reason, Basra was built on the site of an ancient Sassanian city that had been razed.

The revolts were ruthlessly put down. By the 10th and 11th centuries much of the problem presented by the subject peoples had been resolved as a majority (but by no means all) had converted to Islam. (Conversions seem to have been especially common after the massacres necessary to put down revolts.) Even so, the converts, called *mawali* in Arabic, faced discrimination for generations because they were still left outside the Arab social system and were only more gradually integrated into it.

By the ninth and 10th centuries Arab civilization had become reconciled to urban living, and the original garrison town had turned into important multiethnic cities with vibrant cultural and economic institutions. The later foundations of Baghdad (762) and Cairo (969) became two of the

greatest cities in the medieval world, in terms of both their size (both with over 500,000 inhabitants) and their cultural achievements.

Outside of the initial Arab conquests in the Near East, the spread of Islamic civilization had an important influence on local settlement patterns. Although the Maghreb (northern Africa west of Egypt) had been conquered in the seventh century, the Fatimid rulers of Egypt unleashed a fresh wave of Arabic pastoralist tribes from Arabia into the area in the 12th century, owing to sectarian differences with the local rulers. These Banu Hilal tribes devastated the area and actually took much land out of agricultural production and turned it to pastoral use. On the other hand, the Arab colony in Spain, al-Andalus (711–1492), took on a sophisticated urban character in the great cultural centers of Seville, Córdoba and Granada. South of the Sahara, Djenné and Timbuktu became large mercantile cities and important centers for the spread of Islam to Africa through the madrasas at Sankore and other mosques.

The situation along the other axis of Islamic expansion, toward inner Asia, was quite different in its effects on settlement patterns. In this region most of the population was made up of Iranian or Turkic tribesmen who lived as nomads. They readily converted to Islam, perhaps because it seemed well suited to their way of life. The Seljuk and Ottoman Turks, originally brought into the Near East as mercenaries, went on to conquer and rule much of the Islamic world. Most Mongols outside of China eventually converted to Islam also, although their raids under Genghis Khan and his successors through inner Asia as far as Egypt in the 13th century led to a terrible economic and demographic collapse from which the northeastern Islamic world never recovered, with most of the Islamic cities in the area destroyed or greatly reduced in population. The Islamic cultural and political capital of Baghdad was sacked by the Mongols (1258) and never recovered its former prominence.

A third settlement pattern that the Arabs encouraged was plantation slavery. This practice had been invented by the Carthaginians in antiquity in order to exploit the vast agricultural resources of the Maghreb in North Africa. A relatively small population of masters and overseers (whose homes were most likely in nearby cities) lived on large estates in the countryside that were worked by hundreds or thousands of slaves, who lived on the estate in barracks little different from stables. Once they conquered North Africa in the second century B.C.E., the Romans took over the practice, referring to it as the *latifundia* system. It was later adopted by the Arabs when their military officers acquired large estates seized from the conquered peoples of the Near East. The concentration and mistreatment of

slaves on these kinds of plantations led to a major slave revolt of East African captives (mainly from the Zandj region opposite Zanzibar) on a sugar plantation near Basra in 869 that lasted until 883 and had to be suppressed by military action. Muhammad's teaching that manumission of slaves was a pious action in itself and his instruction that only prisoners of war who refused to convert to Islam could be enslaved were for the most part ignored in the face of the immense profits available from trading and working slaves in a plantation system.

See also AGRICULTURE; ARCHITECTURE; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES, CLIMATE AND GEOGRAPHY; CRAFTS; ECONOMY; EMPLOYMENT AND LABOR; FAMILY; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; LANGUAGE; MIGRATION AND POPULATION MOVEMENTS; MILITARY; MINING, QUARRYING, AND SALT MAKING; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; ROADS AND BRIDGES; SACRED SITES; SCANDALS AND CORRUPTION; SEAFARING AND NAVIGATION; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; STORAGE AND PRESERVATION; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

FURTHER READING

- Paul Bairoch, *Cities and Economic Development: From the Dawn of History to the Present*, trans. Christopher Braider (Chicago: University of Chicago Press, 1988).
- Neville H. Chittick, *Manda: Excavations at an Island Port on the Kenya Coast* (Nairobi, Kenya: British Institute in Eastern Africa, 1984).
- William E. Deal, *Handbook to Life in Medieval and Early Modern Japan* (New York: Oxford University Press, 2006).
- Tom Dillehay, *The Settlement of the Americas: A New Prehistory* (New York: Basic Books, 2000).
- Erwin A. Gutkind, ed., *International History of City Development*, 8 vols. (New York: Free Press of Glencoe, 1964–1972).
- John Haywood, *Penguin Historical Atlas of Ancient Civilizations* (New York: Viking Penguin, 2005).
- Paul M. Hohenberg and Lynn Hollen Lees, *The Making of Urban Europe, 1000–1994* (Cambridge, Mass.: Harvard University Press, 1995).
- Richard Jones and Mark Page, *Medieval Villages in an English Landscape: Beginnings and Ends* (Macclesfield, U.K.: Windgatherer Press, 2006).
- Heng Chye Kiang, *Cities of Aristocrats and Bureaucrats: The Development of Medieval Chinese Cityscapes* (Honolulu: University of Hawaii Press, 1999).
- Harry A. Miskimin, "People, Food, and Space: Urban Size and the Late Medieval Economy," *History Teacher*, 27, no. 4 (1994): 391–403.

- David Nicholas, *Urban Europe, 1100–1700* (New York: Palgrave Macmillan, 2003).
- Charles S. Orwin and Christabel S. Lowry Orwin, *The Open Fields* (Oxford, U.K.: Clarendon Press, 1967).
- Sydney Pollard, *Marginal Europe: The Contribution of Marginal Lands since the Middle Ages* (New York: Oxford University Press, 1997).
- Norman J. G. Pounds, *An Historical Geography of Europe* (New York: Cambridge University Press, 1990).
- Peter Robertshaw, *Early Pastoralists of South-Western Kenya* (Nairobi, Kenya: British Institute in Eastern Africa, 1990).
- Marilyn Silberfein, ed., *Rural Settlement Structure and African Development* (Boulder, Colo.: Westview Press, 1998).
- Evon Z. Vogt and Richard M. Leventhal, eds., *Prehistoric Settlement Patterns: Essays in Honor of Gordon R. Willey* (Albuquerque: University of New Mexico Press, 1983).
- Gordon Randolph Willey, ed., *Prehistoric Settlement Patterns in the New World* (Westport, Conn.: Greenwood Press, 1981).

► ships and shipbuilding

INTRODUCTION

Ships and boats expanded the horizons of medieval people. With them, people could step beyond the boundaries of oceans, lakes, rivers, marshes, and swamps into places otherwise inaccessible to them. In central Africa boats enabled people in dense forests to create societies that extended for hundreds of miles near rivers and to build trade economies in which boats carried traders and their goods to trading towns along rivers. In the Americas boats allowed Mayan culture to spread along the coasts of mainland Mesoamerica and as far as islands in the Caribbean. In China boats gave people mastery of inland waterways that helped them transport goods and people for thousands of miles, and in India boats were essential to moving products on rivers to ports where the products could be loaded on seagoing vessels.

For the Islamic world boats and ships carried not only goods and passengers but also knowledge and technology, as well as offering Muslims real-life adventures to exotic lands. Without transportation on rivers and seas many of the faithful would not have been able to make required pilgrimages to the holy city of Mecca. In medieval Europe boats and ships became part of a vast network of trade, and European developments in shipbuilding reveal to the modern historian an arms race in which control of the sea could make empires. Perhaps the most amazing feats of seamanship were accomplished by Polynesians in their settlement of the Pacific on sturdy, well-balanced boats built to withstand the terrors of the ocean.

Environment had a profound effect on the technology of shipbuilding in the medieval world. Various environments

required different solutions to the problems posed by navigating waters. In forests in the Americas and Africa travel by boat was often the fastest, safest method. Big ships would have been unsuitable to maneuvering in winding rivers among dense forests; that both Americans and Africans should create the canoe as a solution to traveling in places where small boats would have significant advantages over large ones is not surprising: Cultures in the Americas and Africa devised canoes that were narrow and light, for quick movement of small numbers of people and small loads of goods. Environment was not alone in influencing the building of boats and ships. Cultures put their own special demands on boats and ships. For instance, in western and central Africa cultures built war canoes—big canoes used to convey warriors swiftly along waterways, allowing armies to attack quickly and to maneuver around enemies that were shielded by swamps and rivers.

Of the developments in seafaring technology during the medieval era the most significant may have been the planking technique used for European caravels, the invention of bulkheads, the adaptation of the compass for navigation in open seas, the development of multiple masts with several sails, and the use of square sails in addition to triangular ones. All represented leaps forward in shipbuilding. The technique of creating a frame onto which planks were nailed edge to edge made for light, strong ships and gave European caravels an edge in technology in the late 1400s that allowed their ships to dominate the oceans of Asia as well as Europe. It also permitted a small European power such as Portugal to take control of major sea routes and Europeans to sail with confidence to the Americas. In a race to catch up to European shipbuilding, the use of planks and nails on frames was adapted to their ships by Asian sea powers.

Another significant development in shipbuilding technology probably began in China with the creation of bulkheads, which, during a storm or after an accident, gave Chinese ships an advantage over others by containing flooding to a single chamber in the case of a breach in the hull or deck. This development would become essential in shipbuilding, permitting ships to better endure the hazards of the oceans; when coupled with the compass, it would allow ships to be built bigger and to range farther away from shore, creating new sea-lanes for commerce. These shipbuilding technologies resulted in significant social changes; those cultures that did not adapt the advanced technologies tended to become marginalized. For instance, the city-states of East Africa declined in part because the ships of their Arab trading partners, who controlled the trading lanes along eastern Africa's coast, lost that control to sturdier caravels, whose frames gave them space to carry not only more cargo but also cannons for attack as well as defense.

AFRICA

BY MICHAEL J. O'NEAL

The chief problem historians and archaeologists have with studying ships and shipbuilding practices in medieval sub-Saharan Africa is that any such watercraft the people may have built were made of nondurable materials. These materials probably included reeds, poles, bark, and logs. Because they are nondurable, they decay over time, so the archaeological record is thin.

Accordingly, historians and archaeologists have to rely on other sources. One is language. If the language spoken by a people contained words that referred to boats or rafts, then clearly those people used such watercraft. However, in some language groups there were no such words. One good example is the Bantu-speaking peoples of southeast Africa. To the extent that historians can know for certain, it appears that these people did not use watercraft of any type, for the language did not contain words for boat, raft, or other watercraft. For fishing purposes, they used traps and weirs (fences placed in a river or stream for catching fish) and did not venture out into the waters of a river on a craft.

A second method is artwork. Some examples exist of artwork that depicts watercraft and people using them. Some of this artwork is in the form of rock art that dates back to ancient times; however, it is likely that cultures continued to build similar watercraft into the medieval period. It is believed, for example, that the Tongan-speaking people used canoes for purposes of trade along river routes. Although they did not always speak the same language as those with whom they traded, evidence suggests that they rowed the canoes to the banks of the river near the trading community and then indicated their presence through whistles and similar noises. After the nearby people brought goods for trade, the rowers moved along to the next community. A 16th-century painting depicts this process, though it is unknown which tribe the rowers of the boat were from.

A third method, related to the second, is to rely on the testimony of European explorers, such as the Portuguese, as well as the testimony of Islamic explorers. In the 16th and 17th centuries numerous Portuguese explorers roamed the continent. In their travel accounts, they often mention boats and rafts. In most cases, these primitive craft were used by fishermen. Explorers also made drawings of people using watercraft, and in some instances, they took back to Europe models they had made of the craft.

In southern and East Africa most of these craft were very simple. They consisted primarily of rafts and canoes. Rafts were made by lashing together lengths of wood or poles. Canoes were made from bark or from dugout logs. In the case

of bark canoes, sheets of bark from such trees as the cottonwood—the bark of which comes off in sheets rather than in fragments—were lashed to a frame made of sticks. A sheet of bark was first heated to make it more flexible. In the case of dugout canoes, the size of the canoe was limited only by the size of available and suitable trees. In most cases throughout Africa boats were not propelled by rowing—that is, by oars fixed to the boat and pulled by a rower sitting backward. Rather, they were propelled by paddling, with the paddler facing forward, or by punting—that is, propelled by a long pole pushed into the riverbed or lake bed. While many such canoes were quite small, capable of carrying perhaps only two persons, some were up to 80 feet in length and could carry as many as 100 people. Most such craft were used on inland waterways, but along the Guinea coast and the Gold Coast fishermen ventured up to several miles at sea.

In addition to dugout canoes, boats made of lashed-together reeds were used on Lake Chad. On the East African coast dhows were in common use. The dhow was borrowed from North Africa and was usually a small boat with a triangular sail and a low mast. Some of the ships built in this region were in fact large, possibly as large as ancient Greek galleys and Scandinavian longboats. They were not as seaworthy, though, because they did not have an interior frame to give them support and to withstand the buffeting of heavy seas.

In this respect, historians distinguish among many different kinds of medieval boats. One of the distinctions they make is between boats with some kind of skeleton, or framework, and those that were merely a shell. In general, medieval African boats were of the shell variety. Even boats made of reeds were shell-like, and they floated because they were coated with some type of waterproof material.

In west-central Africa boats were more complex, primarily because many of the cultures that flourished in the region—Mali, Songhai, Ghana, Benin—were riverine cultures, depending on the Niger River and its tributaries for food, transportation, and trade. Evidence has been found that the people in this region made boats out of planks of wood and that the edges of the planks were rabbeted to form a tighter fit, then caulked to keep out the water. The boards were hewn with an adze, a chopping and carving tool made with a thin blade attached at right angles to a handle. Some of these boats may have been up to 60 feet long and had a carrying capacity of 6 tons. While western Africa made extensive use of plank boats, some evidence suggests that plank boats were also used in East Africa.

The Songhai culture made extensive use of boats and canoes, as did its predecessor, the kingdom of Mali. Much of the region was densely forested, making wood widely available for the construction of boats. Further, the population would

have been highly motivated to use boats and canoes because of the nature of the terrain. Such was particularly true during the rainy season, when rivers ran high and the area was dotted with lakes, pools, lagoons, and marshes. Water transport was often the most efficient way to travel and to import supplies from outlying regions to the kingdom's cities. Even in the modern world boats are a primary means of transportation in the nation of Mali.

One of the tribes that the Songhai subdued was the Sorko. One of the primary duties of the Sorko was to build and operate boats on the Niger and throughout the kingdom. Some of these boats were dugout canoes. Others were plank boats called *kanta*. These boats were used to transport such commodities as rice but were also used as transportation for the kingdom's elite families. Considerable evidence, including testimony by later European and Islamic travelers, notes that a common occurrence was for goods to be carried by human porters along footpaths to the edges of rivers. There the goods would be loaded into boats for transportation to city markets.

THE AMERICAS

BY LAWRENCE WALDRON

Most of the watercraft used by Amerindians in the Common Era had been developed much earlier. The canoes, kayaks, umiaks, rafts, and reed boats of the Common Era all had their origins in very similar vessels used by archaic Indians. Nevertheless, Amerindian watercraft and their uses continued to evolve in response to the changing conditions of the people. As some ethnic groups migrated inland, they either eliminated watercraft as unnecessary or adapted large, sturdy seacraft to rivers, rapids, and swamps. The design, building materials, function, and size of watercraft all came under review from time to time as Indians changed their lifestyle, territory, or trading patterns. By far the most powerful factor affecting boat design was the craft's usefulness in obtaining food. Tied to these practical considerations, some boats became increasingly streamlined, lightweight, or maneuverable. Others became larger and sturdier in order to transport large crews and payloads, sometimes over much longer distances.

By the beginning of the Common Era there were several different varieties of stretched-skin boats in use throughout the varied environments of present-day Canada and the United States. As some groups adopted the technology of the skin boat, they also quickly changed its material construction to better suit their environment and the materials available to them.

The Indians of the North American woodlands may have adopted the idea of making boats by stretching membranes over wooden armatures from their westerly neighbors, the

Plains Indians. Crow and Arikara hunters and traders had been using such boats from ancient times, made by stretching a bison hide over a bentwood frame. However, Woodland Indians such as the Cayuga, Ojibwa, Micmac, and many Iroquois groups had no regular access to large mammals so they found an ingenious substitute. Theirs was a skin boat made not of animal hide but of tree bark. While tree bark might seem to be either too delicate or too brittle for use as a boat-building material, certain species of trees provide a hardy bark that can be soaked or beaten into a strong and flexible membrane.

Women usually did the fine but tedious work of preparing the bark and tying it to the gunwales with roots or animal sinew. Young men then bent and fastened the wooden frame into the desired shapes. In some cases crossbeams, thwarts, and other parts of the frame were forced into the hull only after it had been sewn together by the women. In this way the hull was stretched to an extreme tautness. Tree resin, animal fat, or both was then added to the stitching to waterproof the vessel.

Eastern Woodland Indians favored elm, birch, and linden bark. Some western groups, such as the northern Shoshone and Bannock ethnicities, also developed these bark vessels after switching from the wooden dugout canoes they had used before the Common Era. What distinguished many Woodland bark boats was that they did not follow the umiak and kayak design favored by earlier groups for stretched-hide craft. Rather, Woodlands boatbuilders used bark to construct a type of craft otherwise made only in wood, the canoe. This small, fast-moving bark canoe weighed no more than a small child and could be hoisted out of the water and carried from one river to another. Thus Woodland Indians moved across their territories with seemingly no more difficulty on water than on land.

Throughout much of the Americas and many of the Caribbean islands, the dugout canoe was the watercraft of choice. This often flat-bottomed vessel was easily adaptable to South American rivers, Mexican swamps, island-to-mainland ferrying, and even the open seas of the Caribbean and Gulf of Mexico. It had no rudder and was steered by boaters who used paddles that allowed them to face in the direction they were traveling. While canoes in North America often featured a pointed prow, those farther south, from the Rio Grande to the Amazon, tended to vary greatly in shape.

Classic Maya ceramic pots depict both historic and mythical figures riding in canoes with raised prows and sterns that curl upward and outward, serving not only as a decorative flourish but also to prevent splashing water from entering the hull. Maya imagery also illustrates a rather snub-nosed variety of canoe, which seemed to retain more of the

purely cylindrical proportions of the tree from which it had been hewn. Central American canoes south of the Maya and South American canoes could be likewise cylindrical, lozenge shaped, or nearly rectangular. Some featured a narrow, flat-tened shelf along the gunwales, prow, or stern. Canoes found along the South American coasts and Caribbean islands featured a pot-bellied design in which the center of the hull was far wider than the extreme ends of the vessel.

In making a dugout canoe, a tree of a suitable variety and size was selected and felled. An oily or resinous species, such as Spanish cedar, was preferred because it could withstand water seepage and rotting. Trees could vary in height from those that would yield the typical 10- or 20-passenger to the 80- to 100-passenger canoes used by Carib and Maya seafarers. Once felled, the tree's bark was removed, after which the canoe could be fashioned by some reductive process. In one such process used by the Aztec and many others throughout the circum-Caribbean and South America, contained fires were set along the upside of the stripped log in order to render the wood there brittle and workable. Adzes were then used to chip away the fragile charcoal, leaving the characteristic dugout hull.

This cavity could be deepened by further charring but could also be stretched outward by another process involving saturation with hot water. Water was poured into the newly carved hull, after which hot rocks were dropped into the water. The hot, steaming liquid would render the wooden fibers of the carved log elastic, causing the hull to expand outward. The result was a canoe whose hull was rounded halfway along its length and wider than the tree from which it was originally carved.

Perhaps the most unusual American watercrafts were those developed by Andean Indians in ancient times but which have been used throughout the Common Era up to the present. Inca and other indigenous boatmen paddled or poled small reed boats across the sprawling Lake Titicaca. In these fibrous vessels Peruvian and Bolivian pilots transported family members, foodstuffs, and even their llamas. Fishermen also cast their nets into the lake from these buoyant vessels and either loaded on or hauled their catch home behind them.

The boats were fashioned from four or more bundles of *totorá* reeds, a kind of thick grass that grew along the shores of slow-moving bodies of fresh water. The reeds were lashed together into a canoe-like shape, with an upward-curling prow and stern. Typically, a reed boat could last up to a year before it rotted or became waterlogged. The biodegradable vessel could then be used for any number of purposes, from fire kindling to construction filler. Since reed boats were quite narrow, lakeshore Andeans could not use them for all their

transportation needs. To supplement their fleets of reed boats, the Inca also built flat balsa log rafts for transporting much larger amounts of goods and animals across the vast expanses of Lake Titicaca. It is worth noting that while the unusual reed boat seems to have developed only in the Andes, it had a North American analogue in the marshlands of California. There, the Yokut Indians used *tule* grass to make rafts, which were similarly buoyant and biodegradable.

By the time of the European encounter, Native Americans had not developed large ships with masts, sails, compartmentalized bulkheads, or the like. Though maritime trade connections existed all along the western shores of the Americas and across the Caribbean Sea, Amerindians seem to have felt neither need for nor interest in explorations beyond the coastal and Caribbean archipelagos. Disconnected from other landmasses where maritime technologies had been circulating for millennia, Indians developed instead a unique variety of small vessels tailor-made to American trading, fishing, and hunting needs.

In turn, early European settlers observed that native watercrafts were much better suited to inland river travel than their large ships. They often adopted the technology of Indian vessels wholesale so that many designs remained virtually unchanged throughout the colonial period. Even the nomenclature of these Indian vessels was retained so that kayaks and umiaks are still called by those names and likewise the Arawak word *canoa* has been adopted to refer to a variety of vessels throughout the Americas, now generically called canoes.

ASIA AND THE PACIFIC

BY KENNETH HALL

Ships and local watercraft were crucial in the development of Asian and Pacific societies. Small dugouts and hulled wooden ships that have been recovered among regional coastal archaeological sites are smaller versions of the watercraft that dominated the trade route between Africa and China during the era before 1000 C.E. These were the prototypes for the Southeast Asian *jong*, China Sea junks, and western Indian Ocean dhows that European navigators encountered when they arrived in the 16th century.

During the medieval age Asians built, owned, and navigated ships that were often of considerable size and were the preferred source of transport for the international trade in the India-to-China maritime passageway. In the Middle East-to-India portion of this route, variations of the Middle Eastern and Indian dhows were preferred; from roughly 800 to 1000 the dhow was prominent among vessels sailing between India and China. From 1000 the Malay *jong* was the prototype for the large Chinese junks of up to 1,000 tons carrying capacity,

which with redesigned *jong* were then preeminent in providing transport to the increased volume of trade merchandise along the India-to-China route.

During the medieval era Malayo-Polynesian seafarers continued to navigate the Pacific in ingeniously designed and built double-outrigger canoes. These boats consisted of two hulls connected by lashed crossbeams and covered with a central platform. Although referred to as a canoe, the vessel was wind-driven, using sails made of natural fiber matting. The two hulls gave the craft incredible stability and resiliency in the open ocean as well as the capacity to transport people and supplies over long distances. A medium-size boat 50 to 60 feet long could accommodate two dozen people and their belongings, including plants and animals to be introduced on the new islands they settled. Many 21st-century Polynesian sailors continue to use boats with the same basic design.

One sailing ship relief carved on central Java's ninth-century Buddhist stupa at Borobudur shows a sophisticated medium-size ship that used multiple masts, at least two types of sails (a canted square sail and a lugsail), a spritsail, quarter rudders, outriggers, and paddles that stuck out of portholes. A second Borobudur relief depicts similar ships but without outriggers. This second relief is consistent with contemporary cave paintings from Ajanta in western India, which show large, multi-masted ocean vessels without outriggers. The Chinese imperial records and the accounts of Chinese Buddhist pilgrims speak of the *kunlun bo*, "Southeast Asian ships," sailed by multiethnic Southeast Asia-based seamen that visited China's ports and provided most of the transport for China's Buddhist pilgrims en route to Southeast Asia and India from roughly 300 to 1000. The largest ones were said to be more than 164 feet in length and stood out of the water 13 to 15.4 feet and were thought to carry up to 600 to 700 persons with 10,000 bushels of cargo (250–1,000 tons). Like the ships depicted in the Borobudur reliefs, these ships had up to four sails made from natural fibers that were set in an off-center, oblique row so that they could better maximize the wind currents and sail at maximum speed during the Asian monsoon seasons.

Based on the evidence supplied by recoveries of early shipwrecks, it is now confirmed that before 1000 Southeast Asian *jong* and Chinese junks were constructed of several layers of thin, horizontal planks, normally up to 200 feet in length and lashed together using cords made from the fibers of a coconut; the several layers provided reinforcement against an outer plank breaking. Because of the shortage of iron in the shipbuilding areas of Southeast Asia, nails and clamps were not used. Chinese accounts report that this was also because of local belief that the heating used in the production of iron would give rise to shipboard fires. The resili-



Mountain and river landscape: sailing before the wind; ink on silk panel, Ming Dynasty, China, 1368–1644 (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1916-136)

ient saltwater-soaked fiber lashing was preferred because it would not rust or pop out in a storm.

Recoveries of shipwrecks at South China Sea and Melaka Strait archaeological sites confirm these literary accounts.

Southeast Asian ships and boats had planks and frames fastened together with coconut palm ropes; the ship hulls were built by attaching planks on each side of a raised rib that was attached to a center keel. “Sewn plank” ships had stitches of fiber rope passing through holes drilled near the planks’ edges within the seams. “Lashed lug” ships had the insides of their planks cut out so that the planks could be lashed to the ship frame. In either case, the frame of Southeast Asian ships was not watertight. These sewn and lashed ships were adequate for the luxury trade of the era before 1000, but new opportunities that came with the increased volume of the maritime trade route in the Song era, made this technology inadequate.

By the 13th and 14th centuries new dowel-fitted teak ships—which the initial 16th-century Portuguese visitors called *junco*, the transcription of the Malay *jong* and Chinese junk—provided greater rigidity for the ocean crossings of larger boats with a carrying capacity of up to 1,000 tons. These ships towered over the smaller Portuguese *nau* that had a carrying capacity of 400 tons. Common to the earlier *jong*, the new ships were neither nailed nor lashed but were built using up to three layers of planks held together by wooden dowels that were inserted from the inside into holes drilled at the seams. Southeast Asian *jong* had three to four sails (a bowsprit sail, a spritsail, a canted square sail, and a lugsail) made of woven rattan (bark fiber) and three rudders, one on each side and one in the middle, in contrast to the Portuguese, Chinese, Middle Eastern, and Indian ships of that era that used a single, stem-post rudder.

In contrast, Chinese junks built after 1000 did not have a keel at their center and were flat-bottomed. They had a single, large stern-mounted rudder (in contrast to the two Southeast Asian *jong* quarter rudders), which could be adjusted up or down according to the depth of the water. The rear rudder was critical to the junk’s stability and was so large that up to three men had to control it during storms. Leeboards and centerboards attached to the hull also helped to stabilize the *junk*. By the 15th century the heavy rear rudders had holes drilled in them to allow for greater maneuverability.

The most notable feature the junk of that era was its watertight hold, separated by bulkheads, which reduced the likelihood of sinking should a single hole be made in the hull. Each division of the hold could be reached through separate hatches and ladders. This also allowed the spatial separation of different types of cargoes and differentiated human living space from transported commodities. By the 15th century Chinese ships had square-pallet bilge pumps that were used to pump water seepage from their holds. Like the *jong*, a junk’s navigational flexibility resulted from its multiple rectangular sails (battens—from three to 12 on the largest junks), which

could be readily angled, whether moved inward toward the ship’s center to allow the junk to sail into the wind (by letting the wind cross the sail and pull it forward, similar to the uplift that occurs when wind crosses an airplane wing), or outward allowing the sails to catch the fullness of the wind currents from the rear.

Chinese ships hung flags from their masts both as identification and for good luck. Red and other brightly colored flags with Chinese writing on them were intended to please the dragon that Chinese sailors believed lived in the clouds, so the dragon would not cause endangering typhoons and other storms. All Chinese ships depended on the compass for navigation, supplemented by the sailors’ knowledge of the stars and constellations and the detailed navigational charts that were critical to the movements of Chinese shipping—among these were the massive Ming “treasure fleets” commanded by the eunuch admiral Zheng He from 1405 to 1433. By the 15th century large freight-carrying China- and India-based junks and Java-based *jong* dominated the bulk carrying trade, supplemented by smaller vessels modeled on the *jong* or junk, which were based in the ports of Myanmar (Burma), Thailand, the Straits of Melaka, Vietnam, Korea, and Japan. These smaller regional craft frequently used slave laborers as sailors and were known for their acts of piracy as well as their alternative role as cargo carriers.

The largest ships were designed to maximize profits in the peaceful bulk-carrying trade, but lacked the speed to flee, outmaneuver, and combat the firepower of the earliest Portuguese and Spanish ships (only the early 15th-century Ming fleet had mounted cannons). After the arrival of the Europeans, Southeast Asian shipbuilders in Burma, Thailand, and Java built galleys of less than 200 tons capacity for military combat and constructed smaller and cannon-armed *jong* and junks that were able to neutralize the initial European advantage.

In the western Indian Ocean and in coastal India, several regional variants of the dhow were preeminent. The “Arab” dhows were commonly built in the Middle East and South Asia with a high stern and side rails sweeping low toward the bow before rising to a characteristic jutting prow. The largest medieval-era dhows reached up to 115 feet in length and could carry 400 tons. They had a rear rudder and a yoke-type steering gear system with chains leading from the ends of the yoke to the steering wheel. Dhows had two lateen (triangular) sails, in a fore-and-aft rig, unlike the square rig characteristic of early European sailing ships or the rectangular sails common to *jong* and junks. These lateen sails allowed the dhow to sail into the wind; as the wind crossed the sails that were filled with air the ship was pulled ahead.

Like the *jong*, the dhow was constructed from a center keel. It was not watertight with holds like the junk, but in-

stead like the *jong* had coconut husks packed into its seams, which swelled when wet to prevent water seepage. Dhow construction started with the hull planking and later added the reinforcing framework. This planking had to be supported during construction, which required temporary supporting ribs or templates on the outside. As in the eastern Indian Ocean, the dhow sideboard planking was lashed or sewn together using coconut fiber cord acquired from India, which had been soaked in saltwater to give it strength. Teak from southern India was the preferred wood for dhow construction, and early dhows had teak masts that leaned forward a bit to catch the wind better and which also allowed their use in the loading and unloading of cargo. A feature unique to the dhow was its “thunderbox,” the barrel-shaped structure overhanging the stern that served as the ship’s sea toilet.

EUROPE

BY DETLEV ELLMERS

In the Middle Ages no craftsmen had to work more carefully than did the shipwrights. The lives of everyone on board depended on the quality of the shipwrights’ products. Well-trying techniques—for example, how to join planks—were passed from one generation to the next, resulting in highly specific shipbuilding traditions. Each technique produced watercraft for different purposes, whether from small boats for local fishing and ferrying to big vessels for long distance trade. The trading ships were the biggest movable objects made by men. The details of ship construction are best known from excavated craft, and these archaeological remains make it possible to identify different shipbuilding traditions and to understand their development over the centuries, as well as identifying local variations within one tradition. Many ship finds (sites where ships are found) in Scandinavian and British waters and along the southern shores of the Baltic and North seas give good direct information. Research in the Mediterranean and along the Atlantic shores of the Continent, where there have been only a few medieval ship finds, depends more on written and pictorial sources.

In Mediterranean seaports medieval shipwrights continued to make ships like the Romans had. For centuries they continued to use mortises and tenons to join the edges of the planking, until, in the late Middle Ages, they arrived at the simpler carvel construction. Like the Romans, they arranged two steering oars, one at each side of the stern, and adopted the sternpost rudder of Hanseatic cogs after 1300. In the late 10th century shipwrights began a momentous change in the rigging of large vessels. Instead of one large triangular sail (called a lateen sail), they added two sails, and later three minor ones, on two or three masts. This allowed smaller crews

to maneuver ships more easily, as the sails could be operated one after the other, with each being more manageable than a single large one.

The main type of warships—used in armed conflicts and for escorting trading vessels—were long, narrow galleys, designed for speed, created for large crews of oarsmen (about 100 in the ninth century, up to 230 beginning in the 12th century) who operated in two or more rows along each side. Auxiliary sails made the voyage out to the enemy easier but required a small extra crew of sailors. A third crew of warriors was on board to fight with hand weapons and catapults. The fleets of galleys and other supporting types of warships were built, equipped, and maintained in state arsenals, which became centers of many different crafts with a high degree of division of labor. The medieval arsenals at Barcelona or Venice are still to be seen.

After 1300 Venice and Genoa converted the galley into a special trading vessel, the “great galley.” It was larger and broader than the fighting galley, and it carried little or no armament except where there was a risk of pirates. It made better headway under sail than when powered by oars, which were reduced in number to create greater cargo space, and it was more reliable than mere sailing ships. It carried passengers (often pilgrims to the Holy Land) and valuable cargoes and, as early as the 14th century, sailed as far north as Flanders.

All other types of Mediterranean trading vessels were summed up in the term *round ships*. Their name derived from the Roman *oneraria*, and they were tubby, spacious, and slow, propelled exclusively by sails. While the Venetian trading fleet remained that of the state, all other round ships were built in private shipyards, belonged to private shipowners, and transported cargoes and passengers for private merchants. In 1268 a record describes Venetian round ships as being about 85 feet long, 20 feet wide (with a length and beam proportion of 4.2), and about 21 feet high, with two masts for lateen sails, two complete decks, one forecabin for the crew, and a spacious quarterdeck for officers and high-ranking passengers.

Early medieval Scandinavia had no towns, so ships were built at rural estates. Many examples of these Scandinavian boats have been excavated. Typically, they are long and narrow open rowing boats (with a length and beam proportion between 5 and 7) propelled only by a single row of up to 20 oarsmen seated along each side and steered by a rudder on the starboard, or right, side of the hull (as it moved forward). From the keel, forming the backbone of the construction, stem and stern posts rose in elegant curves. The thin planks overlapped each other, with iron rivets joining the overlap. This overlapping construction is called clinker-built. Because of their shallow drafts, these light and sail-less boats landed

by simply beaching at a convenient sandy shore. People used these boats to contact their neighbors, visit religious festivities and political meetings, and raid coastal settlements. Because those who rowed were also warriors, even small fleets could suddenly overcome settlers. It was in these boats that the Angles and Saxons raided England in the third and fourth centuries, settled there in the fifth century, and introduced their shipbuilding tradition into England. In the seventh century, without losing any of its raiding qualities, this type was outfitted to carry one square sail. Step by step the seaworthiness of these vessels increased (with a length and beam proportion of 4.5 to 6) until, in the late eighth century, the Vikings began to raid settlements along almost all the European shores and most European rivers.

For purposes of trade the Scandinavian and Anglo-Saxon shipbuilding tradition produced broad and high but open sailing boats. It was on these that the Vikings dared to cross the Atlantic for Iceland (beginning around 870) and Greenland (985). The archaeological evidence for these trading boats does not go back beyond the 10th century. Older, well-preserved boats, designed to transport people or to engage in battle, have been found sunk in boat graves or at sacrifice sites preserved in peat. But there was no religious reason to deposit trading vessels on the bottom in ritualized fashion. Thus no old trading vessels are found, although they might well date further back than the 10th century, especially since, in the first century C.E., Pliny knew of Germanic mariners making use of sails. Stimulated by increasing maritime trade, the first seaports were established in Scandinavia before 800. Shipbuilding gradually moved off the rural estates and became an urban profession, and the sizes of trading vessels expanded. The best-documented one (Skuldelev 1), built between 1030 and 1040 in western Norway, was about 52 feet long, 16 feet wide, and 7 feet high and could transport 20 to 25 tons of cargo; nevertheless, it was not the biggest of its time.

Outside the Mediterranean and Scandinavian regions, other shipbuilding traditions were developed. That of the cog started in the Frisian mud flats with small trading vessels on which Frisian trade entered the western Baltic before 800. Cogs had flat bottoms, straight stem and stern posts, and steep clinker-built sides. Their thick, wide planks were joined by iron nails. Before 1200 growing Hanseatic trade made the cogs in the Baltic and North seas the predominating trading vessels, using the new stern rudder instead of the Frisian side rudder. The best-documented cog, built at Bremen in 1380, was about 77 feet long, 25 feet wide, and 14 feet high and transported 80 to 84 tons of cargo, but its deck was not waterproof. It had a sheltered quarter for officers and high-ranking passengers in the aftercastle, while the crew, as usual, had to sleep on the open deck. In the event of hostile actions war-

riors were taken on board the trading cogs. In this tradition the small boat for fishing, inland traffic, and other purposes is known as a *kahn*.

Farther west, along both sides of the English Channel, the *hulc* was the predominant trading vessel from the eighth to the 11th centuries. The word means “dugout,” and indeed this shipbuilding tradition began with an oval-shaped dugout. Remains of a dugout dating from around 1000 have been found near Utrecht. It had three additional strakes, or bands of hull planking, added to it, establishing the base of a roughly 56-foot-long, 12-foot-wide, and 4-foot-high seagoing boat. The *hulc* eventually grew to such size that, beginning around 1400, it displaced the cog—even in Hanseatic seaports. This *hulc*, for the first time outside the Mediterranean, had narrow accommodations for the crew in the forecastle and, after 1450, had three masts added to it.

The shipbuilding technique of carvel construction, consisting of heavy planks, edge to edge, nailed with wooden dowels only to frames, was thought to have originated in the Mediterranean. But an excavation from Port Berteau indicates its origin on the French Atlantic shore. This roughly 48-foot-long and 16-foot-wide trading vessel was built there, using carvel construction, in 600. It points to a decisive role for the Bretons in spreading carvel construction. By the 15th century all Europe was using the technique for large ships, because it allowed them to be made stronger and bigger than any other means. The carvel construction was supplemented with waterproof decks and the advantages of the other shipbuilding traditions (sternpost rudders, three masts, and accommodations for all people on board). Evidence from 1493 shows that this construction even allowed a gun deck to be built underneath the main deck through which heavy guns could shoot from gun ports that could be closed from inside for secure sailing. Thus, at the end of the Middle Ages, the Europeans had a ship superior to that of any other nation and they made worldwide use of it.

THE ISLAMIC WORLD

BY AMY HACKNEY BLACKWELL

People in the Islamic world made great use of sea transportation, sailing in the Red Sea, the Mediterranean, and across the Indian Ocean. Islamic ships were different from ships of the West, containing several design features that made them better able to handle the unpredictable conditions and changing winds of the region. Within the Mediterranean, many Islamic sailors used the boats typical of that region. These had square sails and flat bottoms and were constructed of planks nailed together. Their military ships included galleys, which could be rowed by teams of men. For the most part, however,

Islamic sailors used traditional Arab boats, usually called *dhow*s in English. The people of the Muslim world did not call them by that name, and historians are not sure where the word comes from. Arabs called their vessels “sailing ships,” or *marakib*, or they used specific technical terms for different types of dhows.

There were some 200 different styles of dhows known in the Muslim world. These included the *zanuq*; the *boum*; the *sanbuq*; the canoe-like *zaruq*; the Kuwaiti *batil*; the *mtepe* of Kenya; the felucca, which was common on the Nile and the Red Sea; and the *baghlah*, a dhow that sailed in the open ocean. Dhows typically did not have decks and were steered with tillers. Passengers who were not seafarers reportedly found them very uncomfortable to ride in, and often found overseas voyages terrifying.

Dhows had long, thin hulls. Most dhows were built of wooden planks lashed together with coir (coconut-husk fiber) ropes. Historians sometimes describe this method of joining planks as stitching, and Arab ships are described as being stitched together. The vessel was then waterproofed with grease. From a practical perspective, the dhow’s design was ideal for sailing conditions in the Red Sea and Arabian Gulf. Waters in this area could be shallow and full of coral reefs and sandbars on which vessels might run aground. In the seventh century an Iraqi viceroy attempted to introduce to the Arabian Gulf ships of the nailed-together style being used in the Mediterranean. With their flat bottoms and square sails, they proved much more prone to running aground and suffering damage when they did so than the traditional dhows. Arab shipbuilders did not start nailing their ships together until the end of the 15th century, when Portuguese explorers arrived with cannons. Nailed ships tended to survive cannon attacks better than lashed dhows.

Unlike European ships, dhows were not distinguished from one another by the number of their masts. What made one type of dhow different from another was the shape of its hull. Small differences in the shape of bow and stern helped sailors identify types of ships. Some dhows also had elaborately carved sterns or bows, often in the shape of menacing faces and heads. Historians believe that these decorations and figure-heads were meant to frighten either enemies or evil spirits.

The origin of the dhow’s design is unknown. The 15th-century Omani sailor Ahmad ibn Majid-an-Najdi wrote a treatise on navigation in which he suggested that Arabs had learned how to build ships from Noah, who learned the art from the archangel Gabriel. He claimed that the stars of the constellation Ursa Major formed the shape of Noah’s ark. Arab shipbuilders claimed to be able to see the outline of a *batil*, a style of dhow common in Kuwait, in the constellation. Historians surmise that this story must have been a very old

legend, and further that it proves that the shape of the Arab dhow had been invented long before the time this tale was written down.

A dhow might have from one to three masts. Each mast could hold one sail. Most ships in the Islamic world used settee or lateen sails. Ancient Arab boats used semitriangular sails called settee sails. These gradually evolved into the sharply triangular lateen sail, in contrast to the square sails common in the West. They were attached both fore and aft. They could be very tall. The top of a lateen sail came to a sharp point.

Historians disagree about the origins of the lateen sail. Lateen sails do not appear in European illustrations until Byzantine manuscripts of the ninth century, leading some historians to surmise that the design appeared in the Middle East during the Arab expansion of the seventh and eighth centuries and thereafter found its way into the Mediterranean. Lateen sails did not arrive in northern Europe until



Abduction by boat, from a manuscript of the Khamisa (Quintet) by Amir Khusraw Dihlavi, opaque watercolor, ink, and gold on paper; Afghanistan; ca. 1496 (Freer Gallery of Art, Smithsonian Institution, Purchase, F1937-27)

the 14th century. Likewise in Asia most early medieval depictions of sails in India and China were of square sails. Although many scholars argue that the design originated in the Mediterranean and spread west to the Indian Ocean or vice versa, others believe that the lateen sail was invented on the Red Sea. Historians who support this viewpoint argue that square sails work very well in the large oceans of the Far East and Europe, but they are not effective in the seas around the Middle East.

Winds in the Red Sea and the Gulf of Aqaba constantly change directions, forcing sailors to fight their way into the wind quite frequently. Sailing close to the wind is very difficult with square sails because it is hard to change their alignment. The lateen sail's direction can be changed quickly, making it more flexible for sailing in and out of harbors and easier to sail into the wind. Multiple lateen sails provide good sailing speed while still allowing much more flexibility than is available with square-rigged vessels.

Sailing a boat into the wind can require sailors to make regular changes of direction, zigzagging across the wind in order to sail upwind. When sailing a dhow with a lateen sail into the wind, medieval Arab sailors generally avoided tacking, which involves changing the bow's direction across the wind. Instead, they preferred to wear around, or change course into the wind by turning the bow away from the wind and letting the stern turn. Dhows had small rudders that were not very effective at turning the boat into strong winds. It was easier to let a boat take the path of least resistance and sail in a nearly complete circle with the wind in order to change direction.

Arab dhows were large enough and maneuverable enough to travel from the Red Sea to India. Dhows were also maneuverable enough to make good pirate vessels. Pirates lurked near the shores of the Red Sea. Merchant ships would travel down the middle of the Red Sea to avoid attack. An Arab ship could carry 20 to 50 tons of cargo. Merchant ships generally delivered this cargo to the northern point of the Red Sea, from which it could make a quick journey to land markets. A merchant sea captain would employ a crew consisting of 10 to 30 men, depending on the size of his vessel.

The first known illustration of an Arab ship is that of the Hariri ship from 1237. This illustration appeared in a book of grammar written by Abu Muhammad al-Qasim ibn Ali al-Hariri. The illustration shows stitched planking, an anchor, and a central rudder mounted in the stern. There are other, earlier Arab depictions of ships, such as paintings of three-masted ships on ceramic bowls from the Balearic Islands from the 11th century, but these illustrations do not provide much detail.

Some Western historians have suggested that Arab peoples did not like to sail. This assessment is partially based on an eighth-century letter sent by Umar ibn al-Khattab, the second caliph of Islam (r. 634–44), refusing to allow the governor of Syria to invade Cyprus. The letter said that the sea was so large as to make ships seem tiny and was not to be trusted because it could easily kill people on it. Later, in the 12th century, other commentators noted that the Egyptian navy was incompetent and disobedient and ineffective at naval warfare. Nevertheless, other historians point out that Arab sailors from the Arabian Peninsula had large sailing fleets that traveled around the peninsula, down the east coast of Africa, and across the Indian Ocean and Bay of Bengal to trade and spread Islam. They note that the Arab poet Tarafah wrote verse about ships sailing on the sea back in the sixth century and that Arab scholars write about *khaliya safin*, or "great ships" that sailed in the sea. Some Arab writers refer to ships as *batsha*, with or without an adjective meaning "big." This term appears to have referred to both Christian and Muslim ships.

See also ARCHITECTURE; ART; ASTRONOMY; BUILDING TECHNIQUES AND MATERIALS; EXPLORATION; HUNTING, FISHING, AND GATHERING; MILITARY; SEAFARING AND NAVIGATION; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

FURTHER READING

- Tappan Adney and Howard I. Chappelle, *Bark Canoes and Skin Boats of North America* (Washington, D.C.: Smithsonian Institution Press, 1993).
- Ralph A. Austen and Daniel Headrick, "The Role of Technology in the African Past," *African Studies Review* 26, nos. 3/4 (1983): 163–184.
- George F. Bass, ed., *A History of Seafaring Based on Underwater Archaeology* (London: Thames and Hudson, 1972).
- Roxanna Brown, *Turiang: A Fourteenth-Century Shipwreck in Southeast Asian Waters* (Pasadena, Calif.: Pacific Asia Museum, 2000).
- Ole Crumlin-Pedersen and Olaf Olsen, eds., *The Skuldelev Ships I: Topography, Archaeology, History, Conservation and Display* (Roskilde, Denmark: Viking Ship Museum, 2002).
- James P. Delgado, *Native American Shipwrecks* (London: Franklin Watts, 2000).
- Ivan A. Donnelly, *China Junks and Other Native Crafts* (Singapore: Graham Brash Ltd., 1989).
- Robert Gardiner and Richard W. Unger, eds., *Cogs, Caravels and Galleons: The Sailing Ship, 1000–1650* (London: Conway Maritime Press 1994).
- George F. Hourani and John Carswell, *Arab Seafaring in the Indian Ocean in Ancient and Early Medieval Times* (Princeton, N.J.: Princeton University Press, 1995).
- Louise Levathes, *When China Ruled the Seas* (New York: Oxford University Press, 1994).

Sean McGrail, "Toward a Classification of Water Transport," *World Archeology* 16, no. 3 (1985): 289–303.

Eric Rieth, *The Medieval Wreck from Port Berteau II (Chaente-Maritime)*. In *Down the River to the Sea: Eighth International Symposium on Boat and Ship Archaeology*, ed. Jerzy Litwin (Gdańsk, Poland: Polish Maritime Museum, 2000).

Richard W. Unger, *The Ship in the Medieval Economy, 600–1600* (London: Croom Helm, 1980).

► slaves and slavery

INTRODUCTION

Slavery—the practice of owning another human being for the purpose of exploiting his or her labor—has existed since prehistoric times and almost universally around the world in antiquity and the Middle Ages and until modern times. There are still millions of slaves in the world today. Most likely, slavery became intensively practiced as part of the agricultural revolution in the Neolithic era around 10,000 years ago. Hunter-gatherers would have little use for slaves. Australian Aborigines, for instance, did not keep slaves, but some hunter-gatherers in North America did keep slaves.

Slave owners had to adapt themselves to the psychology of the system based on injustice and exploitation from which they profited. They had to adopt a calloused and detached attitude to human life and an indifference to human suffering that would make them seem very much out of place, for instance, in the modern Western world. Rape of female slaves was common (whether or not it was legal in a particular culture). While some institutions, such as Islamic sharia law, required that women impregnated by their masters be freed, in many other cultures, such as western Europe, the fathers of such children were expected to treat their offspring as slaves. In some cultures the murder or even physical mistreatment of slaves was theoretically illegal, but it was very unlikely that a mistreated slave would ever be able to successfully sue for freedom in such cases. In both Europe and the Islamic world slaves supposedly enjoyed this legal protection, but it was nevertheless legal for slaves in both cultures to be put to work on plantations, where the combination of a starvation diet and oppressive workloads made the average survival time about seven years.

In both the Islamic world and Europe systematic thought about slavery was predicated on the work of the ancient Greek philosopher Aristotle. In his *Politics* he had written that slaves are slaves by nature and that slaves benefit from slavery, since their inferior condition cries out for direction by their betters. Still, in the legal regime of his day Aristotle himself could have been enslaved merely through the misfortune of voyaging away from Athens and being captured by

pirates. He could then have been legally sold to another Greek from any city other than Athens. As Aristotle was well aware, this is precisely what had happened to his fellow philosopher Diogenes. Aristotle's ideas kept slave owners from having to examine the true character of the relationship between themselves and the people they exploited.

Medieval religious institutions that stressed ideas of personal freedom and redemption, such as Christianity, Islam, and Buddhism, did not speak out against slavery but rather fully endorsed it. Saint Paul had permitted Christians to hold other Christians as slaves; however, after Christianity became the universal religion of Europe, the church generally did not allow Christians to be enslaved. Sharia law permitted Muslims to own slaves (and Muhammad himself had been a slave owner). Although Muslims could not be enslaved by other Muslims, slaves who converted were not to be freed on this account. The theory was that slavery was a suitable punishment for their earlier failure to convert. This was held to be true even in the case of slaves from sub-Saharan Africa and other isolated areas who had never heard of Islam until they came to be sold to Islamic masters.

Buddhist monasteries in China were supported by land grants. Their lands were usually worked agriculturally by slaves owned by the monastery so that the monks would not have to violate Buddhist teaching by having to kill insects while tending the fields. In 845 the Tang government of China confiscated more than 150,000 such slaves, partly on the ground that they were being mistreated by the monks beyond what was legally permissible even for slaves.

In general, there were two main ways in the Middle Ages by which people could become slaves. One was to be captured as a prisoner of war. This did not apply only or even especially to enemy soldiers, who would likely be hard to manage as slaves; women and children (the most desirable slaves) who happened to live in captured cities, towns, or villages could also be taken as slaves. The other common way people became slaves was through debt bondage (a practice still common in the third world today). In this scenario large landowners or other wealthy patrons loan money to small landowners or tenant farmers each year to buy seed and other necessities. The money is then repaid out of the profits from selling the harvest. But during bad years or through the mounting of interest on the debt over time, the farmer is eventually unable to meet the agreed payment schedule and must enter slavery or sell a child into slavery to discharge the debt. It was to discourage this practice that loaning money at interest was forbidden by Christianity and Islam. Even if Christians could not technically be forced into debt slavery by other Christians, they could still be forced into indentured servitude, a sort of temporary slavery lasting several years.

AFRICA

BY AMY HACKNEY BLACKWELL

Slavery was present throughout medieval Africa in various forms. Most African slaves were not chattel in the sense that American slaves were. Medieval African slavery was more an occupational classification; agricultural workers and domestic workers were often classified as slaves. In many cases, the people who functioned as slaves were really more equivalent to indentured servants, who were temporarily forced to work for another but who could expect to see freedom again. For most of the medieval period slaves were not a major commodity sold in large numbers on the open market, though Mali was known for its hugely profitable slave trade.

Slaves were common. Historians estimate that between one-third and one-half of the population in most sub-Saharan societies was enslaved. The medieval kingdoms of Ghana, Songhai, and Mali were all about one-third slaves. Slaves in medieval Africa were often prisoners of war who were brought to the homes of their captors and made to work. Sometimes vassal states would deliver specified numbers of male and female slaves to their overlords as a political tribute or as part of a treaty agreement. In other cases, convicted criminals and debtors could be forced to work as slaves for their victims' families. Sometimes slaves changed hands through dowries when people married. The children of slaves often became slaves themselves.

Many African slaves received wages for their work and often could earn their freedom. Depending on the society, free people could marry slaves. Ashanti slaves, for example, could themselves own slaves. They could also own property, marry, testify in court, and even be the heirs to their masters. Ashanti slaves often intermarried with their owners' families and their descendants intermingled to the point that their origins became obscure. Some slaves worked their way very high up in society. The freed slave Sakura, for example, seized the throne of the Mali Empire in about 1285.

In the Mali Empire slaves provided much of the agricultural and domestic labor. The slave trade flourished. Spanish observers around 1500 reported that the merchants of Mali were extremely rich and that they did a brisk business in buying and selling slaves on market days. Slaves of all ages were sold, including children. The king of Mali had numerous slaves in his palace, some of them doing domestic work and others serving as concubines.

Among the Songhai people and in the Bornu Empire, many agricultural workers functioned as vassals, akin to European peasants or serfs. Nobles owned or controlled large areas of land. The people who farmed the land had to pay tributes of crops and other goods to the landowners. Nobles might

also control their movements and actions. They did not, however, ordinarily buy and sell large numbers of peasants. The Hausa people in the area of northern Nigeria organized their society into several social strata, ranging from lords at the top to free peasants to serfs bound to the land. The Bornu likewise ordered society into a feudal hierarchy. Nobles were at the top. Below them were freemen, who included freed slaves. Next came slaves, who were typically men and women captured in wars. At the bottom were descendants of slaves, who worked as laborers and as foot soldiers in the army.

The people of the Congo region were long accustomed to slavery. When groups went to war with one another, they would take prisoners home with them to serve as slaves. They also enslaved people convicted of crimes and people who could not pay off their debts. In many cases slaves could gradually earn back their freedom. In eastern Africa many households used slaves as domestic servants. Ethiopian slaves, for example, lived with families and were largely considered part of their owners' families. Slave owners had to feed, clothe, and care for the slaves who lived with them. Ethiopian slaves were allowed to move about freely, to conduct their own business, and to observe their own religions. Within the homes of their employers they performed domestic duties, such as cleaning, cooking, making clothing, and raising crops and livestock. Some male slave owners had sex with their female slaves.

A number of sub-Saharan Africans ended up as slaves in the Arab world. Starting in the 10th century Arab traders regularly crossed the desert with camel caravans. They would acquire Africans in Mali, Ghana, and other points south of the desert and transport them to North Africa. Slaves regularly moved from Ghana to Morocco and Tunisia, from Chad to Libya, and from the southern reaches of the Nile upriver. These traders transported about 6,000 slaves every year. Traders acquired more women than men because their Arab customers mainly wanted domestic servants and concubines. Some African men also were slaves, working as soldiers in North African armies or as eunuchs who guarded the women in harems. Many black African slaves married into North African society. Eunuchs were especially valuable in Muslim markets. Because Islamic law prohibited the mutilation of slaves, traders often castrated male slaves in Africa, at the point of purchase or at some point before entering Muslim territory.

The slave trade on the Indian Ocean coast began in the seventh century and lasted throughout the medieval period. Arab traders sailed to the African coast and acquired slaves from local traders who were generally black Arabs. These traders captured or bought African people and shipped them north to Yemen, Arabia, or even India. Like the Arab traders in the Sahara, they preferred female slaves to males. Many

of these slaves passed through the island of Zanzibar, which became a major market in the Indian Ocean slave trade.

The Atlantic slave trade appeared much later than the Indian Ocean and Saharan trade routes. Portuguese slave traders began capturing people to be slaves in western Africa in the 15th century. Portuguese colonists in São Tomé and the New World wanted laborers to grow sugarcane, so they turned to Africa. Gomes Eannes de Zurara, a Portuguese chronicler, reported that starting in 1444 the Portuguese captured Africans by waging war on them in the name of Portugal and the saints. The Portuguese sailed to the Gulf of Arguin on the coast of Mauritania in ships called caravels, well armed and prepared to fight. They would land at night and attack fishing villages by surprise. According to Zurara, Portuguese soldiers attacked Africans with weapons, killing some of them and capturing the others. The embattled African people ran for their lives, some mothers dropping their children on the way as they ran for cover. Some hid in or under their huts. Others concealed themselves by jumping into the water and wrapping themselves in seaweed; a few drowned using this strategy. The Portuguese men managed to find many Africans who had hidden themselves and proceeded to capture them and take them to Europe as slaves.

Africans quickly learned to fight back against European slavers and became formidable opponents to the Portuguese. Prince Henry the Navigator instructed his soldiers that they should no longer simply attack and seize Africans but instead should buy them. The Portuguese captain João Fernandes spent a year on the coast of the Bay of Arguin in 1445, getting to know the local people and eventually paying them to capture and turn over other Africans to be slaves for Europeans. Portuguese traders solidified their claim to African slaves through the rest of the 15th century. The papal bull *Dum Diversas*, issued by Pope Nicholas V in 1452, granted Alfonso V of Portugal the right to make all pagans into slaves. Unlike traditional African slavery, these slaves were considered to be the property of their owners, and all their offspring would be considered slaves as well.

The Portuguese continued to invest in infrastructure within Africa that would help them capture Africans and ship them to markets. Elmina Castle, built by Portuguese traders and African laborers in Ghana in 1482, soon became an important stop on the slave-trading routes. The construction of this castle involved the coercion of the local African people, Fante of the Akan group, who were reluctant to allow a permanent Portuguese settlement on their land and put up armed resistance. Elmina's existence quickly transformed the culture of the region. The Portuguese formed alliances with some local African groups and punished groups that traded with non-Portuguese Europeans, which increased local ten-

sions between Africans and paved the way for the larger slave trade that developed in the next centuries.

THE AMERICAS

BY MICHAEL J. O'NEAL

Normally, the words *slave* and *slavery* evoke images of plantations in the American South or the Caribbean, where large numbers of Africans—or Native Americans in the case of the Caribbean—were owned as chattel and forced to perform labor for their owners, usually under grueling and inhumane conditions. Under this type of slavery, called chattel slavery, people were regarded as property, or chattel, with almost no legal rights. They could be bought and sold, their children were automatically slaves, and slave owners had power of life and death over them.

Among native North American groups in the centuries before the arrival of Europeans, slavery as an organized institution did not exist, at least not to the extent to which it existed in other parts of the world or to which it would later exist in the New World. In particular, while the practice of holding slaves was fairly common, there was no organized slave trade, so slaves were not bought and sold at slave markets or imported by seagoing slave traders, and generally a slave's children were not automatically slaves. Most Native American bands usually had enough manpower to perform necessary work in their simple economies, although in many bands captive slaves were forced to perform menial duties, including cooking, building fires, digging roots, preparing hides, rowing canoes, and the like. Occasionally slaves were forced by their owners to assassinate members of other groups.

In some cases, forced labor may have been employed within the community to undertake major construction projects, such as the mounds characteristic of the Mississippian culture. One example is the Cahokia culture, which flourished in modern-day Illinois where the Mississippi, Missouri, and Illinois rivers meet. The Cahokians constructed at least 120 large mounds in the area, including one that covers an area of 14 acres. Historians estimate that it would have taken millions of man-hours to construct some of these mounds. Additionally, homes, granaries, ceremonial centers, burial grounds, stockades, and similar structures were constructed on the sites. These structures often had to be rebuilt or refurbished as time went on. Similarly, among the Pueblo peoples of the southwestern United States and northern Mexico, notably the Anasazi, people worked on large communal construction projects, including cliff-side dwellings and kivas, or dugout ceremonial centers.

The people who performed this labor, though, were not thought of as the "property" of the social and religious elites

who directed the projects. They performed labor for “free” and perhaps under some duress, but they saw their labor as contributing to the welfare of the community, and when their tasks were complete, they returned to their families. In general, forced servitude was not a widespread practice among Native Americans. Where it was practiced, it was not based on race, nor was it necessarily a hereditary condition.

There were some exceptions, however. During times of war captives were seized and sometimes forced to perform labor. The nations of the American Northwest routinely formed raiding parties to seize slaves from other settlements, and some historians estimate that the number of slaves in the Northwest relative to the number of free people was quite high, perhaps as high as 30 percent. The practice of seizing captives in war was also common among the Natchez of the American Southeast. When the Natchez seized captives, they typically tortured and killed the men, but women and children were often forced into slavery.

Similarly, the Iroquois of the northeastern United States often conducted what were called mourning wars. These were

raids launched against groups with which the Iroquois had previously done battle. Their purpose was to seize captives and take them back to the Iroquois as a way of compensating families for their losses during war. The prisoners were typically subjected to beatings and humiliation, including running the gauntlet (that is, running through a double line of armed men who attempted to strike the prisoners), where they were beaten and insulted, then given to the mourning families. Over time these captives were integrated into the nation. In most cases, they came to be regarded as kin, though they continued to be forced to perform hard labor. At the same time the seizing of captives depleted the manpower of the enemy nation, reducing its threat to the Iroquois.

A similar practice was also common among the Pawnee of the American Plains. The Pawnee placed a high value on family honor and status within the community. One measure of status was wealth; the most biting insult that could be hurled at another was to call him *ruti-kapakis-kawitat*, or the “one who is poor-ragged.” Thus, the Pawnee frequently seized captives in battle and held them as slaves as a mark

AZTEC SLAVERY

The Aztec culture arose in the valley of Mexico in the 13th century. In time it became the most powerful empire in Mesoamerica. Aztec society identified the *tlacotin* as a distinct social class. These were slaves who were not captives in war. In many respects, slavery under the Aztec was similar to slavery as it was practiced in other Mesoamerican cultures. It was not based on race. It was not hereditary, so the children of a slave were not themselves slaves. Slaves could even own their own goods, and in fact, some slaves themselves owned slaves. They could purchase their liberty, they could be freed if they could demonstrate that their masters had treated them with cruelty, and a female slave was freed if she married her master or had a child by him. Slaves were, however, heritable property, meaning that when the master died, his slaves passed to his heirs, although sometimes a slave who had performed well was freed on the death of his master.

The customs and laws surrounding slavery among the Aztec had some marked peculiarities. A slave owner was legally bound to look after his slave. If, then, a slave who accompanied his master to the marketplace escaped and ran outside the walls of the city and then stepped in human excrement, he was able to appear before a judge and win his freedom, based on the notion that his master had neglected him. The successful slave was then washed, given new clothing, and granted his freedom. Further, it was actually against the law for a person to help prevent the escape of a slave. A person who did so could himself be declared a slave.

Another peculiarity was that a slave owner could not legally sell a slave without the slave’s consent. The only exception was in the case of a slave whom the authorities declared incorrigible because of laziness or bad conduct. Such slaves were forced to wear wooden collars that identified them as incorrigible and that made it harder for them to run away. A slave who had changed hands four times often commanded a high price, for that slave could be purchased for blood sacrifice. But a collared slave who somehow managed to flee into a temple or a royal palace was given his freedom.

As in other Mesoamerican cultures, the Aztec could be enslaved as punishment for a crime. At the request of the wife of a murder victim, a murderer could, instead of being put to death, be given to the wife as a slave. Incorrigible sons could legally be sold into slavery, as could people in debt. Poor people could sell themselves into slavery and were given a year to enjoy their money and freedom before having to submit to their purchasers.

of status and wealth. Additionally, some Native American groups practiced peonage. Typically, the term *peon* refers to a person who is forced to perform labor as a way of working off debt, but it can also refer to the use of convict labor. The latter is the form that peonage took among Native Americans. Again, the “convicts” were typically prisoners who were seized during war. Often these prisoners were eventually released, but not before they had been forced to perform labor for their captives.

Yet another form of early North American slavery had to do with what could be called family extension. Particularly along the borderlands between what are now the United States and Mexico, Native Americans often formed raiding parties. One of the purposes of these raiding parties was to capture brides and others, who were then incorporated into the group. These people were taken against their will, making them slaves of sorts, but they were not forced to perform backbreaking labor and, in fact, became accepted members of their new group and had kin relationships with their captors. Sometimes the purpose of these seizures was simply to find brides for men. Sometimes the purpose was to prove a sense of honor and manhood by triumphing over a neighboring group. Sometimes the purpose was to extend the economic reach of the group. These captives, by being in effect members of two nations, often served as mediators and go-betweens in trade and other forms of economic and social exchange. They provided a necessary linkage between peoples who otherwise may have had no relationship with one another other than that of rivals for limited economic resources.

In Mesoamerica slavery was a much more formalized institution, ruled by laws and conventions that dictated who could become a slave, under what conditions people could become slaves, how slaves were to be treated, and how slaves could be released from servitude. For example, many people sold themselves, and even their families, into slavery as restitution for debt. Sometimes poor people, faced with starvation, sold themselves and their families as a way of surviving. Poor people often sold a son to a noble and then provided slave labor, often over the course of several generations, as a way of “keeping the son alive.” Gamblers and prostitutes sometimes sold themselves into slavery as a way of raising funds, but they had a year to repay the money they received before they had to become slaves. Slave labor was almost certainly employed in the construction of the massive monumental architecture of Mesoamerican cities.

Crime was often punishable by slavery. Thieves were sold into slavery, but their families could redeem them; if the family restored the stolen property, the thief was released from slavery. The families of people executed for capital crimes were sold into slavery, and if a man was found guilty of treason, his

family for five generations was sold into slavery. Typically, a man found guilty of murder was not executed but enslaved, given to the murder victim’s family as a form of compensation. Additionally, many slaves, typically men, were held and then sacrificed to the gods. Throughout Mesoamerica it was a major crime to subject a free person to slavery. It was also a crime for a man to kill another man’s slave; usually the guilty party was punished by becoming a slave to the owner whose slave was killed. Similarly, if a free man impregnated another man’s slave and that slave died during childbirth, the free man became the other man’s slave as compensation.

In South America the Incan culture, the dominant culture that emerged in the late 12th century and reached the peak of its influence in the century before the arrival of the Spanish, employed slave labor in the construction of its massive cities, temples, and monuments, and particularly its extensive network of roads. The Inca spread their influence primarily through persuasion. The empire was so powerful that when emissaries from the Inca approached a neighboring territory bearing gifts and “explained” to the people and their rulers the “advantages” of membership in the Incan state, these neighboring territories generally acquiesced.

While the Inca did not have an organized slave system, the state was all-powerful, with an emperor who ruled by divine right and a royal family and nobility. The state, in the persons of the emperor and the nobility, owned everything: land, produce, the products of manufacture, such as textiles and metalwork, and the like. The Incan state showed no mercy to anyone who opposed it, so the people lived in a kind of slavery. They were frequently drafted to perform public works projects.

The Incan state did not collect taxes in the form of money. Taxes could be paid in kind, with goods, but the usual practice was to perform labor for a certain period of time. This system is called *corvée*, or labor “paid” to the state in the place of taxes. *Corvée* was the system used to provide labor for public works projects. It was a form of slave labor, although the period during which it was performed could be as little as two weeks.

ASIA AND THE PACIFIC

BY LAURA LEE JUNKER

Historians and anthropologists have emphasized the wide range of relations referred to as “slavery” by early European observers of medieval Asia, the necessity of viewing slavery within specific cultural contexts, and the importance of avoiding any universal concepts of slavery. Late-medieval European writing on Asian and Pacific societies often refers to slavery in describing the ties between elite patrons in these

societies (kings, chiefs, and other high-ranking individuals) and their clients (lower-ranking individuals, particularly commoners), a relationship that might be better described as “dependency.” As opposed to these ties of dependency, the term *slavery* may be defined as a social and economic relationship in which someone is owned by another person in a legal sense and can be legally purchased, rented, mortgaged, bequeathed, or otherwise alienated like private property. In contrast, commoners in a dependency or serfdom relationship with an elite patron were generally obligated to pay tribute and to perform military, agricultural, craft, or other services to their benefactor, but their services and resources could not be transferred to another patron without consent.

The ways in which individuals could enter into the state of slavery as well as their ability to leave slave status varied according to cultural and historical circumstances in Asian and Pacific societies. A general contrast, however, can be noted between closed and open systems of slavery in Asia and the Pacific. The more rigid lineage-based systems of social class and political hierarchy in medieval India, China, Korea, and Japan created closed structures of slavery. In these systems slaves were segregated from nonslaves both ideologically and physically in their participation in political, social, and economic life, with little chance for any change in status. In contrast, slavery in Southeast Asian societies, with their more fluid social ranking systems and volatile political dynamics, followed an open pattern in which captured or purchased slaves and their progeny were eventually assimilated into the dominant society (often within one generation). Chiefdoms in the Pacific Islands, depending on their scale, tended to support both types of slave systems.

The concept of slavery was tied to traditions of caste, or *varna*, in medieval India. Historians have established that elements of the caste system existed since the Aryan advances into northern India in the first millennium B.C.E., well before the rise of the fourth-century Gupta Empire and continuing with the later medieval Islamic Mughals of the north and Hindu empires like Vijayanagara to the south. Medieval society was rigidly divided, in descending order of rank and privilege, into Brahmin (a priestly, aristocratic class), Kshatriya (a warrior class), Vaishya (a merchant class), and Shudra (a peasant and artisan class), with pariahs, or “untouchables,” forming a group at the bottom; pariahs were not even considered a legitimate part of the caste system. Even though slavery (in the sense of “owned” individuals who could be bought and sold as commodities) had explicitly been outlawed by the medieval period, many scholars believe that the untouchables originated as a slave class consisting of prisoners of war, criminals, dissidents, tribal minorities, and others viewed as being outside of Indian society. Pariahs had few resources,

they were assigned tasks (such as handling the dead or butchering animals) that were considered polluting to other castes, they were segregated residentially, they were the object of taboos on social interactions with other groups, and they were socially defined as foreigners and outsiders; their children inherited their pariah status in perpetuity. In some ways, the pariah caste fit the model of a closed system of slavery.

China, through the early medieval Tang Empire (618–907), the Five Dynasties (907–60), and the later periods of Song (960–1279), Yuan (1279–1368), and Ming (1368–1644), maintained a highly stratified and hierarchical society, in which inequities in the allocation of land and resources, rights to sumptuary goods and a lavish lifestyle, access to education and political office, taxation, and judicial punishment were institutionalized in state regulations. In Tang society hereditary aristocrats were at the top of the rigid social and political order, followed by professional bureaucrats, Buddhist clergy, peasants, artisans, and merchants, all of whom could own slaves and appropriate their labor. Slaves were of two types, official and private, the former generally associated with the imperial court and government functionaries and acquired through foreign conquest, foreign tribute, and local imprisonment for crimes.

Successful military campaigns by the Tang in Korea, inner Mongolia, central Asia, and northern India in the early years of the Tang Dynasty resulted in the transport of massive numbers of foreign slaves into the empire. (Approximately 200,000 slaves were brought from northern Korea in 688.) Rulers of Tang-controlled foreign tributary states and tribal chieftaincies were obligated to send tribute, which often included slaves who possessed unique artistic, technical, or intellectual skills or who were physically exceptional. The king of Tokhāra (located north of present-day Afghanistan and Pakistan) sent a talented painter of Buddhist icons, while the kingdoms of Japan, Korea, and Burma periodically dispatched dance and music troupes and (in the case of Japan) shockingly hairy Ainu archers; the king of what is now Cambodia delivered albinos. Individuals internal to Tang society also became slaves when all of the relatives of a condemned criminal (particularly for crimes against the state, such as rebellion and sedition) were enslaved as part of judicial punishments. Many of the 40,000 “palace ladies” in Emperor Xuanzong’s (r. 712–56) harem at the capital of Ch’angan were slaves of this type, including many highly educated women who served as scribes and teachers and oversaw silkworm raising and silk production for the palace.

Merchants and clergy, and sometimes entrepreneurial peasants, procured and exchanged slaves, who were seized on trading expeditions or were debt-bonded to their masters. It was officially illegal for individuals outside the government

to buy, seize, or sell indigenous Chinese. (The Tang law code stipulated execution by strangulation for kidnapping other Chinese for enslavement.) However, these laws did not apply to aboriginal tribal peoples in the distant prefectures of the empire and most foreigners, and merchants evaded the prohibitions on local slave raiding by claiming that Chinese debtors were willingly selling themselves or family members as slaves to ease their family financial obligations. Highly skilled horse-riding Turks and Persian craftsmen as well as exceptionally beautiful women from Korea, Mongolia, and Vietnam were highly desirable commodities in the slave-trade market.

In the ninth century Buddhist monasteries were gaining what the Tang aristocracy viewed as dangerous levels of wealth and power, accumulating vast lands, industrial operations (such as silk factories), wealth in gold, and large numbers of slaves procured through debt-bondage arrangements or purchased from merchant slave traders. In 845 the Tang government confiscated 150,000 slaves from Buddhist temple complexes, slaves who ironically were acquired to allow the Buddhist monks to adhere to prohibitions against killing insects during agricultural work but who were often treated very poorly.

Whatever their source, slaves had very little social mobility once they passed into slave status since even debt-bonded slaves were rarely able to purchase themselves out of servitude; marriage (but not concubinage) with nonslaves was strictly forbidden, and children of slaves generally continued in their slave status for several generations. With few exceptions, social segregation of slaves from freemen in both domestic and public spheres, significant economic disenfranchisement, and cultural prohibitions against social mobility conformed to a closed system of slavery.

Medieval polities in Korea and Japan closely followed the Chinese imperial model of assigning foreign war captives as slave labor for newly created or expanded noblemen estates to reward aristocratic supporters. As with slaves in imperial China, intermarriage between social ranks and especially with foreign captives was largely forbidden, there were few possibilities for social mobility, and there was no real measure of economic independence. For example, when the United Silla Kingdom emerged in southern Korea in the seventh century through conquest of the rival polities of Paekche and Koguryo and the expulsion of the invading Tang of China, portions of the conquered land were distributed to Silla nobles as landed estates, along with tax revenue privileges and foreign war captives designated as personal slaves.

By the 10th-century ascendancy of the Koryo Kingdom in northern Korea, slavery had expanded and had been institutionalized for war captives and debt-bonded indigenous people, both groups passing on their slave status to subse-

quent generations. Government slaves performed manual labor as well as various administrative activities associated with the functioning of the state, while private slaves served aristocratic households and temples in various capacities. Similarly to the situation of Chinese polities of the period, the severity of tribute exactions and *corvée* (unpaid) labor demands on both slaves and peasants periodically led to popular peasant and slave uprisings, the most severe occurring throughout the 12th century, weakening the social order and opening Korea to Mongol invasion.

Although slave laborers (largely captives) are mentioned as early as the third century in Chinese descriptions of the coalescing Yamato Japanese state, in Japan the rigid social order and specific roles of slaves in this hierarchy are particularly well described for the Kamakura Shogunate (1185–1333) and later periods. The imperial court, the aristocracy, and the samurai warrior-elites were strongly segregated by lifestyle, wealth, and absolute authority from the mass of peasants and slaves (known as *eta*) at the bottom of the social scale. Peasants had heavy tax quotas, labor levies, and military conscription (draft) from the aristocracy controlling the landed estates but were free to use or invest remaining crops and goods they produced.

In contrast, members of the hereditary slave class, who constituted about 5 percent of the population, were largely descendants of war prisoners, criminals, or seized tribal populations not integrated into the feudal state. They had no rights to ownership of land or other economic resources, and they could be bought and sold like other personal property. They served on aristocratic estates and in Buddhist monasteries as landless laborers and in what were considered degrading occupations, such as curing leather and burying the dead. Slaves and their descendants were locked into their status by rigid social segregation and no legal economic routes to freedom, though some slaves and, particularly, indigent peasants turned to forms of banditry, fueling the need for samurai protectors for the nobility.

In Southeast Asian kingdoms and chiefdoms of the period—characterized by relatively low population levels, an abundance of rich agricultural land that could be intensively farmed given large labor inputs, and an emphasis on maritime raiding and trading for wealth—control of people rather than land or capital was a key aspect of political power. In societies where labor was a valuable asset, it is not surprising that institutionalized forms of slavery would become an integral part of the social and political fabric. Many medieval Southeast Asian cities, such as Angkor, Ayuthaya, Melaka, Aceh, Macassar, and Manila, had economies that were fueled by slave labor, and slaves were the most valuable form of movable property.

In addition to providing in some societies up to 50 percent of the agricultural labor, slaves in the maritime trade-oriented Southeast Asian kingdoms performed an astounding array of occupations. These included fishing, manning sailing vessels, building elite residences and public works, mining, producing crafts (pottery, weaving, and metallurgy), entertaining, serving as concubines or domestic servants, trading, interpreting, writing for illiterate masters, fighting as warriors, raiding to acquire additional slaves, and even functioning as high-ranking government ministers. Slaves were also movable property or forms of "wealth" that, like gold coins, fine textiles, and porcelain, could be used as exchangeable commodities to cement political alliances, to offer as trade products, and to function as part of a bride-price (payment by a prospective groom to a bride's family as part of the marriage contract).

Large-scale slave labor for commercialized production of commodities like textiles, bulk transport of trade goods, and other maritime trade-related activities at the most massive coastal trading ports in medieval Southeast Asia approached what historians call a slave mode of production. This involved centrally managing and housing slaves, making possible a level of production not otherwise available in a household-oriented economy. However, historians agree that the vast majority of Southeast Asian slaves were integrated at the household, kin-based level of production, becoming household members with a certain level of economic independence rather than the nearly complete economic disenfranchisement (deprivation) characteristic of European colonial plantation systems.

In most Southeast Asian societies there were numerous paths by which an individual could enter into a state of slavery or bondage: inheritance, economic reversal, debt bondage, judicial punishment, and capture in warfare and raiding. While intergenerational inheritance of slave status was not inevitable and relatively rapid assimilation of slaves into the kin networks of their owners was common, the progeny of slaves often retained social identities as slaves for a generation or longer. Individuals and even larger kinship groups sometimes voluntarily entered into slavery as the result of economic hardship and the potential advantages of having a wealthy and generous owner. In other cases, a legally binding state of debt bondage to a specific owner was created as result of the failure of an individual to pay economic obligations (such as a bride-price contracted in a marriage negotiation or debts incurred in trading transactions). Many elites attempted to retain the perpetual services of their debt-bonded slaves by paying the bride-price for their offspring or securing other forms of debt with mounting interest. Judicial punishments were also a frequent origin of slave status when the criminal could not pay the imposed fines that generally settled serious

infractions, such as murder, robbery, or a culturally defined lack of deference to aristocracy.

Finally, given the competition for productive labor in comparatively underpopulated medieval Southeast Asia, maritime slave raiding was widespread and large scale, and many slaves were foreign captives. The Sulu Sultanate of the southern Philippines transported about 200,000 to 300,000 foreign slaves from throughout the islands of Southeast Asia into the polity over three or four generations at the time of European contact. Historical accounts indicate that slaves of all types often eventually left the slave ranks by accumulating enough independent wealth to buy themselves out of bondage (particularly for debt-bonded and criminal slaves but also as ransom for captive foreign slaves) or by marrying nonslaves (which redefined their status or that of their children). Probably the most important factors in promoting an open slave system were the lack of strong cultural prohibitions against slaves (whether foreign or indigenous) marrying into commoner and even aristocratic families and the fluidity with which individuals crossed social class lines. Ironically, the loss of slaves through this process of social assimilation and redefinition encouraged the perpetuation and even expansion of slave raiding and other institutional sources of slave acquisition.

Among the island chiefdoms of the Pacific, like the Hawaiians, the Tahitians, the Tongans, the Marquesans, and the Maoris, slavery was generally a temporary condition of war captives, who served as household menials (farmers, fishers, craftsmen, and personal retainers) in return for protection by the lineage males in the patrilineal household into which they were integrated. Unlike in China and Southeast Asian polities, warfare was restricted to isolated island chains with more culturally and linguistically homogenous peoples; thus, captive slaves were likely to speak the same language as and share similar social norms with their captors, and the slaves often quickly assimilated into the household lineage as pseudokinsmen. However, for men in general, but particularly for the nobility and warrior-elite, captivity meant loss not only of social rank but also of spiritual essence, or *mana*. Social status and political authority were inherited at birth but could be denigrated by cowardice in battle, low-status marriages, capture in warfare, and other indignities, so enslavement by a rival chief was to be avoided at all costs, even if the warrior was later repatriated to his lineage through political negotiations.

In the larger-scale chiefdoms of Hawaii and Tahiti, captive slaves also faced the danger of ritual sacrifice to the deities as these societies evolved in the period immediately before European contact into theocratic polities ruled by divine leaders. Another trend in the later Hawaiian history is that an expanded scale of warfare aimed at large-scale terri-

torial conquest meant that massive captive taking and transport were no longer feasible. Instead, conquering chiefs more often sent land administrators to newly annexed lands, which became alienated from their traditional lineage-based ownership, and in a sense all of the subjugated and landless people became “slaves” in the short-term.

EUROPE

BY TOM STREISSGUTH

Slavery was an integral part of ancient Roman society and trade. Roman slaves labored on agricultural estates, were employed to build aqueducts and roads, worked as household servants, and served in quarries and workshops. They were bought and sold throughout the empire and had no legal rights or personal property. The son or daughter of a slave was legally a slave and remained so unless granted freedom by the owner. Roman slave traders carried out a flourishing business along the coasts of the Mediterranean Sea and the Atlantic Ocean, where the open sea allowed for easy escape. Patrick, the patron saint of Ireland, was captured in such a raid and kept as a slave for 16 years on the European continent before finally escaping to his homeland, bringing the new faith of Christianity to the pagan Irish.

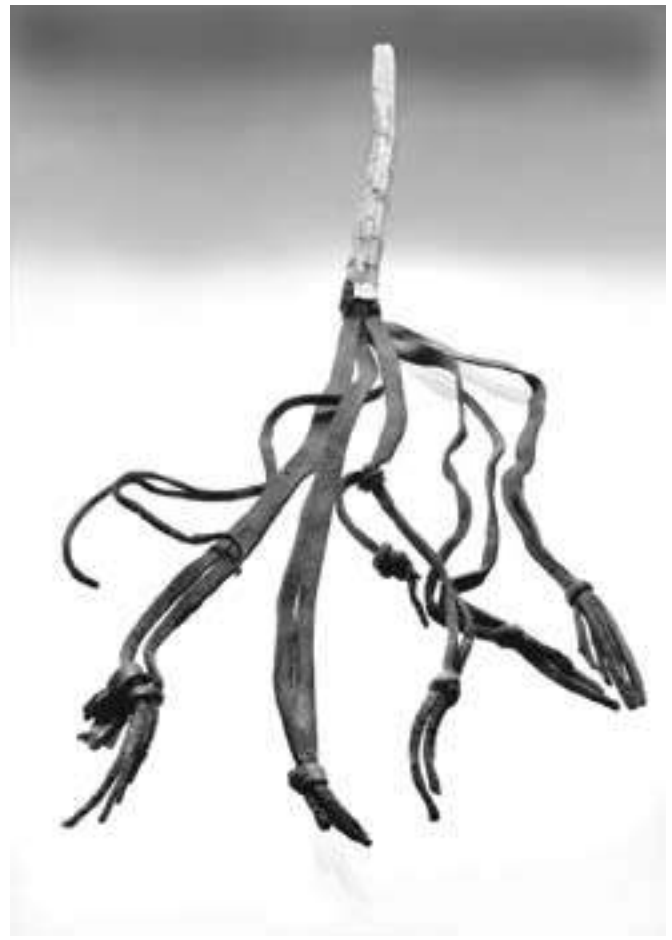
The fall of the Western Roman Empire in the fifth century did not end the use of slaves. The trade in slaves persisted throughout Europe, even as pagan societies were converted to Christianity and were thus, according to Christian doctrine, granted their freedom. Prisoners of war were still sold as slaves; an important slaving trade route linked the Slavic regions of the east to the Mediterranean region, and the cities of Marseille, Prague, and Constantinople had busy slave markets in which Slavs and other eastern pagans were sold to Muslim buyers from the Middle East and North Africa. Another slave trade route linked the Slavic lands to a large market in the Crimea, where slaves were sold to Arab buyers from the Middle East and later to merchants from the Ottoman realms in Asia Minor and southeastern Europe. An important trade in slaves also occurred on the Iberian Peninsula, where Jews free of religious constraints on slavery sold their captives through the Muslim caliphate established in Spain in the eighth century.

The waves of migration in northern and central Europe after the fall of the empire left in their wake chaos and disruption, making much of the population captives and slaves. The Magyars of the distant Eurasian steppes swept through central Europe and the Danube valley in the 10th century, capturing peasants and townspeople of Germany and Italy. Slaves were also taken by the Vikings in their many raids in the British Isles and on the European continent. The Vikings

of Sweden, also known as the Varangians, captured many slaves on their raids down the rivers of the Russian steppes, a practice that established a busy slave market in the northern Russian town of Novgorod and which made the word *Slav* synonymous with “slave.”

In medieval Europe criminals and debtors could be enslaved as a legal punishment. Among the Germanic peoples certain crimes were punished by fines; if the accused was unable to pay the fine, he or she would have to surrender to the wronged party as a slave. It was a custom of the Franks and other Germanic peoples to take war captives as hostages for ransom, if the families of the captives were wealthy enough. Those who could not be ransomed became slaves, to be put to work on the estates of their captors. Some slaves were sold to pagan tribes for the purpose of human sacrifice—a practice eventually banned by Pope Gregory III (d. 741) and punished as an act of murder.

The church took the view that believers could not be held or sold as slaves, and the Christianization of peoples such as



Leather whip from ca. the 11th century; under Anglo-Saxon law only a slave could be punished by flogging. (© Museum of London)

the Saxons ended much of the slave trade in northern Europe. In areas where Christians and nonbelievers lived in proximity, it was still legal to hold non-Christians, usually Muslims, as agricultural slaves or, more commonly, house servants. Conversion to the Christian faith often ended one's status as a slave and required the owner to grant the slave freedom.

Many of the church councils that set out official Christian doctrine dealt with the legal status of slaves owned by the church. By the Council of Agde, in the early sixth century, a bishop who freed a slave was obligated to pay the sum of 20 solidi for the care of the freed slave. The Third Council of Toledo (589) forbade Jews from holding Christians as slaves and decreed that the children of freed slaves could not lose their status. The Council of Worms (876) set a penance of two years for anyone found guilty of killing a slave and a penance of seven years for any woman who intentionally killed a female slave in a fit of jealousy. The 12th-century councils of London and Armagh prohibited the selling of Christians in pagan territories.

Pope Gregory I (ca. 540–604) freed all slaves in his service, granted them property, and prevented anyone from collecting from them the price set for their freedom. Another church father, Saint Éloi (also known as Eligius, ca. 588?–660), the bishop of Noyon, was known to board ships bringing slaves to France and immediately redeem and free as many slaves as he could afford. Slavery persisted in the uncertain and famine-haunted times of early medieval Europe, however, and many people sold themselves into slavery simply for protection or to provide themselves with shelter and sustenance. Gradually, slavery evolved into serfdom, in which laborers worked the land and other productive property for the benefit of a feudal lord, who considered the serfs belonging to his estate to be a form of property. Serfdom gradually spread as feudal lords allowed slaves to inhabit private dwellings and in some cases offered them a formal declaration of manumission—freedom. It was customary for manumitted slaves to be granted enough property to keep themselves free of debt and a return to bondage.

Serfs lived in their own homes and could address grievances to the lord. They had the right to a portion of their land and produce for their own use and were considered full members of the church. This contrasted with the condition of slaves in Roman times, who were considered nonhumans without any legal rights whatsoever and who could not own property, be baptized into the church, or demand protection of the law. Even as slavery died out in western Europe, the institution persisted in the east and in the Mediterranean region. Bonded servants were common in the cities of Italy, and service for the repayment of debt remained a legal institution throughout Europe.

Captives taken by the Mongols in their raids into Poland and Hungary in the 13th century were sold at markets in Russia and central Asia, a trade facilitated by merchants from Genoa and Venice through their trading depots in the Crimea.

Although central Europe was ultimately spared conquest by the Mongols, Russian territory remained under the control of the Mongol khans of Astrakhan and Kazan, and slaving raids on Russian towns and villages remained an important occupation in these territories.

Gradually civil laws prohibited slavery altogether. The trade in slaves was forbidden in England in the early 12th century, although the English settlers colonizing Ireland often made slaves of Irish war captives. The keeping of thralls (slaves) in Scandinavia was abolished in the 14th century. Slavery was not abolished in Poland until the 15th century and in Lithuania a century later. In Russia slavery persisted until the 17th century, when slaves became serfs. In southeastern Europe, Christians taken as slaves by the army of the Ottoman Turks made up the Janissaries, a powerful faction of the Turkish army. Janissaries were often taken as boys and trained from a young age as soldiers and officers. After the medieval period they rose to prominence as an important political faction within the Ottoman Empire.

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

The institution of slavery was common to all major traditions in the ancient world—the Greeks, the Romans, the Byzantines, the ancient Hebrews, and the pre-Islamic Arabs all had slave populations. The emergence of Islam in the seventh century did not question the validity of the institution but rather accepted it and regulated its practice. The Koran contains several passages on the treatment of slaves, tacitly assuming the reality of the institution. Muhammad himself owned slaves, as did several of his military companions who could afford them. Muhammad built upon existing norms of slave ownership, and his successors took their cues from him. Islamic thought presumed that people were born free and that only the strictest rules governed the enslavement of a free person. A body of laws pertaining to slave ownership, slave status, slave trade, and the manumission (freeing) of slaves evolved in the Muslim world. Slavery was thus deemed to be permitted by Allah and became a legal status that was recognized and regulated by the sharia (Islamic law).

Slavery in Islam differed from slavery in Europe in several ways. In Islam both the Koran and the sharia permitted Muslim men sexual access to slave concubines, whereas European men attempting to have sexual relations with slaves were confronted with legal, social, and religious sanctions. Furthermore, in the

Islamic world the offspring of such unions might be recognized and legitimized by Muslim fathers; the father might also choose to recognize and free the slave mother herself. Such was not the case in the West, where such offspring remained anonymous and usually blended with the rest of the slave population.

A major consequence of this difference is that the Muslim world soon developed a far larger proportion of children of mixed racial and ethnic characteristics than did the Western world. Furthermore, race never became quite as definitive a characteristic of a person as it did in the West. Nevertheless, the Muslim world was not free of racial prejudice. Writing about black African slaves, the foremost 15th-century Islamic historian, Ibn Khaldun (1332–1406), wrote that “Negroes are in general characterized by levity, excitability, and great emotionalism.”

A person could become a slave in one of four ways: by being born to a slave woman, by being taken captive in jihad (a holy war), as part of an annual tribute paid by the head of state of a conquered land, or by outright purchase. Because the Koran presumes the natural freedom of human beings, only unbelief can categorically qualify someone for enslavement. Moreover, Islamic jurists determined that unbelief justified continued slave status even after a slave had converted to Islam.

Conquered regions, most notably Mesopotamia, Egypt, Iran, North Africa, central Asia, and Spain, provided sources of slaves. Central Africa and East Africa also became sources of slaves, especially toward the end of the medieval era, when the supply of slaves from Europe diminished significantly. Most of these people, often cultural equals with the Arabs, eventually converted and were absorbed into mainstream Muslim culture. Skilled slaves were imported from outside the Islamic frontier—notably from Byzantium, India, China, and Southeast Asia—to serve as technicians or specialists. Unskilled slave labor was imported from Europe, the Eurasian steppes, and sub-Saharan Africa.

Slave markets thrived during the medieval era, and a brisk trade provided the Muslim world with a steady supply of domestic and menial labor via three main routes. European white slaves arrived overland through France and Spain, from eastern Europe through the Crimean Sea, and across the Mediterranean Sea. Venetian slave merchants figured particularly well in the trade and delivered cargo to Spanish and North African markets. African black slaves were similarly transported through several routes: from the West across the Sahara to Morocco and Tunisia and from Chad (west-central Africa) to Libya, and from the East up the Nile to Egypt and across the Red Sea and Indian Ocean to Arabia and the Persian Gulf. Turkish slaves were transported from the Eurasian steppes to Samarqand (and other Muslim cities) and eventually to Iran and Mesopotamia. Caucasian slaves crossed the



Dinar of Sultan al-Malik al-Zahir Baybars, a sultan of the Bahri line of the slave dynasty known as the Mamluks, Alexandria, Egypt, 1268
(© The Trustees of the British Museum)

narrow landmass between the Black Sea and the Caspian Sea for sale in Mosul, Iraq, and Aleppo, Syria.

Slaves were employed in all parts of the economy: They were domestic servants, agricultural workers, tradesmen and business agents, military recruits, and even leaders; they also occupied posts in the civil administration. In the social hierarchy of slavery, military slave commanders were at the top, while slaves working in agriculture for peasant owners were at the bottom.

The slave military was a uniquely Islamic institution. Military slaves were known in antiquity—in the form of armed bodyguards or local police—but they had no combat role in Greek and Roman armies. In addition, whereas European monarchs populated their officers corps from among their sons and those of the nobility, Islamic rulers chose instead to create a military with commanders whose allegiance would be to none other than the sultan or the caliph and who could never compete for power. Additionally, a slave military would not form a hereditary nobility, would have no conflicting loyalties, and would not build up power bases with the local populations—all characteristics especially well suited to autocratic rulers.

In the eastern portion of the empire slave recruits were largely white and drawn mostly from Turkey, the Eurasian steppes, and central Asia. In the West, Muslim Spain drew its military slaves from the Slavs and from the people of North Africa. Later, Ottomans took their recruits from the Balkans and the Caucasus. Most of these recruits had been part of vanquished populations. They were selected and purchased, usually early in adolescence or even before, converted and indoctrinated to Islamic thought and social norms, and ultimately made to serve the political objectives of the sultan. These former slave boys eventually became the soldiers, officers, and commanders in the Muslim armies. Some acquired considerable political power and even founded slave dynasties (for example, the Fatimids in Egypt).

Below the slave military were high-ranking slave civil servants, who populated the administration of the caliphs and sultans. They too came from the ranks of conquered populations. Despite conversion to Islam, they retained slave status since according to the sharia, this was required due to previous unbelief. Still, they could—and often did—rise to positions of influence, even that of vizier (the equivalent of a chief operating officer).

Eunuchs came next and acted as guards of harems, custodians of mosques, tombs, and shrines, and servants of the ruling dynasty. They were recruited from Slavic and Ethiopian populations especially but also from among Greek (Rum), west African, Indian, and even western European peoples.

Slaves working for merchants and craftsmen in cities and towns occupied the middle ranks of the hierarchy. Some even became responsible for their masters' businesses and could act as the owners' agents. Musicians, singers, dancers, and other performers of both genders were likely to be slaves in the medieval era. In slave society they were especially well regarded and well treated.

Among the lower rungs of the hierarchy were female slaves, who acted as domestic servants and concubines, since the sharia permitted sexual access to a slave girl or woman by her Muslim slave owner. Although prostitution was outlawed by the sharia, some female slaves were also hired out as prostitutes, a practice common in the pre-Islamic era.

At the bottom of the social hierarchy were the field workers in agriculture or those recruited for special public works projects, such as draining ditches for road construction or draining marshes in southern Iraq. These slaves, who were predominantly black, had the harshest lives and often the shortest life spans, which were often cut short by accidents, disease, and exhaustion. Thousands of African male slaves worked cotton, sugar, and rice plantations, some of which were owned by the state. One group, the Zanj from East Africa, who were brought to drain salt deposits in southern Iraq, became famous for a revolt against their masters.

The price and cost of slaves can be understood from medieval Egyptian sources. A dinar was a gold piece, and a dirham was a silver piece; the silver equivalent was 13.3 dirhams for one dinar. Black girls brought in 266 dirhams, adult black females 500 dirhams, black eunuchs 1,000–1,500 dirhams, and trained singers and performers 10,000–20,000 dirhams. White men from Turkey and central Asia who were targeted for the military brought in a minimum of 300 dirhams and often much more; a white girl could fetch at least 1,000 dinars, or over 13,000 dirhams. Relatively speaking, eunuchs were more valuable and more expensive than uncastrated males, younger people were more valuable than older people, and women were more valuable than men.

The sharia denied slaves any legal rights; they could not enter into contractual agreements, hold property, or inherit property. They could not hold office, perform or participate in religious functions, have any authority over others, or present testimony in court. Furthermore, the sharia did not fix any specific penalty for the maltreatment of slaves, although tradition dating back to Muhammad frowned upon such practice. Slaves also required the consent of their masters to marry. The rights of slaves included adequate food and shelter provided by the master and duties that were not excessive for a slave's ability or strength. Ideally, a master should look upon a slave with a kindly attitude and be moderate in his punishment when the slave transgressed. Fines incurred by a slave were the responsibility of the master.

The sharia provided several ways of emancipating a slave. First, the slave owner could make a formal declaration, which was duly recorded and given to the former slave. Second, the slave owner could enter into a written agreement in which the slave would pay a sum for his freedom. Third, the slave owner might liberate his slaves of his own free will, usually at a future date, such as upon his death, and might also require his heirs to free a slave upon his death. If a slave was maltreated, a judge might declare a slave free in yet another form of emancipation. In cases in which a slave woman gave birth to a son by her master, she acquired additional legal rights. Once freed, slaves were not wholly without discrimination, but manumission provided the legal means out of slavery.

Those *dhimmis* (non-Muslims who followed a religion that is tolerated under Islam) who could afford slaves were permitted to own them, but they could not own Muslim slaves, since Muslims could not be enslaved. Furthermore, *dhimmis* were obliged either to sell or to free a slave who had converted to Islam while working for them. *Dhimmis* could not have Muslim concubines, although Muslims certainly could and did have Christian and Jewish slave concubines. Typically, although Jews captured in eastern Europe were ransomed by other Jews, the same could not be said for Christians. Conversion of *dhimmi* slaves to one of the *dhimmi* religions—even if only partially—required the slave owner to free them. Conversion from Islam was a capital offense and was punishable by death. Conversion to Islam by a slave owned by a Muslim did not necessarily mean that the slave would be set free, since according to the sharia, the condition of slavery was due to the state of previous unbelief and could therefore continue.

By the end of the medieval era in the 15th century the slave system had become so entrenched that inevitably several Ottoman sultans were the sons of slave concubines. Moreover, the emergence of European Christian nation-states effectively dried up the traffic in white slavery for both genders. Henceforth, Africa became the main source of slaves, and the slave

population, increasingly black, was permitted to rise further in Islamic society than had previously been possible.

See also ARCHITECTURE; CRIME AND PUNISHMENT; ECONOMY; EMPLOYMENT AND LABOR; FAMILY; FOREIGNERS AND BAR-

BARIANS; GOVERNMENT ORGANIZATION; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; OCCUPATIONS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SEAFARING AND NAVIGATION; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; WAR AND CONQUEST.

Europe

Gregory of Tours: "Harsh Treatment of Serfs and Slaves" (ca. 575)

(The widow of Godwin) married Rauching, a man of great vanity, swollen with pride, shameless in his arrogance, who acted towards those subject to him as though he were without any spark of human kindness, raging against them beyond the bounds of malice and stupidity and doing unspeakable injuries to them. For if, as was customary, a slave held a burning candle before him at dinner, he caused his shins to be bared, and placed the candle between them until the flame died; and he caused the same thing to be done with a second candle until the shins of the torchbearer were burned. But if the slave tried to cry out, or to move from one place to another, a naked sword threatened him; and he found great enjoyment in the man's tears. They say that at that time two of his slaves, a man and a girl, fell in love—a thing which often happens—and that when their affection for each other had lasted for a period of two years, they fled together to a church. When Rauching found this out he went to the priest of that place and asked him to return the two slaves immediately, saying that he had forgiven them. Then the priest said to him, "You know what veneration is due to the churches of God. You cannot take them unless you take an oath to allow them to remain together permanently, and you must also promise that they

will be free from corporal punishment." But he, being in doubt and remaining silent for some time at length turned to the priest and put his hands upon the altar, saying, "They will never be separated by me, but rather I shall cause them to remain in wedlock; for though I was annoyed that they did such things without my advice, I am perfectly happy to observe that the man did not take the maid of another in wedlock, nor did she take the slave of another." The simple priest believed him and returned the two slaves who had been ostensibly pardoned. He took them, gave thanks, and returned to his house, and straightway ordered a tree to be cut down. Then he ordered the trunk to be opened with wedges and hollowed out, and a hole to be made in the ground to the depth of three or four feet, and the trunk to be placed therein. Then placing the girl as if she were dead, he ordered the slave to be thrown on top of her. And when the cover had been placed upon the trunk he filled the grave and buried them both alive, saying, "I have not broken my oath and I have not separated them."

From: Roy C. Cave and Herbert H. Coulson, *A Source Book for Medieval Economic History* (Milwaukee: Bruce Publishing Co., 1936).

The Islamic World

Al-Tanukhi: Excerpt from Ruminations and Reminiscences (ca. 980)

Another [man], I am told, was in a hurry to get rid of his money, and when only five thousand dinars were left, said he wanted to have done with it speedily in order that he might see what he would do afterwards. . . . I

heard nothing of him for three years, and then one day at the Taq Gate seeing a slave clearing the way for a rider, raised my head and beheld my friend on a fine horse with a light silver-mounted saddle, fine clothes,

(continued)

(continues)

splendid underwear and fragrant with scent—now he was of a family of clerks and formerly in the days of his wealth, he used to ride the noblest chargers, with the grandest harness, and his clothes and accoutrements were of the magnificent style which the fortune inherited by him from his parents permitted. When he saw me, he called out: Fellow! I, knowing that his circumstances must have improved, kissed his thigh, and said: My lord, Abu so-and-so! He said Yes! What is this? I asked. He said: God has been merciful, praise be to Him! Home, home. I followed him 'till he had got to his door, and it was the old house repaired, all made into one court with a garden, covered over and stuccoed though not whitewashed, one single spacious sitting-room being left, whereas all the rest had been made part of the court. It made a good house, though not so lordly as of old. He brought me into a recess where he had in old times sought privacy, and which he had restored to its pristine magnificence, and which contained handsome furniture, though not of the former kind.

His establishment now consisted of four slaves, each of whom discharged two functions, and one old functionary whom I remembered as his servant of old, who was now re-established as porter, and a paid servant who acted as sa'is. He took his seat, and the slaves came and served him with clean plate of no great value, fruits modest both in quantity and quality, and food that was clean and sufficient, though not more. This we proceeded to eat, and then some excellent date-wine was set before me, and some date jelly, also of good quality, before him. A curtain was then drawn, and we heard some pleasant singing, while the fumes of fresh aloes, and of nadd rose together. I was curious to know how all this had come about, and when he was refreshed he said: Fellow, do you remember old times? I said I did. I am now, he continued, comfortably off, and the knowledge and experience of the world which I have gained are preferable in my opinion to my former wealth. Do you notice my furniture? It is not as grand as of old, but it is of the sort which counts as luxurious with the middle classes. The same is the case with my plate,

clothes, carriage, food, dessert, wine—and he went on with his enumeration, adding after each item “if it is not super-fine like the old, still it is fair and adequate and sufficient.” Finally he came to his establishment, compared its present with its former size, and added: This does instead. Now I am freed from that terrible stress. . . .

I replied: That is all past, and praise be to God, who has replaced your loss, and delivered you from the trouble in which you were! But whence comes your present fortune and the singing-girl who is now entertaining us? He replied: She is one whom I purchased for a thousand dinars, thereby saving the singing-women's fees. My affairs are now in excellent order. I said: How do they come to be so? He replied that a servant of his father and a cousin of his in Egypt had died on one day, leaving thirty thousand dinars, which were sent to him So, he said, I thanked God, and made a resolution not to waste, but to economize, and live on my fortune 'till I die, being careful in my expenditure. So I had this house rebuilt, and purchased all its present contents, furniture, plate, clothing, mounts, slaves male and female, for 5000 dinars; five thousand more have been buried in the ground as a provision against emergencies. I have laid out ten thousand on agricultural land, producing annually enough to maintain the establishment which you have seen, with enough over each year to render it unnecessary for me to borrow before the time when the produce comes in. This is how my affairs proceed and I have been searching for you a whole year, hearing nothing about you, being anxious that you should see the restoration of my fortunes and their continued prosperity and maintenance, and after that, you infamous scoundrel, to have nothing more to do with you. Slaves, seize him by the foot! And they did drag me by the foot right out of the house, not permitting me to finish my liquor with him that day. After that when I met him riding in the streets he would smile if he saw me, and he would have nothing to do either with me or any of his former associates.

From: D. S. Margoliouth, ed., *The Table Talk of a Mesopotamian Judge* (London: Royal Asiatic Society, 1922).

FURTHER READING

- Marc Bloch, *Slavery and Serfdom in the Middle Ages: Selected Essays* (Berkeley: University of California Press, 1975).
- Pierre Dockès, *Medieval Slavery and Liberation* (Chicago: University of Chicago Press, 1982).
- Herbert J. Foster, "Partners or Captives in Commerce? The Role of Africans in the Slave Trade," *Journal of Black Studies* 6, no. 4 (June 1976): 421–434.
- Bernard Lewis, *Race and Slavery in the Middle East: An Historical Enquiry* (New York: Oxford University Press, 1990).
- William Christie MacLeod, "Economic Aspects of Indigenous American Slavery," *American Anthropologist*, new series 30, no. 4 (1928): 632–650.
- Anthony Reid, ed., *Slavery, Bondage, and Dependency in Southeast Asia* (New York: St. Martin's Press, 1983).
- William A. Starna and Ralph Watkins, "Northern Iroquoian Slavery," *Ethnohistory* 38, no. 1 (1991): 34–57.
- Hugh Thomas, *The Slave Trade* (New York, Simon and Schuster, 1997).

► social collapse and abandonment

INTRODUCTION

The history of the Old World in the Middle Ages was largely dictated by events in the relatively obscure region of inner Asia. The vast stretches of steppe from the Carpathians in Europe to the Gobi Desert north of China, from the Siberian forests in the north to the Hindu Kush mountains in the south, itself produced no great civilizations or cultural achievements, but its nomadic population shaped the medieval world. The out-migration of nomadic tribes from this area led ultimately to the destruction of the Western Roman Empire in 476 and continued to bring pressure to bear on Western culture until the defeat of the Magyars at the end of the first millennium C.E. It also led to the great pandemic of the Black Death, which killed as much as half of Europe's population between 1347 and 1350. When the steppe tribes were finally unified by Genghis Khan in the 12th century, they quickly conquered China and beyond that the largest empire ever seen, extending from Korea to Hungary and Egypt. Turkish tribesmen from inner Asia conquered the Islamic world more than once, but the Mongols had the most devastating effect on the development of Islamic civilization.

The destruction of Baghdad by the Mongols in 1258 did more damage than simply slaughtering the huge population of the city, more than tearing down the delicate and complex irrigation system on which Mesopotamian agriculture had always depended, more than destroying the library and research staff of the House of Wisdom. Islamic clerics saw this terrible calamity as the judgment of god against Islam as it had

evolved since Muhammad. In reaction, philosophical learning and the investigation of the natural world was denounced as blasphemous: the search for new knowledge implied that the revelation of the Koran was incomplete. Thousands of books of science and philosophy were burned all over the Islamic world. Greek intellectualism fell out of favor as a means of approaching and interpreting the Koran. The lifetime of the Prophet was seen as a privileged time; improvement on the era that had received the Koran seemed impossible, and to insist otherwise seemed blasphemous. Consequently, technological inventions and social reforms that had been created since that time were overturned. In particular, many astronomical observatories were destroyed as unique symbols of blasphemous curiosity and new learning. Although not all Muslims accepted this reaction, the fundamental change of view caused the Islamic world, which up to that time seemed in many ways more advanced and sophisticated than western Europe, to turn back in on itself and eventually lose the ability to react militarily, economically, or culturally to the west; it was largely colonized by European powers in the modern period.

Elsewhere in the world, many cultures destroyed themselves by their own success. A rising population puts pressure on the local landscape that can be sustained only by the most careful land management. The failure to shepherd resources results in a collapse of agriculture and hence of civilization. This story played itself out again and again during the Middle Ages, from Easter Island in the South Pacific to Angkor Wat in Cambodia to Great Zimbabwe in Africa to the Mayan civilization of Central America and to the Mississippian city today known as Cahokia in the center of North America. At Cahokia and on Easter Island a population brought under the tremendous pressure of famine responded with violence directed perhaps against the ruling elites but perhaps with little definite target, yet it seems that more often old centers of habitation were simply abandoned as the mismanaged lands that supported them failed.

At the very end of the Middle Ages the Americas underwent a pandemic crisis far worse even than the Black Death. Having lived in isolation from the Old World and the diseases endemic to its peoples, the population of the New World had absolutely no immunity to smallpox and other illnesses brought by the Spanish after 1492. By 1550 Old World diseases had spread throughout most of the New World, killing as much as 90 percent of the population. This, more than the concerted attacks of the relatively small number of conquistadors invading the Aztec and Inca empires, brought the downfall of the most sophisticated states in the Western Hemisphere.

AFRICA

BY BRADLEY SKEEN

Outside Egypt and the Phoenician and Greek colonies on the northern coast, the development of cities was late and rare in Africa. During the Middle Ages urbanization outside the Islamic sphere was usually brought about by unusual economic circumstances and tended to collapse either because those circumstances changed or because cultures did not adapt to the novel urban conditions. Such mundane facts are far removed from the conception of the “lost cities” in Africa of the popular imagination and even from the sometimes fantastic suppositions made by early investigators.

The beginning of the Middle Ages in the horn of Africa comes with the collapse of the kingdom of Kush (between 300 and 600), centered during this later period around the city of Meroë. Kush had become an important state in the eighth century B.C.E., when it had even briefly conquered Egypt. The heartland of Kush, however, was in the Nile Valley above the third cataract, corresponding to the northern part of modern-day Sudan.

At one time historians believed that some dramatic single event, such as the destruction of Meroë by an invading army, must have destroyed the kingdom of Kush and its civilization overnight. Such a romantic idea was fostered by the modern conditions of the ruins of the royal cemetery at Meroë, a group of more than 200 shattered pyramids half-buried by encroaching sand dunes. In fact, no archaeological evidence of such destruction (for example, a layer of burning) has been found there, so it seems rather that the city was gradually abandoned.

The royal house and aristocracy of Meroë had used the wealth they had gained from mediating trade between Egypt and East Africa to create an elite culture that modeled Egyptian civilization, but in an artificial and romanticizing way. This model included their miniature copy (at least compared with the gigantic Egyptian pyramids at Giza) of the pyramid form for their tombs—a practice that had long since been abandoned in Egypt itself—the worship of Egyptian gods, and the creation of a pseudohieroglyphic script (still undeciphered).

The collapse of Kush refers to the state’s loss of its political cohesion—that is, local elites no longer could or would be controlled by the center—and the decline of the elite Egyptianizing culture. This collapse occurred because the trade between East Africa and Egypt shifted from overland routes passing through Kush to routes on the Red Sea and the Indian Ocean controlled by Axum. Without this income, the superstructure of the Meroitic monarchy, with its Egyptian pretensions and imperialist ambitions, could not be sup-

ported and fell away, leaving local economies, cultures, and political units that reverted to traditions very similar to those that had preceded the rise of Meroë. There was no longer any use for the imperial capital and its pyramids, so these were abandoned over time. What happened was a process of cultural change rather than destruction.

The kingdom of Axum dominated Ethiopia from the first century to the 10th century. It became especially important after the collapse of Meroë. Shortly after 300 the kings of Axum converted to Christianity, no more than a few years after the Roman Empire had done so. The wealth of the kingdom was based on control of the East African and Indian Ocean trade of the Roman (later Byzantine) Empire passing through the Red Sea.

Axum is best known for its royal cemetery, where 119 stone stelae were erected. The objects are slender slabs of stone up to 36 yards high, carved to resemble the facades of buildings. The tallest of these are probably the largest single pieces of stone ever quarried. At one time the cemetery seems also to have been decorated with gigantic carved thrones and colossal statues, but these were looted or destroyed before the beginning of archaeological investigation of the area. In general, the well-developed urban character of Axum and its subject cities, its sophisticated technology and engineering, and its extensive trade network made it the most sophisticated state in sub-Saharan Africa in the second half of the first millennium. The Western discovery of this ancient civilization led in the popular imagination to fantastic characterizations of its history—for example, making Axum the home of the Queen of Sheba, in this case fueled by local legends that survive from the kingdom’s height. For instance, a church in Axum to this day claims to hold the Ark of the Covenant (the container of the tablets of the Mosaic Law) salvaged from the sack of Solomon’s temple in Jerusalem.

The monarchy of Axum gained its power from the control of wealth that accrued from the trade passing through the Red Sea between Roman Egypt, East Africa, Arabia, and India. It used its resources to support grand displays of prestige in the gigantic monuments in the royal cemetery and to aggrandize its power in militaristic expansion (for example, the conquests of southwestern Arabia in the sixth century). It also built up an elite social structure based on the importation of foreign ideals, in this case those of the Eastern Roman or Byzantine Empire—for instance, in the use of Greek as an official language, the striking of a Byzantine standard coinage, and the adoption of Christianity. The mercantile wealth of Axum came to an end when Islamic control of the foreign ports linked through the Red Sea isolated Christian Axum. The elite culture collapsed when the source of wealth in foreign trade ended. In this case, however, the abandonment

of urban centers and the end of elite culture left important changes in society as a whole, especially in the establishment of the Ethiopian Christian Church as an institution.

Weakened by its economic decline, the city of Axum was destroyed in the 10th century by the army of the Ethiopian queen Gudit (fl. 960), a figure as much legendary as historical. Thereafter, Ethiopian culture turned inward, retreated from the sea and contact with the Islamic and Orthodox Christian worlds, and devolved into a rural, feudal state.

No archaeological site in Africa has been as misunderstood as Great Zimbabwe (located in the modern-day state that is its namesake). Its European discoverers fantasized that these extensive ruins of large masonry walls in the interior of Africa must be the lost city of the Queen of Sheba of biblical fame. In fact, every effort was made, for political reasons, to argue that the city had been built by anyone other than native Africans. More rational explanations of Great Zimbabwe's rise and fall would have to await the application of scientific archaeology to the ruins in the mid-20th century.

Zimbabwe means "walled enclosure" in the Shona language, and the name Great Zimbabwe is applied to the center of a civilization that flourished between about 1250 and 1450 in modern Zimbabwe. Great Zimbabwe is today the ruined remains of a city that underwent rapid expansion in building and population growth after 1400 so that it reached a population of as many as 18,000 immediately prior to its sudden abandonment in 1450. It is surrounded by lesser *zimbabwes* comprising settlements of a few hundred or few thousand peoples. The dressed drystone walls of all these settlements enclosed small groups of huts and were surrounded by much larger numbers of huts that served as the dwelling places for the population at large. The walls must have separated a small but dominant political or religious elite. It is clear that the style of stonework is unrelated to that found anywhere else in the world; it evolved from older and simpler structures that had been built in that area several centuries before the creation of an urban center. These walls were built entirely for the purposes of display, since they would not have been suitable for any military purpose such as city walls are in other areas of the world. Great Zimbabwe probably began as a religious center, with stone walls used to mark off sacred space. Archaeologists generally accept that the Shona people who occupied the area of Great Zimbabwe at the time of European penetration into the area are the descendents of the Zimbabwe builders and that they share a language and culture that, according to their own historical traditions, was present in the area from 1000 or before.

The necessary precondition for the beginning of an urban center like Great Zimbabwe was wealth that could be concentrated in the hands of a ruling elite. Great Zimbabwe

and its satellite communities were located on a plateau too high to be bothered by the tsetse fly infestation that makes living conditions so difficult throughout much of Africa because of this insect's spread of sleeping sickness. When the cattle-herding ancestors of the Shona people moved into this area, that fact alone must have greatly increased their wealth and prospects. However, a ruling elite controlled some greater source of wealth that allowed them to dominate their culture by conspicuous displays, such as the building of their walled enclosures. This source of wealth was probably a trade in gold. There is ample archaeological evidence for gold mining in the region contemporary with the development of urbanization. The extent of the trade has been revealed by the discovery inside Great Zimbabwe of manufactured goods from as far away as Persia, India, and China.

The rapid growth of Great Zimbabwe and its satellite communities posed the same problems that cities face everywhere in the world. However, the elite class of the Zimbabwe civilization seems to have failed to meet the demands of these problems with the fundamental changes in technology and agriculture that enable the growth of urban civilizations. No evidence of a sanitation system in Great Zimbabwe exists. In a city of 18,000 people the lack of a sanitation system would mean that human and animal waste would have piled up near places of habitation, with a consequent high incidence of disease and mortality. The area would soon have been stripped of firewood so that this vital commodity would have had to have been carted from ever increasing distances, hence become increasingly scarce and expensive. As labor was diverted away from the cattle-based agriculture that was the foundation of the society, dietary substitutions of cereal crops for the poor masses in Great Zimbabwe would have impacted their health and well-being. Even this form of agriculture would have become increasingly difficult as the fertility of farmland degraded. Building up over two or three centuries, such environmental deterioration would have made life in Great Zimbabwe unlivable for its inhabitants. Whatever problems existed would have been made worse by the rapid burst of population growth after 1400. It is no wonder, then, that the people living in Great Zimbabwe eventually broke their allegiance to the elite culture that had fostered urbanization and simply abandoned the city to return to the pastoral way of life of their ancestors.

THE AMERICAS

BY KEITH JORDAN

Several periods of social collapse punctuate the history of the Mississippian culture (ca. 750–ca. 1500) of the Eastern Woodlands in North America. Archaeological evidence

shows that the power of the first great Mississippian center, the city of Cahokia in Illinois, began to decline in the mid-12th century. Local villages surrounding the site were abandoned, and a defensive palisade was built around the temples and the chief's houses at the center of the city. Perhaps to compensate for a decline in the chief's real power, chiefly costumes and symbols became more complex and elaborate. By a century later the city's population had declined by about 60 percent. At the same time there was a sharp decline in the manufacture of decorated objects that may have been used by chiefs to secure the loyalty of their followers. The growth of noble families may have led to increased competition at the top levels of the society.

Natural factors also played a role in Cahokia's demise. Two periods of drought, each about 25 years long, beset the area in the early 13th century, and there is geological evidence that local creeks started to fill up with silt, possibly causing flooding. There is also some evidence for a rise in the local water table. The Cahokians may have contributed to their own demise by deforesting the area for fuel and construction. In the late 13th century an earthquake may have damaged the main temple mound at the site, and a related chiefly center in East Saint Louis, Illinois, was burned, perhaps by invaders. The Cahokian population declined further until the city had almost completely been abandoned by 1400. However, the inhabitants of Cahokia did not merely "disappear" or "decline." They may well have migrated onto the Great Plains and left their farming lifestyle to take up buffalo hunting, as did the ancestors of the Osage, the Omaha, and the Quapaw Native Americans.

Individual Mississippian centers rose and fell over the next two centuries, but the culture as a whole seems to have collapsed decisively in the 16th century following the Spanish expedition of Hernando de Soto into the Southeast from Mexico. Although de Soto's journey through the Southeast was relatively brief and did not result in a Spanish conquest of the native peoples like what happened to the Aztec and the Inca, its legacy was just as deadly. De Soto's men and animals introduced into the area diseases for which the indigenous peoples had no immunity, leading to massive epidemics. These diseases created dramatic population decline and social chaos, and the knowledge of Mississippian religious and governmental lore died with the chiefs and priests, surviving into modern times only in fragmentary form.

Although popular and New Age writings are full of references to the mysterious "disappearance" of the Anasazi, or ancestral Pueblo, peoples of the North American Southwest, in fact several periods of site abandonment took place during the development of this culture. The huge and influential site of Chaco Canyon, New Mexico, was abandoned and lost its

apparent political power in the early 12th century. The decline was probably the result of many factors rather than a single cause. Excess population growth may have led to overcrowding, thus exhausting the farming lands around the site, and skeletal remains bear some evidence of increasing malnutrition. According to scientific study of tree growth rings from the area, a major drought struck Chaco around 1090. While the rains resumed in the early 12th century, summer rains tended to arrive later and end earlier than they had previously done. Although construction continued at Chaco to around 1120, this did not stop the movement of people out of the canyon, and exotic goods, like copper bells from Mexico, ceased to be traded into the site. If the site was a powerful religious center controlled by ritual specialists, as some archaeologists think, the influence of religious leaders might have declined sharply when their rituals did not succeed in bringing needed rain in the face of the drought. Their followers, losing confidence, may then have abandoned them, and not even the eventual return of the rains was able to stop the process.

Man-made environmental problems may have compounded the natural ones. The Chacoans cut down whole forests for construction timber during the 10th and 11th centuries, altering the environment and leading to soil erosion. It is possible that the rulers of Chaco resettled at the site of Aztec, New Mexico, where Chaco building and burial traits last until around 1250, before finally taking over the trading center of Casas Grandes in northern Mexico in the 13th century. In any event, subsequent societies in the Southwest seem much more egalitarian, perhaps in reaction to the failure of the Chaco elite.

After the collapse of Chaco, Anasazi settlements flourished at Mesa Verde, Colorado, and in the San Juan River basin, but then these areas, too, were abandoned between around 1270 and 1300. Indeed, the whole northern Southwest or Four Corners region was drastically depopulated at this time, with the inhabitants moving south to become the historic Pueblo peoples encountered by Spanish explorers in the 16th century. The number of people in the Mesa Verde area, for example, dropped from around 15,000 to 7,000 by about 1280 and plummeted further in the next two decades. In some cases, the abandonment seems to have been quite orderly—people sealed up their houses and took their valuables with them. A drought struck the Four Corners between 1276 and 99, according to tree-ring data, and spread in the same direction as the migrations, from north to south, but again the drought seems to be just one of many contributing factors to the abandonment rather the primary cause of it.

Already in the early 13th century, the so-called Little Ice Age led to longer, colder winters in the Southwest, drier conditions, decreased spring sunlight, and shorter farming

seasons. Natural phenomena alone do not account for the collapse of the Four Corners Anasazi. Some areas, like the San Juan River valley, were little affected by the drought but were abandoned nonetheless. Population growth at Anasazi settlements, in the absence of a strong unifying belief system as seems to have been present at Chaco, might have led to social conflict and chaos. The early Pueblos adopted or developed the kachina cult (ancestor worship) after the migration as an ideology promoting community cohesion and cooperation. There is evidence for widespread warfare in the Four Corners before the abandonment—skeletons showing signs of violent death, placement of settlements on easily defended cliffs, defensive towers, painted images of warriors, and whole sites burned and destroyed. This evidence suggests chronic conflict between communities over scarce natural resources, a pattern that continued among Pueblo groups up to the European invasions of the 16th and 17th centuries.

The decline of the Classic (ca. 250–ca. 850) Mayan city-states of the lowlands of Guatemala, Belize, southern Mexico, and western Honduras is one of the most-discussed, often hyped, and controversial social collapses in human history. As is the case with the Anasazi, pseudoscientific claims in current popular literature suggest that the Maya simply vanished from the earth. The Maya did not disappear; rather, at the end of the Classic Period they abandoned many settlements as well as the Classic institution of rule by individual divine kings. They did not decline as a whole culture—in fact, several Mayan cities went on to flourish and fall in succession in the Yucatán after the Classic Period, and Mayan states were warring and trading with each other as well as creating art at the time of the Spanish Conquest in the 16th century. Moreover, the “collapse” of the Maya did not take place all in one blow. Rather, it was a gradual process of abandonment of cities and institutions spread across more than a century. New construction had ceased at most Classic Mayan cities by the mid-ninth century, but some sites in Belize saw continuous habitation and construction up until the arrival of the Spanish. Royal inscriptions using the Long Count dating system, another hallmark of Classic Maya culture, ceased to be produced gradually, with the last-known recorded Long Count date in the lowlands corresponding to 910.

The causes of this change were many. There is evidence of increased and mutually destructive competitive warfare among the separate city-states as they tried to dominate each other, similar to the conditions that contributed to the decline of the classical Greek states. The goal of warfare for most of the Classic Period was to capture and sacrifice a rival king, so military operations were limited. At the time of the collapse this military conflict seems to have degenerated into outright wars of conquest. Fortifications became more com-

mon in the ninth century, and several cities show evidence of destruction. Populations in some cities grew quite large in the late Classic Period and may have exceeded the carrying capacity of Mayan agriculture. Deforestation and soil erosion may have led to the waning influence of Mayan kings, who as shamans were supposed to be magically responsible via their rituals for the fertility of the land.

At some cities like Copán, there is evidence that the power of nonroyal noble families grew to rival and ultimately eclipse the king's own power, and in general, Mayan royal families themselves grew, leading to conflicts among rival claimants to kingship. The rulers may have attempted to compensate for their problems at home by organizing more monumental construction in their own honor, leading to further environmental degradation. Invasion from central Mexico was once a popular theory for the collapse, but the evidence for large movements of foreigners into Mayan lands has been debunked, and many new artistic features once seen as evidence of Mexican “influence” are now recognized as local and Mayan in origin. Natural disasters have been suspected as additional culprits, and in fact, there is scientific evidence of severe droughts in the Yucatán in the ninth and 10th centuries. However, this drought did not affect the whole Mayan region, and the Yucatán was not abandoned but flourished during the “collapse.” In addition, the abandonment of some sites was well under way before these droughts. As in North America, though natural disasters may have contributed to social collapse, they certainly were not the primary cause.

The great metropolis of Teotihuacán in the basin of Mexico met a catastrophic end around 650, and possibly as much as a century earlier. Though the city itself was not completely abandoned, most of its population of 125,000 to 200,000 left after the temples and elite residences at the center of the site were burned and destroyed. Foreign invasion is one possible explanation for the destruction, but internal social factors leading to a revolt or civil war seem more likely. As with the Maya, Teotihuacán's vast agricultural and building projects may have led to deforestation and natural disaster, which the leadership tried to remedy with religion through building more monuments, leading to social collapse in a vicious circle.

The Toltec capital of Tula in the central Mexican state of Hidalgo fell from power and was sacked and burned around 1150, according to archaeological data. The culprits were probably seminomadic Chichimec, migrants from the arid north of Mexico driven south by worsening climate conditions. Their ranks may have included some of the ancestors of the Aztec.

The city of Cerro Blanco, center of a powerful Moche state in northern Peru, fell upon hard times in the late sixth

century, struck by a succession of natural disasters, including drought, floods, and possibly even an earthquake. Though the city recovered and was rebuilt, it lost much of its prestige, and the center of political power shifted to the site of Pampa Grande, while the ideology of Moche rulership weakened. By 800 Pampa Grande itself was abandoned after the palaces of the elite were burned and plundered, most likely by their disgruntled subjects.

Although some popular crank literature continues to assert that the Tiwanaku state of Bolivia and its influence collapsed in 12,000 B.C.E. owing to a cosmic catastrophe, the more sober archaeological truth is that its power declined between 1000 and 1100 C.E. The natural events that spurred its downfall were less than cosmic but were nonetheless significant. Core samples from lakes and glaciers in the Andes reveal that severe climate changes beset the region between 1000 and 1300, leading to a marked reduction in annual rainfall. The drought lasted for decades (at least) and caused the failure of the agricultural base of Tiwanaku civilization. The political sphere, or “empire,” of the city collapsed, and its inhabitants may have ritually destroyed the site before they abandoned it.

ASIA AND THE PACIFIC

BY LAURA LEE JUNKER

In discussing cases of collapse of civilizations or societies in Asian and Pacific medieval history, it is important to understand that “collapse” generally involves the breakdown of social and political institutions that define particular societies but rarely involves the wholesale annihilation or disappearance of the people who made up that society. (Easter Island, as discussed here, may be seen as an exception.) The causes of social collapse in human history are diverse, as we will see in the examples outlined here. They may include conquest by a foreign group, environmental disasters or degradation affecting economic viability (for instance, drought, destruction by typhoons, disease and depopulation, ecological changes), social conflict within a society (such as competition for power or uprisings of disenfranchised groups), or more often a convergence of several factors. As the social fabric and structures of state organization begin to unravel as a result of these stresses, most of the population (particularly the nonelites, who are not part of the government) are generally absorbed into conquering nations or radically change their social and economic strategy to survive (that is, they make themselves over as a new form of society).

Medieval India between the fifth and 16th centuries had a fragmented political landscape consisting of numerous highly militaristic kingdoms and empires in which po-

litical structure and authority was defined and legitimated by religious ideals, including Buddhism in the early phases, followed by Hinduism and Islam. Large urban centers like Multan, Gaur, Tughlaqabad, and Vijayanagar were used as the anchors for territorial expansion and foreign trade that eventually reached central Asia, China, Africa, and the Near East. The political fortunes of these kingdoms and empires appear to have hinged on military might, the ability to claim ideological right through strategic use of religious fervor, and a powerful economy. The last included the capacity for industrial-level production of export commodities (such as silk, semiprecious stone beads, and indigo), efficient transport of goods by sea and land (allowing the polity to monopolize the lucrative foreign trade market), and massive agricultural production. When one or more of these military, economic and religious elements failed, dominant polities collapsed and ceded power to rising kingdoms.

Vijayanagar, the capital of the Hindu empire that ruled southern India in the 14th through 16th centuries, was overrun in 1565 by a conquering Islamic Mogul army from the north. The elites fled southward, leaving abandoned and in ruins religious and administrative architecture, critical irrigation systems, and commercial centers. Social, ideological, and economic collapse followed military conquest, since the remaining Hindu population (largely peasants) lost their religious center, state-defined systems of caste, large-scale state-run water-control systems that had made agriculture productive in the arid environment, and established links in international commerce.

Similarly, the sultanate of Bengal, in the 13th through 16th centuries, centered at the city of Gaur on the India-Bangladesh border, went from a regional powerhouse in foreign trade toward rapid collapse in the mid-16th century owing to an unfortunate confluence of factors: military invasion by the Afghan leader Sher Shah, the loss of commercial preeminence to competing trade powers, and a plague that decimated the demographic base of the state. In both cases external polities quickly filled the economic and political void in the regions.

While China tended to support extensive unified empires through this period, it also went through cycles of political fragmentation, collapse of state structures, and significant shifts in the social order. The Tang Dynasty (581–907) in China, with its demise at the end of the ninth century, is one of the best-studied cases of social collapse in medieval period Chinese societies. The Tang rulers, through military force and unprecedented economic expansion, forged an empire that unified what is now northern and southern China, expanded into northern Vietnam and northern Korea, and controlled western steppe trade routes by invading vast areas of central Asia. Most important, the empire exported its con-



Eleven-headed Kannon, Japan, 13th century; the bodhisattva Kannon is the manifestation of the wisdom and infinite compassion of the universal Buddha, who was especially popular among the Japanese of the 11th and 12th centuries, a time of social upheaval. (Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1904-350)

cepts of aristocratic privilege, court culture, highly centralized political rule, and a strong state control of commerce to Korea, Japan, and other distant lands, with the spectacular capital of Xi'an (then called Ch'angan, the largest city in the world) serving as a model for orderly and cultured society.

However, the social system in which noble pedigrees bought access to political authority and in which social and economic mobility was highly constrained soon cracked under the strain of social rebellion. Disenfranchised military leaders marched on the capital, and the emperor was forced to restore order by allowing the rebels to establish private fiefdoms within the rapidly decentralizing state. This was soon followed by a loosening of central management over commerce and markets, allowing the rise of a new independently wealthy merchant class. Faced with internal unrest from military governors, embittered and scheming aristocrats, a rising merchant class, bandit gangs of disenfranchised lower classes, and even scheming court eunuchs, the weakened Tang Dynasty fell military prey to antagonistic states along its borders (including the Tibetans and Turkish Uighurs). The final collapse of the Tang 907 ushered in a period of political fragmentation in the north and a decline of aristocratic ideals. Society was reshaped into one with unprecedented social mobility and economic opportunity. This new social pattern was reinforced in the new Southern Song state (907–1276) by Confucian scholars, who emphasized that the ideal society was one in which power and social action were centered at the local community level.

Both Korea and Japan saw repeated patterning of strongly centralized states, followed by social and political crisis and fragmentation into a political landscape of regional powers. In Korea the powerful kingdom of Silla (668–891) was patterned after the Tang as a highly centralized state ruled by hereditary aristocracy whose wealth contrasted sharply with the slavelike conditions of the commoners. However, the state soon disintegrated under peasant uprisings, the rise of independently powerful “castle lords” out of the besieged local aristocracy, the rise of new sects of Zen Buddhism that emphasized individualized spiritual enlightenment and agency, and economic instability driven by difficulties in tax collection and decentralization of sources of wealth and production. As in China, a cycle of political fragmentation was followed by unification by a powerful state (Koryo, 918–1392) which attempted to redress some of these internal social and economic issues through new concepts of merit in civil service, attempts at land distribution and tax reforms, and limits on aristocratic power. However, internal class conflict continued to plague the Koryo kingdom, weakening it to the point where the Mongol Yuan Empire in China was able to conquer Koryo and establish it as a client Yuan state.

In Southeast Asia the numerous tropical maritime trading kingdoms of the medieval period were notoriously socially unstable and politically fragile, owing at least partly to economies heavily reliant on foreign commerce, ethnic heterogeneity, and leaders with authority that derived from continual alliance building rather than fixed hereditary rights. Political cycling, in which regional power centers rose and fell with surprising rapidity, rather than enduring hegemony by a single polity, was the norm in the region. The Khmer state (ninth through 15th centuries), centered in present-day Cambodia, was unusually resilient but collapsed eventually as the result of military pressure and environmental factors. The Khmer state was politically consolidated out of a number of independent regional chiefdoms by King Jayavarman II (r. ca. 790–850), whose successors built the spectacular Hindu and then Buddhist-oriented centers of Angkor Thom and Angkor Wat, consisting of extensive complexes of temples, monuments, reservoirs, canals, and elite residential structures.

While the Khmer state gained great wealth through maritime commerce, their economic staple was large-scale wet-rice production supported through extensive irrigation and reservoir systems. Remarkable carved relief scenes on the temples and other public architecture emphasize the military power of the Khmer state as it expanded against its neighbors (Champa to the east, the Vietnamese in the north, the Thais to the west, and the Malays to the south) with sophisticated ships and a well-armed land-based military led by elephant-riding generals. However, the decline of Khmer political dominance in the region and the collapse of Khmer social fabric by the late 14th and early 15th centuries is attributed by scholars to a combination of economic, ecological, and military factors: a precipitous fall in agricultural surplus due to environmental changes and failure of irrigation technologies, military expansion of the rising Siamese people to the east and the invading Mongols to the north, and rapidly increasing malaria due to standing water in irrigated rice fields.

In the Pacific islands we have perhaps some of the strongest historical and archaeological evidence for the various environmental, technological, and social factors that lead to the so-called collapse and even near-disappearance of societies. Easter Island (or Rapa Nui), an isolated island in the southeastern Pacific settled by migrating Polynesians (probably Marquesans) sometime around 400 to 500, had serious ecological constraints, including its relatively small size (only about 100 square miles), no permanent rivers for water and crop irrigation (only three freshwater volcanic lakes in the rugged interior), few indigenous mammals and cultivatable plants, no highly productive shallow coral reefs for marine harvesting, and considerable distance from other islands (around 1,240 miles from the nearest inhabitable island) that

precluded trade as a safety net. In addition, many of the traditional equatorial crops of Polynesian colonizers would not grow well in the somewhat cooler climate of Easter Island, so chicken was their only domesticated animal, and sweet potato, yams, banana and gourds were their staple crops.

In the first thousand years after initial settlement the Easter Islanders flourished in the form of several socially stratified chiefdoms that supported themselves fairly adequately through farming and fishing and built an increasingly dense landscape of villages and chief's residences, represented archaeologically by the fortified village of Orongo, comprising 48 oval stone houses with earthen roofs. Ceremonial activity centered on *ahu*, large rectangular ceremonial platforms built of volcanic rock (a large one called Tongariki, measuring around 148 feet in length and 10 feet high). These often supported rows of huge stone statuary (the largest more than 30 feet high and weighing more than 50 tons), legless busts with outsized heads sporting topknot hairstyles and elongated earlobes that might represent sacred ancestors.

Archaeological evidence and contact period European accounts suggest that Easter Island society began a dramatic decline some time around 1500 to 1600. By the time of initial European discovery in 1722, the Dutch explorers found a population of 1,000 from an estimated high of 10,000 prior to 1600, a barren landscape largely devoid of trees, many of the ceremonial *ahu* in ruins, and little evidence for the social stratification and political complexity attested by archaeological research for earlier periods. Archaeological investigations and the study of oral traditions suggest that a combination of population increase beyond the carrying capacity of the environment, ecological degradation by the human population, and social conflict over dwindling resources all contributed to societal collapse.

Archaeological settlement studies show that the population continued to grow throughout the Easter Island occupation but reached critical levels in the century or so before European contact. Geological studies of the history of soil erosion and paleobotanical studies of changes in pollen preserved in ancient soils indicate that trees were slowly and then more rapidly depleted as populations used wood for fuel, for canoe and house building, and for wooden rollers to move the several-ton statues from interior quarries to coastal *ahu* and cleared fields for expanding agricultural fields. Erosion and heavy farming degraded the soils and reduced agricultural productivity, while fewer wood canoes curtailed fishing and negated the possibility of maritime "escape" routes off the island.

Social conflict and warfare between groups on the island are evidenced in the appearance of possible defensive lava tube "refuges" in the island interior, the building of the 2-

mile-long Poike Ditch to defend a peninsula on the island, the proliferation of obsidian spearheads, the destruction of *ahu*, and the emergence of intensified ritual that included a bird cult and possible cannibalistic rites. While archaeological evidence indicates that there were probably several territorially discrete chiefdoms on the island at the height of development, oral traditions collected after contact tell a story of apocalyptic war in the 17th century between enigmatic groups known as the "Long Ears" and "Short Ears" that resulted in annihilation of most of the population. Archaeological work on at least a dozen islands elsewhere in the Pacific (popularly known as the "Mystery Islands") has documented prehistoric occupation but no inhabitants at European contact, suggesting that eventual failure of societies on small, remote islands due to economic nonviability and social conflict is not an unusual outcome.

EUROPE

BY BRADLEY A. SKEEN

During the Middle Ages western Europe suffered three periods of social collapse that resulted in the transformation of society and the loss of whole villages, cities, and ways of life: the barbarian invasions that destroyed the Western Roman Empire in the fifth and sixth centuries; the renewed waves of barbarian invasions in the ninth and 10th centuries that led to the institution of feudalism; and the pandemic of bubonic plague that killed approximately one-half of the population in the middle 14th century. In addition, eastern Europe suffered two catastrophic invasions in the later Middle Ages that resulted in the Mongol occupation of Russia and the destruction of the Byzantine Empire.

In the fourth and fifth centuries a massive out-migration of nomadic tribes from central Asia had a domino effect all the way to the Roman Empire, with one group of people displacing another in a chain that stretched from beyond the Urals to the borders of the empire. In the sixth century another wave of Asiatic invaders, among them, the Avars, forced more Germans into former Roman territories, notably the Franks into France and the Lombards into Italy. The Lombard invasion of Italy in the 560s and 570s was especially devastating. Nearly every town in the Po valley was sacked. Refugees from the region fled to the sandbars north of the mouth of the Po, where they eventually founded the city of Venice.

In 541 and 542 a pandemic of bubonic plague, probably beginning in Ethiopia, swept over Europe, especially the Byzantine Empire. As many as 25,000,000 people died, including as much as 40 percent of the population of the Byzantine Empire. It came at the very moment that the emperor Justinian (r. 527–65) was making the last realistic attempt to reconquer

the Western Roman Empire, forever dooming that project. As is typical of the plague, major outbreaks recurred in the Byzantine Empire about every generation for the next two centuries.

The cumulative effects of these disasters created an entirely different and much-impooverished world between 350 and 650. From a demographic perspective the population of Europe declined by more than half, perhaps much more. The usual estimate for Italy, the hardest-hit area, is that the population in 600 was only one-seventh of what it had been two centuries earlier. Very few population centers had been abandoned, but huge stretches of countryside that had contained rich villas and prosperous farms were completely depopulated. Large Roman cities, which once had populations of 100,000 or more, now had no more people than a village.

The case of Rome and its environs was one of the most extreme, but it was far from unique. The population of Rome and its port of Ostia in 400 must have been close to 1 million. By 600 Ostia had almost completely vanished, with most of the city buried under rubble and accumulated earth. In Rome itself the small remaining population lived in the ruins of public buildings. For example, the hollow spaces of the triumphal arches of the emperors were broken open and converted into dwellings. The Roman Forum, which had once been the political and economic center of the Western world, became a sheep pasture, with most of its temples and government buildings pulled down. The entire documentary history of the Roman Empire had been stored in government offices in Rome in 400; by 600 they had been destroyed. Roman factory complexes such as the pottery works at La Graufesenque in France, which produced more than 100,000 ceramic items of all kinds per month, or the water-powered flour mills such as those at Barbegal in France or on the Janiculum Hill in Rome, which produced 4 to 5 tons of flour per day, were abandoned and forgotten. In short, an entire civilization was destroyed during the course of those few centuries.

By 800, the year of the coronation of Charlemagne as the first Holy Roman Emperor (r. 800–14), western Europe had slowly recovered in terms of population and political institutions, even if it still lacked great urban centers, and its intellectual life was already centered on recovering the Roman past rather than making its own progress. But at this time, new incursions, usually in the form of violent raids, from outside peoples again broke up the cohesion of western Europe, in this case those of the Vikings from Scandinavia, of Asiatic Magyars moving from the eastern steppes into the region of modern-day Hungary and devastating Germany, and of Islamic forces from across the Mediterranean. This led to a breakdown of central authority and the waste of resources re-

quired for military reaction to the raids. In many local areas these raids were quite devastating (but it must also be said that Viking settlement led to the founding of many towns and the so-called Norman principalities in France and Sicily). More particularly, the institution of feudalism—in which political power was decentralized into the hands of noblemen holding castles serving as places of refuge in the countryside—was in place by the time order was generally restored about the year 1000. The raids left western Europe far more politically fragmented than it had been before.

By 1300 Europe had reached a population approaching 100 million, probably larger than the Roman Empire's at its height. But a pandemic of bubonic plague known as the Black Death killed between one-third and one-half of the total population between 1347 and 1350. Rural areas like Poland had lower death rates, while Italy, the most heavily urbanized part of Europe, is now thought to have had a death toll of at least two-thirds of its population. This again led to the abandonment of vast regions of countryside and its reversion from farmland to forest. The Jewish ghettos of Mainz, Strasbourg, and other Rhineland cities were completely depopulated, not through plague but through anti-Semitic violence—inspired by the general panic brought about by the crisis—that killed thousands of Jews and induced any survivors to flee as refugees. The Black Death also brought about the end of the feudal system of enserfed agricultural labor. Those peasants who survived found that the value of their labor, and with it their social mobility, had dramatically increased. They could now bargain for higher wages or readily find high-paying work in the towns and cities.

Eastern Slavic civilization was organized between the upper Dnieper and Don rivers into a federation of essentially independent principalities known as Kiev Rus, named for the most powerful of the small states. After an initial reconnaissance that resulted in an overwhelming victory at the Kalka river in 1223, Mongols led by Batu Khan (d. 1255), Genghis Khan's grandson, and Sabutai (ca. 1172–1245), Genghis's ablest subordinate, invaded Kiev Rus, completely overwhelmed all military resistance, and destroyed every major city (except Pskov and Novgorod in the northwest). Much of the surviving population fled to the uninhabited forests of the northeast. The foundation established by hundreds of Orthodox Christian monasteries in the area was instrumental in the survival of the Russian people and culture. The principality of Moscow was eventually built up in the area and became the ancestor of the modern Russian state. The Mongols continued their nomadic tradition and lived apart from their agricultural subjects, but they imposed heavy taxes that had to be paid throughout the medieval period. As a result, this period of Russian history is traditionally referred to as the Mongol Yoke, as though Russia were a beast of burden laboring under a yoke.

Arab invaders defeated forces of the Byzantine Empire at Yarmuk in Syria in 636, opening the way for the conquest of all Byzantine possessions in Asia south of the Tarsus Mountains (just northwest of the modern-day border between Turkey and Syria) and in Africa. Islamic forces frequently raided into Asia Minor, however, and as early as 674 they lay siege to Constantinople, the Byzantine capital, on the European coast just across the Bosphorus from Asia Minor. That attempt, and several more in succeeding centuries, always failed. Byzantine fortunes rose and fell, but in 1204 Constantinople was captured for the first time, not by Muslims, however, but by Christian European crusaders who had been admitted to the city to help its defense. Byzantine rule of the city was eventually restored, but the fragmented empire never recovered. By 1354 Ottoman Turks invaded Europe, conquering much of the Balkans in the battle of Kosovo (1389), leaving Constantinople little more than a city-state. In 1453, Sultan Mehmed II, called the Conqueror (r. 1444–46 and 1451–81) finally captured the city, attacking it with an army of 80,000 men against about 7,000 defenders, bringing to an end more than 2,000 years of Roman and Byzantine history. A few Byzantine intellectuals, who either had fled to Italy earlier in the 15th century or actually escaped the siege itself on a Venetian fleet that broke out of the naval blockade, helped—particularly with their personal libraries—to spur the Renaissance and are primarily responsible for the modern world's fragmentary knowledge of ancient Greek literature. Undoubtedly, thousands more texts of Greek authors existed in Constantinople and were destroyed when the Turks sacked the city.

THE ISLAMIC WORLD

BY TOM STREISSGUTH

The Islamic conquests of the seventh and eighth centuries established the new faith from Afghanistan to the Middle East and North Africa. After the death of its founder, Muhammad (ca. 570–632), Islam spread from its home in Mecca and Medina in the Arabian Peninsula. Under the first caliphs, who combined political and religious authority, Islamic armies defeated the Sassanid Empire of Persia and the Byzantine armies in the Middle East and Egypt. The Muslims established the realm of al-Andalus in the Iberian Peninsula and advanced as far as Tours, in central France, where they were turned back in 732 at the battle of Tours by an army of Christian Franks and Burgundians.

A Muslim domain was also established on the island of Sicily in the early 10th century. The governors contended with constant raiding from armies of the Byzantine Empire, while civil war among different ruling factions further weakened the island's defenses. In the middle of the 10th century several emirs (governors) allied with the Normans, who were

Christians from northern Europe, and invited them to invade Sicily. The war between Muslim and Christian armies lasted a generation before the fall of Palermo in 1072. Muslim control ended, and in the following years Muslim civilians converted to Christianity or fled the island.

In Mesopotamia the Islamic civilization was attaining great heights in philosophy, science, mathematics, astronomy, and medicine. But the Muslim domain was too large to be effectively governed from a single capital, and its frontiers were vulnerable to raids and invasion. At the end of the 10th century nomadic tribes of central Asian Turks swept across the Amu Darya (Oxus) River and southward into Persia. The Turks invaded Khorasan and what is now eastern Iran, conquering the city of Nishapur. In 1040 the Turks won a key battle at Dandanakan. The Seljuk Empire that had been founded by a Turkish dynasty spread across Mesopotamia and the Middle East, holding cities for ransom and reducing them to ruins whenever they resisted. Behind the Turks followed new hordes of central Asian nomads who raided towns, ports, caravans, oases, and settled farms throughout the Middle East as far north as Azerbaijan and Asia Minor.

By the 1070s the Turks had reached Egypt. Governed by the Fatimid Dynasty, which ruled most of North Africa, Egypt had been devastated by a long drought and famine, and Fatimid control was challenged by the revolt of the Zirids, a family of local rulers who sought independence. A powerful confederation of Arab tribes known as the Banu Hilal was spreading into North Africa at the invitation of the Fatimids. Following the Banu Hilal invasion the Turks also arrived in the Nile Valley, uprooting the Fatimid administration and creating chaos wherever they went.

A new threat came to the Levant in the late 11th century, when the first wave of Christian crusaders landed on the Mediterranean shores of Palestine. Fired by their religious zeal and the promise of rich rewards of gold and land, the crusaders were led by a skilled military aristocracy charged by the pope with the task of recapturing the holy city of Jerusalem. The heavily armored knights and well-trained foot soldiers of Europe won a string of victories against the mobile Arab cavalry, besieging and taking the city of Antioch in Syria and finally reaching the walls of Jerusalem in June 1099. The Muslim governor of the city expelled all the Christians within the walls and fortified the walls with thousands of archers.

The Christians answered with mobile siege towers. These tall platforms were brought up to the city walls and used by the Christian infantry to storm across the ramparts on the morning of July 15. The fall of the city was followed by a massacre of its inhabitants. The Christians did not discriminate between civilian and soldier or spare Jews, Muslims, or fellow Christians; every inhabitant found was executed, and the bodies of the victims were piled high outside the city walls

and burned. The crusader realms that were established after this event usurped Muslim rulers from the Sinai Peninsula north to Antioch and the upper Euphrates valley (which became the Christian County of Edessa), although Christians always made up a minority in the region.

In Mesopotamia the Abbasid Caliphate that ruled from the city of Baghdad had survived the onslaught of the Turks in the 11th century. Dating from 751 the caliphs controlled tributary states from the Caspian Sea to the Persian Gulf. By the 13th century, however, the caliphate was in decline. The caliph himself had little authority, and true control of the realm had passed to military leaders among the Turks and Mamluks (a caste of soldiers that had risen from slavery to seize control of Egypt).

In the early 13th century, meanwhile, nomadic Mongol tribes inhabited the steppes north of China, in distant northeastern Asia. Their leader Genghis Khan (ca. 1162–1227) forged a powerful army of skilled cavalry fighters, drilled in complex maneuvers designed to confuse and outwit their enemies. Beginning in the 1220s the Mongols swept through central Asia, capturing the important city of Mary (formerly Merv), in what is now Turkmenistan and putting every single inhabitant, except for a few hundred useful artisans, to the sword. The cities of Bukhara, Urganch, and Samarqand fell in quick order, their inhabitants killed or scattered.

In Persia the Mongols often defeated their enemies with sheer terror. By utterly destroying cities that did not agree to surrender, they spread a fearsome reputation through the region, a reputation that persuaded many garrisons simply to give up without a fight. In cities that did resist, the Mongols slaughtered the men, enslaved women and children, and brought artisans home to serve them in their homeland in the Asian steppes.

Under Hülegü Khan (ca. 1217–65), the grandson of Genghis Khan, the Mongols reached Baghdad in 1258 and immediately demanded the surrender of the caliph. Confident of victory, the caliph failed to reinforce the city or gather reinforcements, and Hülegü soon had Baghdad surrounded. The city formally surrendered on February 10, and three days later the Mongols marched into the city, beginning a slaughter and reducing Baghdad to a smoking ruin. The Mongols destroyed every major public building in the city, including the magnificent Abbasid palaces, libraries, and mosques. The caliph himself was executed in a traditional Mongol way, by being rolled into a carpet and trampled to death by horses. The survivors fled Baghdad, many of them purposely spared by the Mongols to serve as messengers of the destruction awaiting anyone who refused to submit.

The Mongol invasion of Mesopotamia brought a centuries-long decline in the region. Irrigation canals and dams were destroyed, setting back agriculture and returning much of the

land to desert. The abandonment of Baghdad and other important cities dealt a major blow to Islamic advancements in the sciences, while the caliphate itself moved to Egypt, where it came under the domination of the Mamluk warrior caste. In the late 13th century, after a Mongol army was defeated at the battle of Ain Jalut, in Syria, the Mongols retreated from Mesopotamia and the Mamluks extended their control into the region.

At this time the Christian Reconquista of the Iberian Peninsula was gathering force. After 1000 the caliphate of Córdoba began to break up. In 1085 Christian forces under the leadership of the king of Castile captured the key city of Toledo. In the early 12th century Aragon joined the campaign. The battle of Las Navas de Tolosa in 1212 was a crucial turning point in the campaign. This Christian victory further divided the Muslim governors of Iberia; within 50 years the cities of Córdoba and Cádiz had fallen, leaving a last Muslim outpost in the kingdom of Granada.

The unification of Castile and Aragon under Ferdinand and Isabella gave the final impetus to the Reconquista. After a series of defeats in the surrounding countryside,

Granada finally fell to the Christians in 1492. The city was abandoned by its last ruler, Muhammad XI (Boabdil) (r. 1482–92), who left behind the magnificent Moorish palace of Alhambra. The Muslims who remained in Spain were stripped of their land and property and forced to convert to Christianity. The majority fled Iberia altogether, moving across the Mediterranean to North Africa, which remained in Muslim hands.

See also AGRICULTURE; ARCHITECTURE; BORDERS AND FRONTIERS; CALENDARS AND CLOCKS; CITIES; CLIMATE AND GEOGRAPHY; ECONOMY; EMPIRES AND DYNASTIES; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NATURAL DISASTERS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; ROADS AND BRIDGES; SACRED SITES; SCANDALS AND CORRUPTION; SEAFARING AND NAVIGATION; SETTLEMENT PATTERNS; SOCIAL ORGANIZATION; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST.

Europe

~ An Anonymous Jewish Account of the Expulsion of Jews from Spain (1495) ~

And in the year 5252 [1492], in the days of King Ferdinand, the Lord visited the remnant of his people a second time, and exiled them. After the King had captured the city of Granada from the Moors, and it had surrendered to him on the 7th of January of the year just mentioned, he ordered the expulsion of all the Jews in all parts of his kingdom—in the kingdoms of Castile, Catalonia, Aragon, Galicia, Majorca, Minorca, the Basque provinces, the islands of Sardinia and Sicily, and the kingdom of Valencia. Even before that the Queen had expelled them from the kingdom of Andalusia [1483].

The King gave them three months' time in which to leave. It was announced in public in every city on the first of May, which happened to be the 19th day of the Omer, and the term ended on the day before the 9th of Ab.

About their number there is no agreement, but, after many inquiries, I found that the most generally accepted estimate is 50,000 families, or, as others say, 53,000. They had houses, fields, vineyards, and cattle, and most of them were artisans. . . .

In the course of the three months' respite granted them they endeavoured to effect an arrangement permitting them to stay on in the country, and they felt confident of success. . . .

The agreement permitting them to remain in the country on the payment of a large sum of money was almost completed when it was frustrated by the interference of a prior who was called the Prior of Santa Cruz. Then the Queen gave an answer to the representatives of the Jews, similar to the saying of King Solomon: "The king's heart is in the hand of the Lord, as the rivers of water. God turneth it whithersoever He will." She said furthermore: "Do you believe that this comes upon you from us? The Lord hath put this thing into the heart of the king."

Then they saw that there was evil determined against them by the King, and they gave up the hope of remaining. But the time had become short, and they had to hasten their exodus from Spain. They sold their houses, their landed estates, and their cattle for very small prices, to save themselves. The King did not allow

them to carry silver and gold out of his country, so that they were compelled to exchange their silver and gold for merchandise of cloths and skins and other things.

One hundred and twenty thousand of them went to Portugal, according to a compact which a prominent man, Don Vidal bar Benveniste del Cavalleria, had made with the King of Portugal, and they paid one ducat for every soul, and the fourth part of all the merchandise they had carried thither; and he allowed them to stay in his country six months. This King acted much worse toward them than the King of Spain, and after the six months had elapsed he made slaves of all those that remained in his country, and banished seven hundred children to a remote island to settle it, and all of them died. . . .

Many of the exiled Spaniards went to Mohammedan countries, to Fez, Tlemçen, and the Berber provinces, under the King of Tunis. On account of their large numbers the Moors did not allow them into their cities, and many of them died in the fields from hunger, thirst, and lack of everything. The lions and bears, which are numerous in this country, killed some of them while they lay starving outside of the cities. A Jew in the kingdom of Tlemçen, named Abraham, the viceroy who ruled the kingdom, made part of them come to this kingdom, and he spent a large amount of money to help them. The Jews of Northern Africa were very charitable toward them. A part of those who went to Northern Africa, as they found no rest and no place that would receive them, returned to Spain, and became converts

When the edict of expulsion became known in the other countries, vessels came from Genoa to the Spanish harbors to carry away the Jews. The crews of these vessels, too, acted maliciously and meanly toward the Jews, robbed them, and delivered some of them to the

famous pirate of that time who was called the Corsair of Genoa. To those who escaped and arrived at Genoa the people of the city showed themselves merciless, and oppressed and robbed them, and the cruelty of their wicked hearts went so far that they took the infants from the mothers' breasts.

Many ships with Jews, especially from Sicily, went to the city of Naples on the coast. The King of this country was friendly to the Jews, received them all, and was merciful towards them, and he helped them with money. The Jews that were at Naples supplied them with food as much as they could, and sent around to the other parts of Italy to collect money to sustain them. The Marranos in this city lent them money on pledges without interest; even the Dominican Brotherhood acted mercifully toward them. On account of their very large number, all this was not enough. Some of them died by famine, others sold their children to Christians to sustain their life. Finally, a plague broke out among them, spread to Naples, and very many of them died, so that the living wearied of burying the dead.

Part of the exiled Spaniards went over sea to Turkey. Some of them were thrown into the sea and drowned, but those who arrived, there the King of Turkey received kindly, as they were artisans. He lent them money and settled many of them on an island, and gave them fields and estates. . . .

He who said unto His world, Enough, may He also say Enough unto our sufferings, and may He look down upon our impotence. May He turn again, and have compassion upon us, and hasten out salvation. Thus may it be Thy will!

From: Jacob Marcus, *The Jew in the Medieval World: A Sourcebook*, 315–1791, (New York: Jewish Publication Society, 1938).

The Islamic World

~ *Fulk of Chartres: "The Capture of Jerusalem" (1099)* ~

CHAPTER 27: THE SIEGE OF THE CITY OF JERUSALEM

On the seventh of June the Franks besieged Jerusalem. The city is located in a mountainous region, which

is lacking in rivers, woods, and springs, except the Fountain of Siloam, where there is plenty of water, but it empties forth only at certain intervals. This fountain empties into the valley, at the foot of Mount

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Zion, and flows into the course of the brook of Kedron, which, during the winter, flows through the valley of Jehosaphat. There are many cisterns, which furnish abundant water within the city. When filled by the winter rains and well cared for, they offer both men and beasts an unfailing supply at all times. Moreover, the city is laid out most beautifully, and cannot be criticized for too great length or as being disproportionately narrow. On the west is the tower of David, which is flanked on both sides by the broad wall of the city. The lower half of the wall is solid masonry, of square stones and mortar, sealed with molten lead. So strong is this wall that if fifteen or twenty men should be well supplied with provisions, they would never be taken by any army. . . .

When the Franks saw how difficult it would be to take the city, the leaders ordered scaling ladders to be made, hoping that by a brave assault it might be possible to surmount the walls by means 'of ladders and thus take the city, God helping. So the ladders were made, and on the day following the seventh, in the early morning, the leaders ordered the attack, and, with the trumpets sounding, a splendid assault was made on the city from all sides. The attack lasted till the sixth hour, but it was discovered that the city could not be entered by the use of ladders, which were few in number, and sadly we ceased the attack.

Then a council was held, and it was ordered that siege machines should be constructed by the artisans, so that by moving them close to the wall we might accomplish our purpose, with the aid of God. This was done. . . .

When the tower had been put together and had been covered with hides, it was moved nearer to the wall. Then knights, few in number, but brave, at the sound of the trumpet, took their places in the tower and began to shoot stones and arrows. The Saracens defended themselves vigorously, and, with slings, very skilfully hurled back burning firebrands, which had been dipped in oil and fresh fat. Many on both sides, fighting in this manner, often found themselves in the presence of death. . . .

On the following day the work again began at the sound of the trumpet, and to such purpose that the rams, by continual pounding, made a hole through one

part of the wall. The Saracens suspended two beams before the opening, supporting them by ropes, so that by piling stones behind them they would make an obstacle to the rams. However, what they did for their own protection became, through the providence of God, the cause of their own destruction. For, when the tower was moved nearer to the wall, the ropes that supported the beams were cut; from these same beams the Franks constructed a bridge, which they cleverly extended from the tower to the wall. About this time one of the towers in the stone wall began to burn, for the men who worked our machines had been hurling firebrands upon it until the wooden beams within it caught fire. The flames and smoke soon became so bad that none of the defenders of this part of the wall were able to remain near this place. At the noon hour on Friday, with trumpets sounding, amid great commotion and shouting "God help us," the Franks entered the city. When the pagans saw one standard planted on the wall, they were completely demoralized, and all their former boldness vanished, and they turned to flee through the narrow streets of the city. Those who were already in rapid flight began to flee more rapidly.

Count Raymond and his men, who were attacking the wall on the other side, did not yet know of all this, until they saw the Saracens leap from the wall in front of them. Forthwith, they joyfully rushed into the city to pursue and kill the nefarious enemies, as their comrades were already doing. Some Saracens, Arabs, and Ethiopians took refuge in the tower of David, others fled to the temples of the Lord and of Solomon. A great fight took place in the court and porch of the temples, where they were unable to escape from our gladiators. Many fled to the roof of the temple of Solomon, and were shot with arrows, so that they fell to the ground dead. In this temple almost ten thousand were killed. Indeed, if you had been there you would have seen our feet colored to our ankles with the blood of the slain. But what more shall I relate? None of them were left alive; neither women nor children were spared.

From: Fulk of Chartres, "Gesta Francorum Jerusalem expugnantium," in Frederick Duncan and August C. Krey, eds., *Parallel Source Problems in Medieval History* (New York: Harper and Brothers, 1912).

FURTHER READING

- Paul Bahn and John Flenley, *Easter Island, Earth Island* (New York: Thames and Hudson, 1992).
- Peter Bellwood, *The Polynesians: Prehistory of an Island People* (London: Thames and Hudson, 1987).
- Graham Connah, *African Civilizations: An Archaeological Perspective*, 2nd ed. (Cambridge, U.K.: Cambridge University Press, 2001).
- Michael R. Drompp, *Tang China and the Collapse of the Uighur Empire: A Documentary History* (Boston: Brill Academic Publishers, 2004).
- Susan Toby Evans, *Ancient Mexico and Central America: Archaeology and Culture History* (London: Thames and Hudson, 2004).
- Leo de Hartog, *Russia and the Mongol Yoke: The History of the Russian Principalities and the Golden Horde, 1221–1502* (London: British Academic Press, 1992).
- David Herlihy, *The Black Death and the Transformation of the West* (Cambridge, Mass.: Harvard University Press, 1997).
- Charles Warren Hostler, *The Turks of Central Asia* (Westport, Conn.: Praeger, 2003).
- Johan Huizinga, *The Waning of the Middle Ages* (New York: St. Martin's Press, 1985).
- Jordanes, "The Origins and Deeds of the Goths," trans. Charles C. Mierow. Available online. URL: <http://www.ucalgary.ca/~vandersp/Courses/texts/jordgeti.html>. Downloaded on November 9, 2007.
- John Kantner, *Ancient Puebloan Southwest* (Cambridge, U.K.: Cambridge University Press, 2004).
- Lester K. Little, ed., *Plague and the End of Antiquity: The Pandemic of 541–750* (Cambridge, U.K.: Cambridge University Press, 2006).
- Thomas F. Madden, *The New Concise History of the Crusades* (Lanham, Md.: Rowman and Littlefield, 2005).
- David Morgan, *The Mongols* (Oxford, U.K.: Blackwell, 2007).
- Stuart Munro-Hay, *Aksum: A Civilisation of Late Antiquity* (Edinburgh, U.K.: Edinburgh University Press, 1991).
- Joseph F. O'Callaghan, *Reconquest and Crusade in Medieval Spain* (Philadelphia: University of Pennsylvania Press, 2004).
- Robert Sewell, *A Forgotten Empire: Vijayanagar* (Boston: Adamant Media Corporation, 2006).
- David Webster, *The Fall of the Ancient Maya: Solving the Mystery of the Maya Collapse* (London: Thames and Hudson, 2002).
- Derek A. Welsby, *The Kingdom of Kush: The Napatan and Meroitic Empires* (Princeton, N.J.: Markus Wiener, 1998).
- Philip Ziegler, *The Black Death* (New York: John Day, 1969).

► social organization

INTRODUCTION

When studying social organization, it is good to keep in mind that the terms used by historians, anthropologists, and archaeologists are ones created by people to describe cultures and customs that were not necessarily their own. For instance, people of hunter-gatherer cultures might have no understanding of what *hunter-gatherer* meant, and even if they

came to understand the term, they might not perceive it as applying to themselves. Further, terms for describing social organization are subject to revision, not only by scholars but also by others who may adapt the terms for their own purposes. For example, at one time the term *feudal* was supposed to apply only to a social organization found in Europe during the medieval era. Many people found the concept to be useful when applied to other societies, thus creating descriptions of feudal societies in medieval Japan, ancient China, medieval India, and medieval Ethiopia. In recent times, the use of *feudal* has become even more muddled, because some historians have attacked the notion that Europe was ever truly "feudal," suggesting that the very concept of feudalism had more to do with historians misunderstanding what happened in medieval Europe than with what medieval Europeans themselves thought they were doing. This dispute over *feudal* has become ever-more complex, with some historians arguing that disparate parts of Europe were feudal at various times, while others were not. The essence of this conflict is that the terminology used for social organization is for convenience: Terms help people think about broad trends in human behavior that can explain how cultures functioned and why cultures survived or disappeared.

One way to evaluate a medieval culture's social organization is by how well it served the needs of the people living within the culture. At its most fundamental, this evaluation means discovering whether the social organization enabled people to survive long enough to bear children, raise those children, and pass on their social organization to those children. Sometimes, people barely survived long enough for their children to reach their late teens. Some cultures found ways of organizing their resources so that people lived much longer, although in most of the medieval world someone who lived into his or her seventies was considered to be remarkable. The Aztec culture provides an example of how this works in terms of historical analysis.

The Aztec represented a very successful culture; they were the greatest political and military power in their region for 200 to 300 years before the coming of the Spanish. Their social organization provided for the fundamental needs of an ever-growing population, and its support of a military caste proved very successful, because the military caste was able to suppress rival societies and provide thousands of captives for blood sacrifices that, they believed, kept the sun rising each morning. Still, the very aspects that made Aztec society successful contributed to its failure. A far too simple view of Aztec social collapse focuses on the idea that a small Spanish force had superior military technology. Even using superior armor and swords and riding horses, the small number of Spanish adventurers could have been overwhelmed by the

Aztec, who were very good at killing people. A key to the success of the Spanish was the hatred the neighbors of the Aztec had for them; the Aztec priestly class was despised, and their government was loathed. Thus, aspects of Aztec society that seemed to make it successful inspired outsiders to destroy it.

Therefore, care should be taken in evaluating a society's organization. A good question to ask is "How well did the society's organization adjust to changing circumstances?" In the Near East the Sassanian Empire did not adjust at all well to the surge of Islam; although Muslim leaders used some government bureaucrats from the Sassanian government in their own bureaucracies, over a period of about 100 years, they reorganized most former Sassanian lands into their own model of social organization, based on traditional Arab practices. On the other hand, the socially rigid Byzantine Empire, which created much resentment among its own people with its often oppressive social organization, managed to survive, even though it lost a great deal of important territory. Why did the Byzantine Empire remain a persistent threat to the Islamic world for centuries after the Sassanian Empire had disappeared? The answer to that could speak to why Islam was the biggest success in the Near East and why some societies manage to adjust, as the Byzantine society did, or succumb to new pressures, as the Sassanian society did.

Military power alone does not answer why one society is more resilient than another, although brute force was an ever-present factor in the societies of the medieval world. A stark example of this is what happened in central Asia in the 1200s. Cities of wealth existed on the many routes collectively called the Silk Road, a term invented by a historian. The slow drying up of the land was an important environmental factor in their decline, but cultures can survive changes in their environment by moving to new lands, as many Africans south of the Sahara did when the desert expanded southward, or by adjusting to the changing circumstances, as the Maya did. The Maya moved out of their cities and, despite suffering a severe drop in population, kept their culture alive by changing important aspects of their social organization, such as eliminating the roles of priest-kings and shifting from a focus on urban life to a focus on small, scattered communities. In the case of the cities of central Asia the settled peoples of the region were nearly annihilated by the Mongols.

Even though military power and natural disasters may manage to exterminate some societies, one of the lessons to be drawn from medieval social organization is that people are very resilient, and they can overcome great hardships. Examples of this can be found in medieval India. Muslims armies were able to conquer much of India in part because those armies brought with them new rules of warfare that were unfamiliar to Indians. But as India succumbed slowly

to the military and political dominance of Islam, many Indians continued to live in their traditional ways. Over centuries, India's Muslims became ever more Indian in behavior and outlook; Indian social organization not only survived but indeed transformed the political practices of their new overlords. Examples abound from medieval times, such as the transformation of the Mongol invaders of China from nomads to settled people absorbed into China's social structure and the Norman overlords of England who gradually shifted from speaking French to speaking English and thinking of traditional British heroes, such as King Arthur, as their own heroes. What made some social organizations so valuable to their people that they retained much of their structure even after utter defeat by another culture? Answering that is part of the fun of learning about medieval social organization.

AFRICA

BY LEAH A. J. COHEN

Many of the organizational elements of societies in medieval Africa were the same as those from ancient history. For example, matrilineal (when descent is traced through the mother) and patrilineal (when descent is traced through the father) lineage systems still dictated social groupings, relationships, and hierarchies. Chiefdoms were common, and in many societies the elders' councils represented the lineages or clans within the society and made decisions with the support of those they represented, especially in the areas with lower population densities and for human groups living outside major civilization centers. Those human groups that had remained small and continued to make a living as hunter-gatherers were perhaps more egalitarian, making decisions by consensus. As a result of domesticating plants and animals in ancient times (and gaining the capacity to have surplus food), centrally governed city-states and empires had emerged. During the medieval period the spread of improved agricultural techniques and increased trade between groups within Africa and with those from outside of Africa brought different ideas and demands for new products and resources. All of these conditions resulted in the rise and fall of numerous city-states and many new empires during this period. While lineages may have still played a role in the social organization of people within these civilization centers, new principles based on structured government hierarchies, occupational caste systems, and religious hierarchies became more prominent.

LINEAGE- AND CLAN-BASED SOCIETIES

For the smaller human groups lineage (a type of kinship relation that groups people according to blood relations to a

common ancestor) was the main organizational structure. These groups were usually engaged in hunting and gathering, farming, or herding, and there was little of the occupational specialization that led to differences in status and wealth as in the major civilization centers in Africa. In medieval Africa descent could be matrilineal, such as the Ashanti who lived in present-day Ghana around 1200 and the East African Bantu who were still hunter-gatherer, farmer, and herder groups at the start of the medieval period, or patrilineal, such as the Yoruba of present-day Nigeria, who may have been descendants of the ancient Nok civilization. Some groups were more or less egalitarian with decisions made by consensus or by a council of elders that represented each of the families or lineages in the society. A higher order division in this social structure was that of clans, which were also based on descent and grouped several lineages together. These cultures became known as segmentary societies after E. E. Evans-Pritchard developed the concept in his 1940 study of human groups in Sudan. The term *segmentary society* is commonly used to describe societies that are subdivided into kinship groups that are relatively equal in status and are part of larger more distant kinship groups.

Hierarchies did exist where lineages were differentiated, usually based on closeness of relation to the founder of the community or an important ancestor. Chiefdoms existed with the chief's lineage holding more social and political power than other community members, but that power was often exercised within a context of approval from the elders, who in turn had the approval of the families or lineages they represented. Within medieval Yoruba culture the council of elders was often more powerful than the leader.

AGE-SET AND AGE-GRADE SOCIETIES

An important organizing principle in some areas of eastern and southern Africa during the medieval period was that of age-sets and age-grades. Community members (usually only males) were born into an age-set with the boundaries for that group ranging from 4 to 14 years for each set. Members of each age-set developed close ties with each other that transcended lineage ties. As the age-set members grew older they passed through different age-grades, which assigned the age-set with specific roles and responsibilities. For example, among the Masai of East Africa men in the Moran age-grade were assigned the role of village warriors. This type of social structure was often found among Kushite peoples and the Nilotic people with whom they came in contact. The Oromo people (a Kushitic-speaking people) who lived in medieval eastern Africa were one of many African cultures that were organized based on an age-grade system. People were born into an age-set; for the Oromo the divisions were made ev-

ery eight years, but it varied from four- to 10-year divisions. Although societies that are organized into age-sets may have lineage and kinship links as well, the age-set crosses lineage and kinship boundaries and counteracts power and status that is inherited through lineages. Typically movement into an age-set was symbolized through traditional ceremonies.

HIERARCHICAL CITY-STATES AND EMPIRES

As the human population grew, trade expanded as the result of demand for Africa's slaves, gold, salt, ivory, and other natural resources. Because farmers and herders were able to produce enough food to feed people engaged in other livelihood activities, city-states with more complex social structures emerged all across the continent. In some areas the transition away from small-scale villages with little central governance began with lineage groups uniting under clans headed by chiefs that could trace their lineage back to an important or founding ancestor. Either alliances formed between clans, or powerful clans began to conquer new peoples and territories. Kingdoms, such as those of medieval Nubia, became known for their military expertise.

One example of this is the Yoruba, who had been organized into patrilineal descent groups prior to the 11th century and then started to form centrally organized city-states with leading chiefs. A council of elders advised the reigning monarch. In the more southern city-states in the forested areas this council had a substantial amount of political power and the elected monarch (*oba*) was more of a figurehead. Some city-states also had a council of military advisers in addition to the civilian council. There were a handful of reigning queens, but mostly these states were ruled by kings. Royal lineages existed but right to the throne could be denied for misconduct. In some of the city-states democratic elections were held for the *oba*. At the end of the medieval period systems were developing for occupational associations (such as for artists), religious groups, and other types of social groups. After the development of city-states, Yorubaland was organized around occupational guilds that crossed the lineage and clan groupings. These guilds answered to the *oba* of the region, who also had a council that provided advice and named his successor.

Another example of the transition from less to more hierarchical social organization comes from the Hausa people of present-day Nigeria. Around the 10th and 11th centuries Hausa people established several smaller villages and eventually city-states. Initially the villages were decentralized. As populations grew, so did the social and governmental structure. Each of the city-states was ruled by a *sarkis* and was enclosed in a wall, which also protected a sizable amount of farmland. It is thought that these city-states may have formed because access to land became more difficult



Male stone figure, Sierra Leone, Guinea, as early as the 15th century; the figure wears a headdress and bracelet reminiscent of the regalia of certain Temne chiefs and rides either an elephant or a lion, symbolic of a king's power. (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Museum purchase, 85-1-3)

due to the migration of Berber pastoralists into northern Hausaland. These city-states had a ruling aristocracy that was centrally located around the palace, and skilled occupational classes (including weavers, tanners, and metalsmiths), merchants, and musicians all resided within the city's walls. Outside the walls lived the farmers who produced food for the city dwellers and the slave communities. The first centralized kingdom to develop from these city-states was Daura in the late 12th century. At the time that Islam swept the region with the migration of Fulani people from the north, the Hausa states of Gobir (north), Zamfara (east), Kebbi (west), and Yauri (south) were ruling the region.

More complex social systems developed as grand empires emerged during the medieval period. The Sudanic empires of present-day West Africa, which were Ghana (eighth through 11th centuries), Mali (13th through 15th centuries), and Songhai (which started as a smaller state in the ninth century and developed into an empire by the 15th century), are some of the most frequently cited kingdoms of medieval

Africa. Other highly stratified and centrally organized civilization centers included Nubia (3800 B.C.E. through the 12th century) in northeastern Africa, Kanem-Bornu (at least as early as the ninth through the 19th centuries) in central Africa, Axum (third–eighth centuries) in eastern Africa, and Mapungubwe (11th through the end of the 13th centuries), and Great Zimbabwe (11th–15th centuries) in southern Africa. To manage densely populated areas, centralized systems of governance were needed to create and enforce laws and regulations, to provide access to resources such as water, and to carry out conquests. For many of these civilizations class differences in status were fueled by an increase in specialized occupations and material wealth. Archaeologists often identify social stratification through differences in tombs and tomb markers, the remains of specialized occupations, and such signs as the size of houses, the existence of luxury goods, and the material with which houses were constructed. Additionally, in pastoral communities the size of the herd was also an indication of status. Within empire civilizations, in general, the existence of monumental architectural features such as palaces, churches, or mosques also indicated class differentiation.

In the medieval empires it was common to see social stratification with the ruling class under a highly revered king (or sometimes queen) with a network of religious scholars, advisers, judges, and government administrators at the top; a merchant class, specialized skilled craftspeople, and laborers in the middle; and slaves farmers, herders, and unskilled laborers at the bottom. At the top of the social hierarchy there was extreme luxury and ceremony with rich cloth, jewelry, foods, and servants. At the other end of the social hierarchy people were often enslaved from areas of new conquest.

Slavery in medieval Africa came in many forms. There were indigenous systems of slavery that were less brutal than the Arab or transatlantic slave trade systems. Often slaves were used to work the mines and salt-production industries. It was common for slaves to be put to work within the households of merchants or elites doing domestic chores. In some central African communities female slaves and their offspring were incorporated into the kinship of the household and were relatively well taken care of. In southern Africa there were slaves who inherited their status as slaves because one of their ancestors had committed a crime or had been captured during war. These societies also made such provisions for people who were destitute. These types of slaves lived in their own houses and could leave the community. Despite the fact that these conditions were better than those under chattel slavery, these slaves did not have their freedom. However, there are a few cases in which former slaves reached positions of high status (as military leaders, for ex-

ample), which indicates a less rigid social structure, where an individual could move between social classes. Even though there are examples of this social mobility, it is suspected that this was not commonplace, and it depended on the society. For example, the Igbo of present-day Nigeria made a distinction between free men and those born without freedom. Even though those who were not considered free would be incorporated into the lineage of the household within which they worked, they did not have the social mobility to earn titles as other Igbo males did.

Women often held positions of high status in many of the cultures of medieval Africa. Before the widespread adoption of Christianity at the start of the medieval period in Nubia, women played a very unique role as warrior queens who fought in battle and reinforced the Isis cult religion. Other empires were led by females during this period. It is thought that in the 11th century Kanem's queen ruled over a multi-tiered governance system. Some Berber groups gave women the responsibility of passing on their oral histories.

The lineage-based social systems that were common in rural Africa also played a part in the social organization of the major civilization centers. For instance, the throne of the Ghana Empire was passed down from the ancestral founder of the empire matrilineally with the sons of the king's sister claiming right to the throne; other monarchies in the Sahel region were also matrilineal. The Ghana kings traced their descent group back to an ancestor who was thought to have originally settled the land. Most empire leaders acquired their positions through lineage and military might during this period. However, one exception is that of the Oromo culture, which elected its leader democratically.

The grand empires of medieval Africa had elaborate systems of leadership. By the start of the medieval period Ghana had a strong organizational system. The king ruled with the advice of a council that was made up of individuals from all the different social strata in the empire. For example, the king of Ghana was the leader of his subjects' traditional religion and was thought to have divine powers. This Mande kingdom had a multitiered system of governance that included units called *kafu*, which were the villages or towns that ranged from 10,000 to 50,000 people each. The leader (called the *mansa*, or king) of each *kafu* was considered to have divine powers and was revered by the people. These leaders were part of a confederation of *kafus* whose ultimate leader was the king of kings. The Ghana Empire had many structures that glorified the present and past kings, including a traditional priesthood that protected the tombs of previous kings. The kings were always dressed in fine robes and adorned with jewelry. The luxury enjoyed by the king and his closest associates was the result of the

great wealth that the kingdom accumulated by controlling access to gold and its taxation in the trans-Saharan trade network. In southern Africa's Great Zimbabwe there was a palace where the chief lived and reigned. He was revered and considered to have divine powers. Portuguese writers from the 16th century recorded that he was approached from a crawl and everything he did was repeated by all in his court.

The medieval Buganda kingdoms located northwest of Lake Victoria (present-day Uganda) were organized based on lineages and clans with men of status serving as lineage leaders or elders who answered to the leaders of the clans. The king oversaw many tiers of officials that met regularly to discuss administrative and governing issues. Despite the lineage system, within Buganda society some individuals achieved mobility. Young men were often sent to the capital to serve as message bearers and to do other jobs for the court and elite. If they did well, they would be advanced to serve as a low-status chief. In this position they could earn the right to move up the social ladder. In general, outside the capital homes were organized around the chief's home, which was larger and better stocked. The chiefs collected taxes from their community members and then passed those taxes on to higher chiefs.

While many of the centrally organized civilizations of medieval Africa did not separate religion and the state (and, in fact, many cultures considered the king or queen to have divine powers), there were examples of empires that exercised religious tolerance. Within Christian Nubia, the king was also a priest, yet there is archaeological evidence that Muslims lived alongside Christians. When Muslims arrived in ancient Ghana, they initially existed in a separate Islamic community from the royal palace. The king allowed the practice of Islam and the construction of mosques, but he and many of his subjects continued to practice their traditional African religion. Most of the Muslim people lived in a separate city near the capital; however, Muslims did serve as advisers to the king and court. Within the Mali Empire, even after the adoption of Islam, it was not mandatory for all of the people to also adopt Islam.

For the most part the city-states and empires of this period were ruled from one centralized location. However, after the fall of Axum around 1,700 to 1,000 years ago, medieval Ethiopian history was unique in that the region was ruled from migrating capitals. The entire infrastructure of the capital city moved from place to place as needed to ensure a secure resource base and rule over the people. Merchants, soldiers, aristocrats, church officials, laborers, farmers, and servants all moved with the capital; at times up to 100,000 inhabitants migrated. Because what evidence remains that

would tell us about life during this period is spread all over the region, archaeological efforts are yet to be focused on this period in Ethiopia's history.

EVOLVING SOCIAL SYSTEMS

Medieval lineage groups, chiefdoms, and kingdoms were hardly static. Despite the fact that there is much archaeological work to be done to reveal the details of life in medieval Africa, colonial writers from the 16th century observed changes and recorded oral histories that indicate modifications in the social structures of the people they encountered. The increased contact with other human groups, city-states, empires, and traders and the changing natural resource base resulted in these variations, and these same conditions were certainly affecting social systems throughout the medieval period. For example, the social structure of the Kongo (also called Bakongo) people of central Africa, who had been farming near the Congo River throughout the medieval period, mutated from a network of lineages to more hierarchical and complex sociopolitical systems. Previously, within a society of loosely connected lineages, chiefs acted more as representatives of the lineages rather than authoritarian rulers, and decisions were made in an egalitarian manner. As the structure of the society changed, chiefs held substantial power and controlled a considerable amount of land. Changes in the social structure of the Kongo are thought to have been related to changes in livelihoods (for example, the spread of agriculture and consequent clearing of the land and increases in trade—including, in particular, increases in slave trade activities). Later in the 16th century it was observed that the lineage system shifted from matrilineal to patrilineal and back to matrilineal, which indicates that these changes may have been present in the earlier medieval period as well.

Another factor that resulted in changes in the social organization of people during the medieval period was the spread of Islam. Some societies converted more completely and others melded their traditional social systems with those of Muslim traders, creating a unique social system. For many of the Hausa people, Islam was not common until the 14th century, but even after converting some of their ancient beliefs and traditions endured and some of the Hausa never converted, retaining their animist religious traditions into present times.

In northern Africa prior to the adoption of Islam in Berber, or Amazigh, society women held high status, including the role of supreme leader. Even after adopting Islam near the end of the medieval period, the men and women of the Twareg, or Kel Tamasheq (a Berber group), of northern Africa enjoyed free interaction, and women held substantial social

and political power. Women were responsible for passing down the poetry and literature.

LESS CENTRALLY ORGANIZED CIVILIZATION CENTERS

The civilization of Jenne-jeno, which originated as early as 250 B.C.E. and was at its height between 400 and 1100 C.E., is a notable example of a densely populated center that was not based on a hierarchical social structure. The inhabitants in this settlement area were supported by agriculture based on rice, millet, and sorghum grown in the surrounding Niger Delta floodplains. Archaeological evidence of Jenne-jeno reveals that there were specialized workers in iron, jewelry, and pottery as well as farmers and herders. Trade with outsiders was well established. Despite the fact that home sites were clustered based on occupational trade, there is no evidence of a powerful ruler or of differing status based on wealth or occupation. Houses were not substantially different in decor or size. It is thought to have been an egalitarian civilization.

In general, the Berbers of North Africa were far less united than a single term implies. They made their living hunting and raising livestock and in less harsh lands near the coast or in a desert oasis by farming. The various groups that fall under the term *Berber* were engaged in trade at times with the different occupiers of the northern coast of Africa, enslaved to work the occupiers' lands, tax-paying farmers to the occupier states, or leaders of repeated resistance movements. Berber peoples became essential to the trans-Saharan trade, particularly after the adoption of the camel in 300, because they had the skills needed to lead caravans across the expansive desert.

The Berber people usually resisted central governance. In the interior of the desert these groups were mostly left to their own systems of organization. Their social relationships were more egalitarian, with families being the main organizational unit. Traditionally, Berber herders were nomadic and united into groups consisting of several families on a seasonal basis. This unification of families was weak and changed from season to season. They are said to be a segmentary society, meaning that their main organizational unit was subdivided into clans and then further subdivided into families. Groups were bound together loosely under representational elders. Family descent was patrilineal, so heritage was based on the father's bloodline.

Many of the decisions that affected Berber communities were made through consensus. At each level of Berber society, power was distributed to create a balance where no one person, family, or clan had more power than another. There was also a weak, overarching system that unified Berber groups into federations and that was activated only when necessary

for defense and negotiation with outsiders. With increased contact with invaders who employed more complex systems of social and political organization, some Berber groups began to coalesce under the acting leaders, or *aguellid* (war leaders), who became known as kings. Contact with the Romans just before the medieval period left a legacy of Christianity, and kingdoms scattered throughout parts of the Sahara and northern coast.

The Igbo were a people that settled in southern Nigeria sometime during the ninth century. Their social organization was generally thought of as more egalitarian and less authoritarian than the medieval empires and city-states. The Igbo people were usually organized into villages, and adult males from the village were all eligible to meet and discuss community decisions. Although every adult male had a say, individuals could gain respect, titles, and status through accomplished ability and allegiances or loyalties that an individual might have from kinship, wives (polygamy being a symbol of status), and friends. Some Igbo societies did organize under chiefs, but the chief did not have final word and was often challenged by other lineage and family elders. Furthermore, social order was maintained through the existence of secret societies that enforced social norms.

THE AMERICAS

BY MICHAEL J. O'NEAL

Before the Spanish conquest the range of social organization types in the Americas was wide. On the one hand, some cultures had complex, highly stratified social systems, meaning that people were sharply divided into higher and lower classes, each with its own privileges in the case of the upper classes and its own demands in the case of lower classes. Others had more egalitarian social structures, meaning that while the culture had leaders, most people belonged to the same social class, no group enjoyed any particular privileges, and decisions were made by consensus rather than the dictates of a leader.

Social stratification was almost always a marker of social, economic, and governmental complexity in the Americas before European contact, as indeed it was throughout the world. In preceding centuries as cultures evolved from hunter-gatherer societies to sedentary agricultural societies with permanent towns and cities and attachment to the land they farmed, it was inevitable that people would get sorted into classes, each class enjoying a higher level of prestige than the one below it. (Archaeologists and historians use the word *sedentary* not to refer to “laziness” or “unwillingness to work” but to the notion of settled, fixed communities, in contrast to nomadic communities that moved about in search of food.) People be-

came more specialized in their occupations and functions, so classes of craftsmen, artisans, farmers, landowners, serfs, and peasants emerged.

Religion became more complex and organized with emphasis on state-sanctioned rituals, a calendar of religious events, and temples and shrines where religious activity took place. This led to the emergence of a class of priests and shamans who wielded considerable authority and social influence. Further, the mythology of many precontact cultures evolved over time to provide people with a sense of unity—of belonging to a particular people with a unique history and destiny. This mythology supported the notion that the highest social class, including the king or emperor and the nobles that surrounded him, were the descendants of the culture’s earliest founders, who themselves were descendants of gods.

Not all American cultures prior to the Spanish conquest, however, shared these views. Many remained far less complex and sophisticated. There was little specialization of labor, so every member of the group played a role in its most important activities, including hunting, gathering, fishing, and the collection and storage of food. While a class of priests and shamans exerted influence, the religious views they taught were directed at creating a set of societal norms to which everyone in the community adhered. And while these more tribal societies had leaders and headmen, these leaders did not rule by divine right or because they were regarded as descendants from the gods; rather, they tended to emerge by consensus because of their leadership abilities.

A common characteristic of many precontact American cultures was that clan and kin relationships were important. Throughout the Americas people identified themselves through membership in a clan, which is defined as any group of people who claim descent from a common ancestor—though in some cases that ancestor was not necessarily a blood relative. In some cultures, but by no means all, this distant ancestor was regarded as a god. Some of these clan relationships were patrilineal, meaning that a person traced his or her ancestry through the father’s line and the father’s line of descent was regarded as a source of stability. Others were matrilineal, meaning that the mother’s ancestors were the basis of clan membership and a new husband went to live with his wife’s family rather than the bride going to live with her husband’s family.

Clan relationships provided people with an extended social support network that encompassed more than the immediate family. This support network enabled people to survive during hard times and to perform laborious tasks that could be accomplished only with the help of numerous people, such as clearing fields, building irrigation systems, or bringing in the harvest. Identification of clan relationships also helped

early cultures avoid the risk of inbreeding. When populations were smaller than they are in modern life and when people were less mobile, a danger existed that close blood relatives, such as cousins, could marry and have children. Before European contact Americans recognized that this had to be avoided, and acknowledgment of clan relationships helped in this regard. Most importantly, clan relationships were a source of identity and belonging.

THE INUIT

One generalization that can be made about social organization in the Americas is that it tended to be more complex and formal in more equatorial regions, less so farther to the north and to the south. The Inuit of the far north, for example, maintained a relatively simple social structure. Because of the forbidding cold of the Arctic, populations were not very dense, and nothing like the modern city emerged. Rather, people lived in small settlements with bands of perhaps 60 to as many as 300 people, who lived primarily from the resources provided by the sea. The word *muit* was used to refer to the people who inhabited a particular geographical area. The Inuit tended to trace their ancestry bilaterally, meaning that the father's and mother's lines of ancestry were equally important; some Inuit groups, however, placed more emphasis on the father's line.

The basic social organization of the Inuit was the nuclear family: father, mother, children, newly married older children and their spouses and children, close relatives such as grandparents, and sometimes more distant, unmarried relatives. Work was allocated along gender lines. Within each band people recognized a leader based on his age, experience, and wisdom. The leader's principal role was to provide advice based on his lifetime of knowledge about the environment. Further, each band had a shaman, or *angakuk*, who was usually a man but could be a woman. Generally, Inuit shamans were disliked. They exercised their power through fear, but they served an important social function by keeping people in line and ensuring that they adhered to social norms. Usually, the Inuit avoided social conflict as much as possible; the precariousness of life in the frozen north made it imperative that people cooperated. When conflict erupted it was often settled by song duels in which the "combatants" composed and sang songs insulting their adversaries. These song duels, witnessed by the community and often a source of laughter, defused tension and restored social order.

The Inuit maintained flexible ties to other bands. While these bands were often in competition with one another for resources, the Inuit also recognized that sometimes they needed to cooperate with and gain the cooperation of other bands. Marriage was one way in which ties were maintained.

A newly married couple typically lived with the woman's family for a period of time, often until the birth of a first child, and then returned to the man's family. In this way ties were established with another band. Gift giving was also important. Sometimes the "gift" could include permission for a man from another band to have sexual relations with a member of one's own band, although the woman always had the right to refuse. Otherwise, material gifts were a way of maintaining loose social ties with another band.

NATIVE AMERICANS

The term *Native American* has different meanings depending on the context; it can apply to any indigenous group of Americans, from the Inuit of the Arctic to the groups at the southern tip of South America. In modern life, though, the term is often applied specifically to the many tribes that inhabited North America in what are now Canada and the United States.

The North American continent was home to hundreds of groups, each with its own culture and form of social organization, making generalizations difficult. One generality that can be made, however, is that the environment often shaped social organization. For example, the Utes of present-day Utah, New Mexico, and Colorado—in contrast to, say, the Woodlands of eastern North America or the Sioux of the central Plains—lived in mountainous regions. These regions were separated from one another by mountain ranges, valleys, and canyons. Like the Inuit, they were spread out over a wide area, and Ute culture was divided into bands; examples include the Moache band, which lived on the eastern slopes of the Rocky Mountains, or the Uncompahgre, whose home was the valleys surrounding Colorado's Uncompahgre Plateau and Gunnison River. These widely separated bands, each adapting to its geographical niche in its own way, never formed a highly organized tribe. Because the region was sparsely vegetated, each band needed a large area to survive, one that would provide the band with enough food. Since people had to spread out over a large geographical area, the most important unit of social organization was the family rather than the band, although membership in a band remained important in Ute life. Bands came together only during the winter months when they held festivals and marriages were arranged. As the weather warmed and the snows melted, the bands dispersed, following the thawing to higher and higher elevations to plant crops and find food.

The Apache, who lived in what is the present-day American Southwest, adhered to a slightly more sophisticated and complex social system than that of the Utes. A typical Apache community consisted of two to six extended families that were matrilineal; that is, upon marriage the groom lived with

the bride's mother's kin rather than his own. The purpose of matrilocality among the Apache and other early societies was to avoid inbreeding, for it helped ensure that men would be widely dispersed. This unit of two to six extended families was referred to as a *gota*. Although a *gota* operated communally in such matters as hunting game, it was led by a headman, or chief. The position of headman was not necessarily hereditary; rather, it was conferred on a man by consensus as a result of his leadership qualities. If no hereditary headman was suitable, the group, in effect, elected someone from another family. Although nominal power resided with men, Apache women held a great deal of influence; it was their matrilineal lines that formed the basis of Apache society.

Beyond the chieftainship, there was no real social "order" in Apache society. There was a kind of nobility that consisted of young men identified by the chief who would assume leadership responsibilities as the chief aged and after he died. It is also clear that there was a poor class of Apaches, for the headman organized charitable relief for them by collecting goods and food from more affluent members of the community. The social organization of the Apache extended beyond the *gota*. In addition to being a member of a *gota*, each Apache was also a member of one of 62 matrilineal clans. These clans overlapped the various Apache settlements. Members of these clans did not intermarry. Again, the social organization was communal, with members of the different clans called on to aid one another in times of need.

A major way in which the Apache maintained social order was through magic and the fear of magic. When conflict erupted, particularly conflict between members of different clans, order was maintained by the fear of magic and sorcery. People who behaved according to the social norms of the tribe were said to have power. This power protected a person from magic and sorcery. Power took many forms, including, for example, "fire power," "mountain lion power," "wind power," and "black-tailed deer power." People could invest their time and energy into learning a source of power, usually through a shaman, who taught pupils in exchange for food, horses, and other commodities. Learning this form of power was no mean feat. Acquiring black-tailed deer power, for example, required the student to learn nearly 60 chants; each of these chants had at least 20 verses, and chanting one such verse could take up to a half hour. Acquisition of this power ensured that one had adhered to the norms of Apache society, and that power could be used to keep others in check and to resolve disputes.

Both the Utes and the Apaches lived in the vast mountain and desert regions of the American Southwest, giving rise to a particular type of social organization. In contrast, the Woodlands of the American Northeast and southeast-

ern Canada lived in a very different type of region. As the name suggests, these many tribes inhabited densely forested regions. Because the forests provided them with abundant resources, these tribes led more sedentary lives in larger, more fixed communities. Accordingly, their social structure became yet more complex. Some of these tribes were patrilineal, others were matrilineal, and still others were bilateral. Most recognized clan groups, and each clan was identified by an animal totem. The clan was the basis of social interaction.

Some Woodlands groups were more sedentary than others, depending more on agriculture than on hunting and gathering, and developed more complex social structures. Many had hereditary leaders, often called sachems, sagamores, or *werowances*. This leader, rather than ruling by consensus and agreement, claimed the right to rule by virtue of divine descent. Some groups had one leader for civic affairs and another for military affairs. Land was owned in common, with group members having the right to use it but not to own it. In these more sedentary societies social stratification was more evident, with upper, more privileged classes and lower classes of the poor and agricultural workers. Some of them, notably the Iroquois, were organized matrilineally, and members of a matriline lived together in a large dwelling called a longhouse. While they had male leaders, the social leader of the group was the matron of the line, whose authority extended to religious, ethical, and social matters.

MESOAMERICA

Among the most prominent Mesoamerican cultures was that of the Maya, who inhabited a swath of land in southern Mexico, Yucatán, and parts of Central America. Historians identify three broad periods of Mayan history. The earliest, called the Formative Period, began in about 1500 B.C.E. and extended to about 250 C.E. The Classic Period, when Maya culture in numerous city-states achieved its florescence, extended from about 250 to 900. Finally, the Postclassic Period began in about 900 and extended to about 1500, with the arrival of Europeans. During this time Maya culture began to decline until it lost some 90 percent of its population. About 4 million Maya survive in the 21st century.

Archaeologists do not agree about the nature of Maya social organization. They note that it is difficult to make inferences about an abstraction such as social organization from the material archaeological record. Evidence such as tombs and excavations of housing sites can provide some indication of social stratification. Some historians believe that Maya society was highly stratified; others disagree. Historians cannot even agree, for example, on whether Maya society was organized patrilineally or matrilineally. Nor do they have the same opinion on whether Maya society was unified or seg-

mented—that is, divided and not uniform across the many city-states that made up the Maya culture.

It is known, however, that Maya culture was sedentary, depending on agriculture for survival. Because much of the region was hot and dry, the Maya had to develop sophisticated farming and water-management techniques. In those areas that were wet and forested, the dense forests posed their own impediments to agriculture. This type of activity needed to be organized on a large scale involving hundreds, if not thousands, of people, suggesting that at least some social stratification was inevitable. The archaeological record shows wide differences in wealth and status, differences exhibited in the size and elaborateness of public buildings and of homes. The highest status individuals were probably members of patrilineages, although again this is uncertain.

At bottom, some archaeologists have concluded that there was no uniform system of social organization among the various Maya city-states. Each one existed relatively independently from other Maya communities, and thus its form of social organization was unique to itself. It is likely that some communities were highly stratified, with wide differences in wealth and status. These communities may have needed a rigid social order to survive. Others probably featured more flexible, less stratified societies.

A fuller record exists for the Aztec, the culture that flourished in central Mexico during the centuries before the arrival of the Spanish in the early 16th century but that had its roots in the 12th century. The Aztec developed a stratified and fairly complex social organization, though one that was somewhat fluid and allowed lower class people to rise through hard work and skill. Their social order was a clan-based system that consisted of 20 clans, called *calpulli*, each of which had its own officials and governmental organization. Within this clan-based social structure, each person was born into a particular social class. At the top, of course, was the king, referred to as the *tlatoani* or *tlacatecuhtli*. The king was always reputed to be a descendant of Acamapichtli, a Toltec prince. In turn, Acamapichtli was regarded as a descendant of Quetzalcoatl, the Toltec's principal god. According to Aztec myth, the prince came to Tenochtitlán, the Aztec capital city, to establish the royal line. He did so by mating with 20 wives, possibly one from each of the 20 clans.

Beneath the king and the royal household were the nobles, referred to as *pipiltin*. Every noble was regarded as a descendant of Acamapichtli, and thus was of royal blood. The chief advantage of being an Aztec noble was that one could own land in his own name on achieving adulthood. The nobles were also taught to write, using the Aztec system of glyphs, and they were given educations in religion and the arts. Nobles held the highest religious, judicial, civil, and

military positions. However, in the Aztec social hierarchy being a noble did not guarantee holding an important job. The highest positions were held by nobles who showed skills in leadership. Any member of the nobility who failed to demonstrate leadership skills could end up with a low-ranking job, including that of a servant in the royal household, or even no job at all. Nearly equal to the class of nobles was a class of warriors who achieved a position akin to knighthood by showing valor in warfare. Warriors were typically promoted from lower classes.

The next social class was that of the working class and commoners, referred to as *macehualtin*. These people were educated in trades or farmed the Aztec's communal lands. The land was owned by the clans, so commoners themselves could not own it in their own name. However, they were entitled to ownership of the produce of the land, which they could trade, sell, or consume for their own needs. These commoners were members of the 20 clans, and it was possible for a commoner to rise to office in his clan and thus have more prestige, in fact if not in name, than a low-ranking or unemployed noble. Alongside agricultural workers were a class of landless commoners who normally worked in trades as craftsmen; the less capable among these typically worked as day laborers.

Beneath the commoners was a class of serfs, or *mayeque*, who worked plots of land in return for payment in the form of some percentage of what they produced. They were attached to the land, in effect part of it, so that if a parcel of land was sold, they went with it to the new owner as part of the bargain. In addition to laboring in the fields, males worked as servants and performed such tasks as hauling water or constructing buildings; women were often employed as cooks. Serfs had one advantage: They were not required to pay taxes. Accordingly, some commoners, who were required to pay taxes, tried to pass as serfs. Many, too, were immigrants from conquered territories. A serf who was industrious was able to rise to the class of commoner.

Finally, at the bottom of the social order were slaves. Aztec slave owners did not have life-and-death power over their slaves. They owned a slave's labor but not the slave's person. Slaves could own property, including their own house, and they could not be sold or traded to a new owner without their consent. Slaves could even own other slaves. A person could escape slavery through hard work and meritorious service to his or her master.

SOUTH AMERICA

In discussions of any aspect of South American culture before the Spanish conquest, historians inevitably focus on Andean civilizations—that is, the civilizations of Bolivia, Ecuador, Peru, and parts of Chile that flourished in the Andes

and along the western coast and valleys of the continent. The archaeological record for these civilizations is more extensive and more advanced than that of the interior of the continent. Put simply, while a considerable amount is known about the Andean civilizations, little is known about the rain forest civilizations that occupied much of the rest of the continent.

The Andean civilizations depended on agriculture, so they were sedentary rather than nomadic. Further, their agricultural enterprises flourished despite the harsh terrain that hosted wide differences in temperature and elevation. Over the course of many centuries, the people of the Andes developed complex terraced fields along the mountains, irrigation systems, and a network of roads that eased the movement of people and goods through the region. All of this economic activity required a complex social system.

The basic social institution was probably like the *ayllu* of later times. This was a social unit at the village level that was based on kinship. The *ayllu* provided a kind of vertical integration of the families of the unit. Again, climate and geography dictated this form of social organization. Because of the sharp differences in elevation, people at different altitudes had to specialize in certain kinds of crop. Those at the higher elevations, for example, emphasized such crops as tubers and millet, while those at lower heights emphasized more tropical crops. Reciprocal exchange between the families of the *ayllu* at different elevations ensured that everyone had a variety of foodstuffs. In time, these cultures would pay tribute to the more powerful Inca civilization.

Late in the precontact period the Inca became the most dominant Andean civilization and the one that is most studied by modern historians. But the Inca did not emerge from nowhere. Inca civilization was the final florescence of a number of Andean civilizations that had emerged in the preceding centuries. Not a great deal is known about most of these civilizations. Many produced pottery and had sophisticated agricultural systems, including terraces and irrigation canals; one such canal was 75 miles long. It is known that some of these civilizations became increasingly militaristic and had a social class of warriors. One such Andean culture emerged at Tiwanaku in about 500 near Lake Titicaca. The culture was urbanized, and it is known that its society was highly stratified. At about the same time the Huari emerged in southern Peru, and it, too, was socially stratified. Along the northern coast of Peru the later Chimú culture was greatly stratified, with classes from a divine king down to farmers and peasants who worked the land. In the middle was a class of artisans and craftsmen who produced pottery, textiles, and other goods for mass consumption.

Inca culture began about 1200, although its origins are obscure. The Inca Empire expanded rapidly through military

conquest, in time encompassing 380,000 square miles. Historians do not know as much about the Inca Empire as they do about the Aztec Empire, primarily because of a lack of written records. It is known that the Inca Empire was highly regimented. It was a socialist state; the state owned the land, access to water, and surplus agricultural production, which it then redistributed as needed. Harvests were transported to large storehouses, where they were used by public servants, the army, priests, and especially the nobility.

At the head of Inca social structure was the emperor, referred to as Sapa Inca, who controlled every aspect of the empire. Next were the nobility, who were members of the royal family. Below the nobility were the state's high priest and the commander in chief of the military. The next level consisted of the *apus*, the military commanders of each of the empire's four regions. Such people as architects, priests, army commanders, and civic administrators made up the next class. Just below them were musicians, artisans, lower ranking military officers, and accountants. The bottom rung of the social order included herders, farmers, sorcerers, and men who had been conscripted into the army.

People did not pay taxes but instead were required to work for the state on such public works projects as the construction of roads. This obligatory service was known as *mita*. Most of this work was done by members of the social class called *runas* or *mitimaes*, essentially the lower classes. Members of the upper classes, including the nobility, craftsmen, and priests, were exempt from *mita*. Another exempt class was the *yanacuna*, or boys who served as permanent aides to the nobility or to the emperor. Physically attractive girls were taken to convents in the capital city, Cuzco, where they would be trained as concubines for the emperor.

The emperor was regarded as a descendant of the sun. To preserve the purity of the bloodline, most Inca emperors took their sisters as wives, and members of the nobility typically married their cousins. Members of the nobility were identified by the heavy jewelry they wore dangling from their ears. For this reason, the Spanish conquerors referred to them as *orejones*, or "big ears."

ASIA AND THE PACIFIC

BY BRET HINSCH

Although Asia is both enormous and diverse, its history nevertheless reveals some clear patterns in the general expansion of its medieval societies. Most important, China and India, the two major cultural centers on the continent, each developed large, complex, literate, prosperous civilizations that exerted enormous influence over surrounding peoples. Korea, Japan, and Vietnam remade their societies while being constantly

exposed to Chinese ideas and institutions, whereas the various peoples of Burma, Thailand, Cambodia, and Indonesia developed within the Indian culture zone.

CHINA

The collapse of the Eastern Han Dynasty in 220 C.E. marked the traumatic end of national unity and the emergence of a distinctive medieval social and economic system. Even before the end of the Han, Chinese society had already begun to take on medieval characteristics. With the central government in decline, extended prominent families stepped into the vacuum to maintain local order. They accumulated large estates worked by dependents who were increasingly tied to the land. Peasants were willing to give up their traditional autonomy in return for protection from bandits and foreign raiders.

China went through several centuries of chaos in the early medieval era, marked by a succession of weak regional governments. North China was conquered by the Tuoba, a nomadic Mongol people, while southern China was governed by a succession of fragile states. Social mobility drastically declined as security became more important than opportunity. Although there were still free peasants, large numbers of people worked as tenants on the estates of the great landholding families. Social status became progressively more hereditary, and genealogy was a primary source of prestige. The members of the landed elite maintained their exclusive social status through intermarriage, and they carefully excluded new blood. In fact it became illegal for people of different backgrounds to marry. Social strata resembled hereditary castes. Union between people of different backgrounds was even considered physically unclean. Because of early medieval Chinese society's low mobility and its association of status with both land and pedigree, some scholars classify it as a feudalistic system. However, unlike European feudalism, there was also an active central government, a clear definition of national borders, a literate bureaucracy, an active commerce, and widespread ownership of private property.

The reunification of China under the Tang Dynasty (618–907) marked a period of national recovery, during which society gradually began to change. This era marked a time of struggle for supremacy between the emperors at the center and the traditional local elites who flaunted their exalted ancestry. Although the previous era of chaos had been a low point politically, it did see improvements in agricultural technology. So as society became more stable, the economy grew and social mobility inexorably increased. The monopoly on power of the traditional elite frayed as commerce and urbanization grew. Nevertheless, regional elites continued to maintain their supremacy in many areas and were virtually autonomous for much of the period.

The Song Dynasty (960–1279) marked a major turning point in the history of Chinese society. Most fundamentally, economic growth increased rapidly, fueling widespread urbanization. A new class of prosperous merchants and craftsmen inhabited the growing cities, vying for prestige with the traditional rural elite. An expanding economy brought about rapid social mobility, with an end to fixed social positions. Life became organized increasingly around professions rather than kinship.

Changes in the nature of government affected society as well. The Song system was far more centralized and better organized than earlier eras. Most important, regular examinations recruited talented scholars into official positions. In theory, anyone could now become a high government official, although in practice only the rich could afford the lengthy education necessary to pass these grueling examinations. The exam system severed the traditional link between genealogy and power, forcing changes among the conservative rural elite. Old families began to marry their daughters to parvenu officials to maintain their influence under this new system.

Ming Dynasty (1368–1644) society saw a continuation of these trends. The founder of the Ming, known as the Hongwu Emperor (r. 1368–98) came from peasant stock, and he helped foster even more egalitarianism in the Chinese state and society. Commerce grew so rapidly that some historians argue that China was on the verge of developing a nascent capitalist economy. This prosperity was reflected in the vibrant urban culture of the era. Moreover, the importation of new crops from the Americas, such as sweet potatoes and corn, allowed marginal land to be cultivated, fueling a population explosion that has continued to the 21st century. Rising population and partitive inheritance (inheritance divided among heirs) meant that the number of families with insufficient land steadily increased, fueling immigration to Taiwan and Southeast Asia.

The examination system continued to serve as the most important determinant of elite status. In response, families routinely bought land and used the profits of landlordism to finance the education of their sons. These offspring would intermarry with other scholar gentry families, helping to ensure a degree of prestige regardless of how their sons fared in the examinations. Ideally, a family member eventually would pass the battery of tests and gain official employment. However, as the number of people taking these exams grew, this means to wealth and status became increasingly competitive and frustrating.

EAST ASIA

The expulsion of Chinese armies from the Korean peninsula in the seventh century led to a struggle between three local states: Silla, Paekche, and Koguryo. Although the social

structure in each was somewhat different, in general aristocratic families living in the capital dominated society and government, enjoying hereditary privileges. As in contemporary China, the elite painstakingly traced genealogy because ancestral connections served as the basis of exclusive position and power. Most peasants were free and owned small plots of land. Although some agricultural labor was still communal, ordinarily each family was an independent unit of production. However, aristocratic families controlled enormous tracts of land, often farmed by low caste laborers descended from prisoners of war and criminals. Because of constant warfare, a large percentage of society was eventually enslaved by the aristocracy.

In the ninth century the Korean kings tried to subdue the aristocracy by importing Chinese customs that favored centralization, but they were generally thwarted. Regional powers grew in importance, making it impossible for the government to collect taxes in many areas. The heavy burdens imposed by local authorities, however, led to a series of peasant rebellions in the ninth and 10th centuries.

The 10th-century reforms marking the beginnings of the Koryo era gave rise to a new hereditary elite closely linked to government service, in calculated imitation of China's social system. The bulk of society was made up of free peasants, and the lot of slaves improved until it resembled that of tenant farmers. In the 14th century the new Yi Dynasty (1392–1910) undertook radical land reform. Authorities confiscated the large estates, breaking the traditional power of the hereditary aristocracy. Some land was allocated to the new literati class, marking a radical reorganization of society along the lines of China's system centered on government service.

The medieval era saw surprisingly rapid development in Japan because of the cultural stimulus of China and Korea. Initially the monarchy tried to establish a Chinese-style state with strong central government. However, aristocrats and powerful Buddhist monasteries eventually conspired to turn the emperor into little more than a figurehead. During the Heian era (794–1185), Japanese society became decentralized and local aristocrats became more autonomous. Nevertheless, the state still maintained the facade of Chinese-style central bureaucracy and emperorship, and the court aristocracy remained preeminent. Land tenure was progressively more feudalized, and peasants owed both grain and corvée labor to their land's proprietor.

Kamakura-era (1185–1333) society was organized differently. The court aristocracy and the powerful monasteries lost their hold on society. In response, a mature feudal system emerged, organized around a local military aristocracy that reordered society as a complex series of relationships between lords and vassals. Although this aristocracy maintained a

symbolic imperial system, true power rested with a supreme military leader who maintained order among the fractious noble houses. Unlike the refined court aristocrats, the new *bushi* elite were primarily warriors. These men were initially quite rough and uneducated and often relied on Buddhist monks as administrators. Common people remained tied to the villages, where they supported the feudal hierarchy with annual payments of rice and labor to the local lord.

Far to the south on the Asian mainland the people of northern Vietnam originally practiced irrigation farming in small communities. By the 10th century, as Vietnamese society became more complex, these groupings coalesced into villages. Ever since its unification, the Chinese Empire had included northern Vietnam, so the Vietnamese elite were encouraged to assimilate Chinese culture and participate in the imperial bureaucratic system. Moreover, there was a great deal of emigration southward from China. Many social forms were inevitably brought in from Vietnam's giant neighbor to the north. For example, the Vietnamese traditionally lived in large extended families, but when Chinese immigrants arrived in nuclear families, some local people began imitating this new model. The Chinese also introduced an "equal-field system" that assigned each farmer an equal amount of land, which he tilled for his lifetime, after which it reverted to the state for reallocation. Despite the extent of Chinese influence, the Vietnamese managed to maintain a distinct culture and identity. For example, women labored in the rice paddies in violation of basic Chinese ideas of sexual propriety.

In the ninth century the decline of the Tang allowed the Vietnamese to become independent, and a new local ruling class emerged. Free peasants practiced rice paddy agriculture in the lowlands, while the highlands were inhabited by various ethnic groups. Vietnam's coastal position gave it a cosmopolitan flavor. International trade grew in importance, merchants became numerous, and coastal settlements developed into regional market centers. Communal ownership of land remained the norm. The large clans of each area were extremely strong and competed with the state for authority. The king took numerous consorts from the major clans, and these palace women acted as conduits between the central authority and local clans. In the 13th century, rulers of the Trần Dynasty (1225–1400) tried to reduce the authority of the clans by marrying their own cousins, thereby reducing the access of the clans to the center of power. The Trần accumulated massive royal estates and sought officials from among the major landowners to help them administer the state.

INDIA

The Indian attitude toward society has been conditioned by deep religious beliefs. Indians saw the universe as consisting

of many interlocking levels inhabited by a variety of beings. To the average Indian, society was an extremely complicated place consisting of human beings, heroes, gods, and demons. On a more mundane level, people maintained the ancient division of society into four social categories called *varna*, which were subdivided into thousands of castes or *jati*. Originally this Hindu social model was limited to a section of north India, but in the medieval era it was disseminated throughout India and overseas.

Although Indian social structure consisted of thousands of carefully distinguished hereditary groups, two elite forces were particularly powerful: Kshatriya warriors and Brahman priests. Brahmans were given positions of wealth and privilege, and at court they were employed as royal counselors. They also received large land grants, both as individual families and sometimes to establish Brahman communities. The state actively patronized temples, further boosting the position of Brahmans. In return, Brahmans provided the ideology and values that upheld Kshatriya rule. These two elites usually cooperated to dominate society, and the cooperation between secular and sacred elites became the focus of Indian social structure.

Unlike China, the various regions of India were usually autonomous. Even under the famous empires it was always difficult to control local elites, and central rule was usually weak. This system has been characterized as a type of feudalism, brought about largely by a precipitous reduction in the circulation of currency, which prevented central rulers from paying salaries to local officials. This style of social organization can be seen clearly in the first great medieval empire, that of King Harsa of Kanauj (r. 606–47). Although Harsa controlled the central part of his realm directly, it was mostly decentralized, and each area was under the control of an autonomous local tributary ruler known as a *samanta*. These local princes were obligated to present tribute to Harsa and do his bidding under certain circumstances, although in most matters they remained autonomous. Successful rule consisted of controlling the fractious *samantas* and maintaining their loyalty.

India is incredibly diverse, and in medieval times each region had its own unique traditions and characteristic social structure. For example, as agriculture was adopted in the area of Rajasthan, the local Rajputs—members of the military caste—were able to use this stronghold to gain influence over a large area of north India. This group was divided into small clans, and their exogamous customs meant that they were loosely held together as a people and polity by marital alliances.

The Hindu model of society steadily spread south and east, eventually dominating the subcontinent. Petty tribal

chieftains were gradually converted into local Hindu princes and brought into the feudal *samanta* system. These new *samantas* would push out peoples who refused to assimilate into the Hindu world order and invited Brahmans to settle in their realms instead, attracting them with generous land grants. Brahmanization allowed local kings to imitate the ideology and system of the political center to the north. Eventually some of these petty monarchs conquered neighboring states and established larger kingdoms. At the local level, however, villages remained fairly autonomous and most people's lives were relatively untouched by royal decree. If a ruler taxed villagers too heavily, their leaders might foment rebellion and bring down an overambitious *samanta*.

In southern India the extent of maritime trade meant that prosperous merchants were a particularly powerful force. Some merchants gathered together in autonomous self-governing communities (*nagara*). Others lived in ports under the control of monarchs. Their guilds were extremely powerful and even supported independent armies. Nevertheless, the coastal Indian monarchs also benefited from commercial wealth, which they used to patronize temples and finance their activities.

Temple cities became more numerous and were built ever farther south. Although temples were massively expensive, kings still built and patronized them both out of piety and a desire to attract Brahman support. However, these were far more than just religious centers. A temple city remade the local society along both Brahman and *samanta* lines. The king and people gave generous donations to large temples, which also received regular income from landholdings. In return, the temple bureaucracy would lend money to the villages. The emergence of new pilgrimage centers further influenced economic and cultural life.

Beginning in the eighth century Muslim conquerors began making incursions into India. During the 12th century they were able to establish a large empire in northern India. Because Muslim rulers of the new Islamic states relied on Brahmans and temple cities to maintain their sway, they had to create novel institutions. New customs were brought into the heart of daily life when many Indians converted to Islam and embraced its alien lifestyle and values. This transformation challenged many Indian traditions. Buddhism was hit particularly hard. Because Buddhists are technically atheists, some fanatical Muslims persecuted them with an intense ferocity that eventually led to the extinction of Buddhism in the land of its birth.

Islam was limited primarily to the urban administrative and military elite, while the countryside remained mostly Hindu. Nevertheless, large numbers of low-caste people converted to the new religion to escape their degraded status.

The direct rule of the Muslim sultans rarely extended much beyond the hinterland around the capital at Delhi. Otherwise the sultans depended on the cooperation of local rulers, in a new variation on traditional feudalism. Outside of the cities, Muslim military commanders, as a rule, remained in local strongholds, often centered on a military fief. In the villages, life continued much as before, while the sultans conducted local affairs through village headmen. Although Hinduism was still legal, some rulers used high taxes and specific legislation to encourage conversion to Islam.

SOUTHEAST ASIA

Before the 10th century Southeast Asia was a patchwork of ethnic groups and small states. The unique environment of the region originally gave birth to native societies quite different from those in India and China. For example, population density was relatively low, and some scholars claim that the resulting lack of concern for landed property led to higher autonomy for women. Traditionally, women in the medieval kingdoms of Thailand and Cambodia enjoyed prominent roles in domestic commerce. Kinship was often bilateral, with equal inheritance rights for both sons and daughters.

The spread of Indian culture and institutions throughout Southeast Asia transformed those regions, stimulating the development of high culture and complex administration. There has been considerable debate as to how Southeast Asia came to absorb so much Indian influence. Some scholars emphasize the role of trade. They credit the wealth of Indian traders with giving prestige to their religious ideas and customs, leading distant peoples to emulate them. Another view sees the Indianization of Southeast Asia as a continuation of the gradual spread of north Indian values and institutions southward throughout the subcontinent proper. Eventually Brahmins and Buddhist monks settled abroad, bringing with them skills in writing, law, and government. While Indian influence is no longer considered the prime reason for social development in the region, these ideas were eagerly adopted by growing societies in need of paradigms for more complex social groupings. Southeast Asian rulers were often eager patrons of Indian culture, striving to reconstruct their own societies in the image of the complex models to the west. Between the third and eighth centuries, Buddhist and Hindu sculptures began to appear across Southeast Asia, providing concrete archaeological evidence of this dramatic social transformation.

During the 11th and 12th centuries a complex Khmer state emerged in what is now Cambodia. Most of what is known about Angkor comes from inscriptions and archaeological evidence. This society was a matrilineal monarchy that ruled over a large area using a sophisticated bureaucracy,

which employed written records and a rigid law code. Hindu and Buddhist clerics provided a religious ideology that legitimized and ordered this society. Distant regions were controlled through force of arms and ruled over by royal governors. As in India, temples became important centers of politics and administration. Khmer rulers constructed vast temple complexes, designating local families as temple slaves to support the upkeep of these gigantic monuments.

The decline of Angkor and Pagan, another large Indianized state located in northern Burma, allowed the rise of new regional powers. Ethnic Thai peoples, known collectively as the Tai, migrated southward into the region of the former empires. In the 13th century they founded a state known as Lan Na (or Lanna), with a capital at Chiang Mai in what is now northern Thailand. The Tai had converted to Buddhism centuries earlier and used Indianized religious and secular ideas as the basis of a complex society. Lan Na was an ethnically diverse state, held together by common political and religious institutions. Although most people lived in villages, the rulers established sizable cities with temples and fortifications. Skilled craftsmen such as metalworkers migrated there from other states, raising the technological level.

The Sukhothai state flourished in southern Thailand in the 13th and 14th centuries. This society coalesced out of cooperation between Tai tributary princes and officials who had originally served Angkor. As the Khmer Empire declined, a series of dynamic local rulers built on existing institutions to create a new state. Buddhism was fundamental to all aspects of Sukhothai rule. The king and senior monks even shared the same throne, officially melding secular and religious authority. The Sukhothai kings actively encouraged trade, guaranteed the security of inheritance, and sought to defuse social tensions through just adjudication of disputes, often by the king himself. Social structure was relatively simple, with a small elite ruling over the vast body of commoners. Foreign peoples were also absorbed into the Sukhothai kingdom. Their leaders became Sukhothai nobles, while the ordinary people were often integrated as slaves or feudal vassals.

The Indonesian archipelago also saw the rise and fall of several notable states, each giving rise to a complex society. The state of Mataram (570–927) in central Java gave birth to a new type of state, which was to be a model for later polities. Fertile volcanic soil allowed prosperous villages to emerge inland, while merchants and sailors resided in trading centers along the coast. Irrigation networks were overseen by powerful village and lineage leaders who became the focus of local power. Competing local elites vied constantly for supremacy, but as they were evenly matched, it was not easy for one group to establish suzerainty over the others. Rather than vanquishing foes through conquest, competing lineages formed

complex alliances, often through interlocking marriage ties. The agricultural and mercantile spheres exchanged goods at periodic markets, meshing the two groups into a symbiotic economy that could support a unified state. The importation of Buddhist and Hindu beliefs allowed local leaders to use these sophisticated systems to attract further loyalty, and holy men legitimized and supported the ruler. Both kings and temples received tribute from allies and engaged in trade with coastal commercial hubs. Nevertheless, unlike the civilizations of continental Asia, Mataram never gave rise to a large professional bureaucracy.

Similar states appeared elsewhere on Java, Sumatra, and in the surrounding region during the medieval era. Like the Mataram prototype, these societies mixed productive agriculture with maritime trade, and native cultures were overlaid by imported Indian customs and beliefs. By the 13th century Islam had begun to spread over the same trade routes that had originally brought Indian religions to the region. Eventually, many of the people in Southeast Asia converted to this new religion, re-creating their own societies yet again according to the ideals of a foreign religion.

EUROPE

BY CHARLES W. ABBOTT

Medieval western Europe represented a fusion of two heritages: Roman and Germanic. From Rome came elaborate administration, Roman law, and Christianity. From Germanic and other barbarian invaders came social fluidity among warriors, the common law from tradition, and improved folk technologies in farming. The Roman Empire had been centered on the Mediterranean, a “Roman lake.” (The Romans called it *Mare Nostrum*, “our sea”). As Rome declined, the empire broke apart into three main pieces. Many of its old provinces became part of the Islamic world, while others remained part of the Byzantine East. The third part of Rome was western Europe, Latin Christendom. Western Europe’s economic center of gravity shifted north into cooler and more heavily forested terrain. Many of these lands had never been ruled by Rome, and most of them had never been Rome’s core provinces. In this new medieval Europe old and new models clashed; the tensions were never fully resolved but provided ongoing inspiration.

Certain commonalities emerge about medieval Europe during its 1,000-year history and across diverse societies. Political authority was often fragmented and decentralized; frequently it was embodied in personal ties of allegiance rather than bureaucratic command. Economic life was at times similarly fragmented, in some eras with much productivity being household labor for subsistence. At times the major-

ity of Europe’s inhabitants were part of an unfree peasantry. Taxes were often paid in labor services rather than in cash. Most people identified themselves with reference to their family, their local society, and their estate—clergy, nobility, and commoner.

The centuries after 1000 saw growth in trade, urbanization, and social complexity. A striking agricultural expansion also took place up to 1300. Europe became less forested and more populous as farms replaced trees, but it also became more complex as new cities were founded and as old ones grew larger. Merchants had more and better institutions to serve them. More monasteries graced Europe, containing more mills and libraries. Monarchs had more direct and predictable influence in their domain. Unfavorable weather after 1300 was followed by famines and then by the Black Death (1348–51), which wiped out over one-third of Europe’s population. These developments were bad for social organization but good for social innovation. Urban dwellers were especially hard hit, and new pathways for social advancement opened up in the fourteenth century.

THE THREE ORDERS: THOSE WHO WORK, THOSE WHO PRAY, AND THOSE WHO FIGHT

In England in 995 the Saxon churchman Aelfric (ca. 955–ca. 1010) described his social world as being divided into three groups: those who work, those who pray, and those who fight. These were the three great divisions of medieval Europe. Persons in each group proclaimed separate values, performed their roles as they saw fit, and struggled to rise or to maintain their level in a separate status hierarchy. As history progressed, each group became more internally differentiated. The working class spawned merchants, towns, and the urban nucleus from which modern Europe emerged—but with the military ferocity of the secular leaders, nurtured in a politically fragmented society of sovereign states.

The church (“those who pray”) was its own world. It governed itself by its own institutions, relying on a separate bureaucracy, canon law, separate courts, and the assembly of cardinals. It was responsible for salvation in the next world and enforced discipline through religious symbolism and supernatural sanctions. It had strong faith in its own universality—the church was for all, except for the small number of Jews who remained outside of it. (Muslims were also outside the church, but they did not flourish in Christian Europe, though they created a thriving culture in Muslim Spain.) Among members of the church the highest values were piety, faith, mercy, and charity: a concern for the eternal souls of their fellows.

Secular leaders (“those who fight”) were also those who ruled. They were the heirs of the fall of Rome and the dis-

integration of public order that accompanied it. Many were themselves descendants of invaders who fostered a militarized society. Their goal was to survive, to carve out their domain and rule over it, and to protect against further attacks (from Vikings in the north, Magyars in the east, and Saracens in the south). They trained and prepared for war, they fought wars, and they administered justice to those in their domain. When they were not fighting, they held tournaments (mock fights), or they hunted. Secular rulers held land in grant from larger lords; they did not farm the land themselves but required a servile or free peasantry to farm for them. They provided hospitality in their massive halls, the only nonsacred buildings that could hold hundreds of people at once. They prized physical vitality, and their highest values were martial courage, personal loyalty, and the love of justice.

The common people (“those who work”) included the mass of peasant farmers and herders but also the various other folk not involved in the church, the government, or war. This group included the families of substantial merchants and skilled craftsmen as well as humble peddlers, milkmaids, fishermen, and domestic servants. About 90 percent of men and women fell into this group. The common people were commoners; that is, rather than being military nobles with political status or bishops, abbots, and monks with religious office, they were people without rank. Some of them were modestly prosperous or even rich, but most of them were quite poor. These people worked with their hands, and it is harder to specify their highest values. Solidarity and mutual aid among villagers were important to commoners. Pragmatic focus on endless practical work was a way of life. People in this station of society valued patience, pragmatism, prudence, and diligence.

The common people were indispensable: They did the work without which society would immediately grind to a halt. Growing grain, herding sheep, catching fish, forging iron, making barrels, milking cows, churning butter, constructing buildings, and transporting goods, members of this group were less likely than the others to leave written records. Except for merchants who kept accounts and guildsmen who regulated themselves, much of what we know about them was written by others, in court dockets and in the accounts of their creditors.

THE BASICS OF FEUDALISM

Feudalism emerged as way of marshaling military power in a society in which land was abundant and the cash economy had unraveled. The nominal ruler of a large area (the lord or a high-ranking retainer at court) needed an army. Only with an army could he hold his territory against invaders and local competing strongmen. However, the lord lacked money

to pay his army. The solution was for him to grant estates of land (fiefs) to his regional subordinates (the vassals of the lord), who received their land in return for pledges of military service. A regional fief holder (the lord’s vassal) was free to govern his estate as he saw fit, and he would typically grant fiefs internally to his own vassals. The result was a pyramid structure of patron-client relationships, personal relationships between people unequal in power and status who had reached an agreement.

The superior man granted land to his vassal for the vassal’s livelihood and swore to protect him. The vassal in turn swore to aid and assist his lord when called upon to do so—to provide military service (typically 40 days of service per year), with the vassal responsible for his own horse, armor, and weapons. The agreement was formalized in a solemn ritual pledge; it was Christian in content and was witnessed by the highest church officials available. The vassal owed his lord such intangibles as ceremonial deference and military service, and he appeared at the lord’s court when summoned. In times of service the vassal would bring his own armed retainers and followers with him when called. (The number of one’s followers was a key marker of status and leadership ability.) The lowest rank of followers



Seal of the Picot family, wealthy merchants and aldermen of London, mid-14th century; in all classes of society seals were used in formal transactions. (© Museum of London)

would be ambitious young men—pages and squires—who aspired to hold fiefs of their own in due time.

Neither the lord nor the vassals farmed the land; they were dependent on the labor of free peasant farmers or unfree serfs. These subordinate farmers financed a vassal's military capacity by working on the vassal's agricultural plot (the *demesne*) as well as on their own. Stereotypically, the vassal lived in a manor house and presided over unfree serf farmers, while the manor was largely self-contained as an economic unit. The lord of the manor was a vassal of the higher lord who had granted him his fief, but simultaneously he was lord to his serfs. Serfs worked on his land without pay on certain days. They also paid for the right to use the lord's facilities: the mill, the pond, the forest, and the ovens. All of those resources were the lord's, and serfs paid to use them (either in kind or in cash). In this way an army was financed, and an entire martial class was supported.

Farmers were typically subject to various forms of servitude and inequality. They were serfs and so were not free, but they were far from being slaves. The lord of the manor did not own them and could not sell them. He could not confiscate their property without cause, and he had no right to command them arbitrarily or to deprive them of their land. Serfs had customary rights, but they were not free. They were deprived of the right to move freely. (They could not travel away from the manor without their lord's permission, and if they ran away, they could be returned by force.) They could not choose their own profession, go to court against others, or freely enter contracts; they were generally prohibited from becoming monks (though they might become affiliated with monasteries as laborers). Serfs owed labor services to their lord. They had to go to him for justice, and he often monopolized key functions in general. The court for resolution of disputes was his court, just as the mill and the pond were his. In this sense, feudalism devolved all government functions to local knights, who exercised jurisdiction in their own domain.

THE UNCERTAINTIES OF FEUDALISM

Feudalism was at the core of medieval society from the early Middle Ages until many serfs had their labor dues commuted to cash rents in the centuries after 1000. On one level the purpose of feudalism was political: It was a system for building political authority and matching it with military power. More generally, it was a form of social and economic organization. Authority over land made the feudal system work. Those who farmed the land could be taxed (usually in labor or in kind) to support one knight. That knight swore allegiance to a greater lord, who might swear allegiance to an even greater lord. In this way a body of fighting men could be raised to fight a

neighboring kingdom or to put up a good front against the Vikings so that they would go and plunder elsewhere.

Feudalism also conjures up economic associations: the image of the self-contained manor, for example. At the dawn of the Middle Ages the manor aspired to self-sufficiency. Much production involved household labor. Villagers grew their own food, spun and wove their own cloth, raised their own farm animals, built their own houses, and made their own tools. The balance of production came from within the manor, from local specialists, such as the butcher, the baker, the cooper (barrel maker), the smith, and the tinker (mender).

In medieval Europe serfdom was real, as were knights in armor. The manor as a largely self-sufficient economic institution was real at certain times. (Its self-sufficiency eroded whenever trade revived, since specialization has demonstrable benefits.) Some modern historians have argued that feudalism was not real but a mirage. The knight and the manor are proven historical facts, but feudalism is an idea, a stylized story, an interpretation of reality—not necessarily a historical fact. It existed in some places and at some times in medieval Europe, but it was not a general pattern. While scholars once asserted that the medieval period was the age of feudalism, many now consider feudalism to have been not a stage in history but a stage in historiography (the writing of history).

PEASANT FARMERS

As is the case with feudalism, which is simple to describe in theory but harder to analyze in reality, the exact status of serfs can be difficult to work out. It is hard to tell hundreds of years later, from fragmentary sources written by their supervisors and adversaries, to what extent a particular group of farmers was free. It can be especially hard to tell what their exact dues to their lord may have been, what their bargaining power was relative to their lords, or when their servile obligations arose and why.

The term *serfdom* is imprecise, covering a variety of unfree and dependent conditions. Historically, it emerged from a variety of earlier statuses, including the outright slavery of the late Roman Empire. At that time senators and magnates often retired from Rome to their large country estates. Such holdings were worked by gangs of slaves, and the senators surrounded themselves with armed retainers and had little need for public order. Later on in the early Middle Ages descendants of slaves became serfs. In the sixth century the church forbade the enslavement of Christians, but slavery endured for centuries. (Slaves are listed in England's Domesday Book of 1086.) Because the largest estates were perceived as inefficient, proprietors often broke up estates into smallholdings

where serf families farmed individual plots, the serf operating somewhat like a sharecropper or a tenant farmer.

Not all serfdom arose from people coming out of chattel slavery; in other places free farmers were unable to defend themselves during the general collapse of public order. It was common for them to commend themselves to a local strongman who would protect them, essentially giving their land to a local protector, who then granted it back again in return for labor services. The lord's exact explanation of how he achieved authority over his serfs was often self-serving and differed markedly from the peasants' viewpoint. Successful lords usually gained a territory full of inhabitants, some of whom may have been slaves and some close to free peasants, and then subjected them to relentless pressure for labor services. Sometimes he might bully them; other times he might grant them assistance, but with strings attached. He presented himself as a benefactor, but it was costly to be one of his beneficiaries.

THE CHURCH AND THE CLERGY: CRUSADES AND PERSECUTION

It is relatively easy to imagine the feudal lord in medieval Europe; it is harder to imagine the role of the church. The lord's power flowed from his military prowess, from his potential to contribute to public order (or to disrupt it), by his monopoly over local justice, and by his tax revenue from those who worked the land. The church also drew some of its own power from the ownership of land, for it was one of the largest owners of land in Europe. It had other sources of strength as well.

One source of church influence was its historical continuity. For much of the Middle Ages the church was the greatest source of literacy, brainpower, and bureaucratic continuity. The church had corporate coherence; individuals aged and died, but the church endured. The church could often achieve its long-term goals because of its staying power. The church also drew its strength from the legitimacy it could grant to secular rulers as well as by the reciprocal exchange of favors between church and secular rulers. The emperor of the Holy Roman Empire was by tradition crowned by the pope; lesser kings were invested by lesser religious officers. The church did not need its own military machine to challenge secular rulers. By granting or withholding legitimacy to an individual ruler, it could alter the balance of power, weakening those rulers who challenged church doctrine and prerogatives. The church did not need to attack them itself; ambitious rulers would be happy to launch an attack with the church's blessing.

The grandest example of this practice was the investiture controversy, in which a reform faction of the church with-

drew the right of secular rulers to appoint church officers, such as bishops. The conflict culminated with the Holy Roman emperor and the pope proclaiming each other to have been sacked from office. In the long run the church seems to have won that battle. The Holy Roman Empire was weakened, coming to look less and less like a strong monarchy (such as England, France, and Spain would become). Instead, it became more and more a patchwork of smaller states in the aftermath of the controversy.

While European lands were invaded by Vikings, Saracens, and Magyars in the early Middle Ages, after 1000 Europe built up its strength and began to invade lands on its fringes. (Germanic groups drove into the Slavic and Baltic East, and Christian Spain reconquered the peninsula from the Moors.) A notable example is the Crusades, the first of which was launched in 1095 with the blessing of the pope. He proclaimed that those who embarked on the crusade would cleanse themselves of sin in the process and would be assured of reaching heaven.

In addition to the highly visible Crusades to the Holy Land (the eastern shore of the Mediterranean), Europe began to embark on various campaigns against heresy closer to home. After 950 a "persecuting society" arose in Europe, with the goal of enforcing religious orthodoxy, rooting out heresy, segregating Jews and lepers, and protecting society from various social dangers viewed as contagious. The Albigensian Crusade (1209–29) against the Cathars of southern France was thus another crusade closer to home. The persecutory process provided material benefits for those who engaged in it: It increased their power, wealth, and status, even while it provided a chance to eliminate rivals and enemies. There may have been a cynical element to the Crusades as well. It is better for belligerent warriors to go fight in foreign lands than stay nearby and cause trouble at home.

MONASTERIES AND RELIGIOUS FOUNDATIONS

Among the various associations that flourished in the Middle Ages, monasteries were crucially important. The various religious orders included the Benedictines, the Columbans, the Cluniacs, the Carthusians, and the Cistercians, to name a few. The monastic tradition originated with solitary hermits or anchorites in the Egyptian desert and was well developed by the fourth century. As it grew in numbers, organization became necessary, and some monks isolated themselves together in collectives rather than individually, guided and ruled by an abbot (from *abba*, meaning "father" in Aramaic).

It is difficult to generalize about such a movement, but we know that monasteries grew in number and in the number of members, both men and women. Successful monasteries that grew would create new "daughter" monasteries

by propagation. Great secular rulers endowed monasteries with land and their benevolent protection. Freeman, many from wealthy families, joined monasteries by taking a vow of obedience. Monasteries also accumulated lay brothers and hangers-on as well as supplicants seeking charity. (Monasteries took seriously Christ's directive to feed the hungry and clothe the naked.) Some joined out of sincere piety, and others joined because doing so was expected of many well-born individuals.

As in any institution that flourished, tensions abounded. Monks took vows of poverty, but many came from wealthy families, and monasteries accumulated substantial wealth and owned large tracts of land. Some peasants considered monasteries to be poor neighbors—grasping, demanding, and expanding landholdings aggressively at the expense of the poor. Monks espoused the goals of simple piety and humility, yet contemporary documents show that many monastic leaders had top-notch classical educations and wrote compelling Latin prose.

Monasteries were to be away from the hustle and bustle of the world, but some served as guesthouses (essentially hotels) for traveling elites. The monasteries with royal patrons had the king or the queen as a most demanding customer, visiting periodically as a guest and expecting to be lodged and fed. Monasteries also functioned as medieval conference centers, where king and barons could all gather at once.

MERCHANTS AND TOWNS: COUNTRY GENTRY

Because the lord aspired to a monopoly of government, anyone on his manor found it necessary to submit to his justice to enjoy his protection. The merchant guild provided a way out of this situation. Merchants, by uniting among themselves, could lobby for a stable and predictable commercial environment, including low and predictable tolls, freedom from the seizure of their goods, and the right to form contracts and adjudicate them among themselves. Such was the beginning of commercial privileges, which tended to be localized in particular places, normally walled cities governed by themselves.

It was not necessarily hard to move to a city, but it was hard to make a living in one. In theory, towns were governed by the commune, the sworn association of all members. Large merchants tended to dominate town politics over time, and many towns became ruled over by an exclusive, self-confident, upper-class strata, or urban patriciate. This group was able to succeed in business, but in addition, the children might become notaries, lawyers, accountants, and town council functionaries, and they might accumulate landholdings as well. In some countries, such as England, town-based merchants were separate from the rural-based gentry of independent

landowners. In Italy the cities tended to dominate the country more; the country elite were essentially the urban-based elite.

THE FAMILY

The family is the fundamental building block of society and the enduring unit when all else has crumbled away. Peasant farm families were closest to the modern ideal of the nuclear family; the peasant hovel could not feasibly house more than a married couple, perhaps a grandparent, and their children (as well as the animals that were brought into the house at night and that helped to warm it in the winter). English primogeniture (the passing of land undivided to the oldest son) left the younger sons without significant inheritance. The ideal solution to this problem was to provide younger sons with genteel occupations, such as the priesthood or the law. It was the upper classes for whom family ties meant the most. It was possible to travel and see distant cousins, to engage collectively in business enterprises or war, or carefully to orchestrate marriages so as to gain and maintain control over a city council or a principality.

THE ISLAMIC WORLD

BY MASSOUD ABDEL ALIM

The conquering armies of Arabian Muslims brought with them a tribal, pastoral-nomadic form of social organization. The Muslim's primary identity was based in blood relationships to family, clan, tribe, and ethnic group. Identity was further derived from places, with people identifying themselves as being from a particular neighborhood, district, village, town, city, province, or country. The final basis of identity was religion first and sect second.

During the conquest, Arab Muslims retained the most elite status and differentiated themselves from their converts and those they governed. The attitude was that free Arab Muslim males carried divine revelation to be distributed to the world. As the conquest spread and conquered lands and conversions increased, the dual-tiered system became untenable; ultimately all Muslims were declared equal, whatever their ethnicity, even though in practice the bias continued.

The most fundamental distinction in Islamic social organization is that between *dar al-Islam* (House of Islam), which contains Muslims regardless of race, ethnicity, or location, and *dar al-harb* (House of War), which houses all others living in lands not under Muslim sovereignty. Muslim government rule and the sharia, or Islamic law based on the Koran, reign supreme and govern the status and relations among Muslims and with non-Muslims. A state of perpetual war exists between Muslims and non-Muslims, to be inter-

rupted by occasional truces that permit Muslim forces to regain strength.

ELEMENTS OF MUSLIM SOCIETY AS DEFINED BY THE SHARIA

Medieval Islam experienced a gradual transformation in the relationship among government, religion, and society. At Islam's inception in the seventh century all three were essentially one unit in that religion spawned a government, which in turn ordered society. By the 15th century government in most Islamic lands was clearly differentiated from religion. Strictures in the sharia regarding taxation, jihad, and political leadership informed government decisions but were hardly enforced without considering contemporary political issues. The same was not true of religion and society: The sharia continued to be the basis for structuring society and regulating personal status with respect to marriage, divorce, inheritance, succession, and commerce. Thus, understanding the Islamic social order requires understanding the social organization defined in the sharia and enforced by the ulema, or the clerical leadership.

The sharia recognized three distinct status categories: free Muslim males, free Muslim females, and slaves. From this three-tiered structure, there emerged specific laws on how classes should interact with one another. The sharia also regulates dealings with non-Muslims in Muslim society. These included the *ahl el-Kitab*, or "people of the book"—Christians and Jews—and all others (Zoroastrians, Manichaeans, Pagans, Sikhs, Hindus, and so on). These non-Muslims were called *dhimmis*. Finally, as trade with non-Muslims expanded (especially with Italian city-states), groups of merchants, emissaries, and other foreigners set up residence in Islamic lands. These people fell outside the Islamic social order.

Medieval Islamic society was a community of belief in which smaller segments of society retained a religious character. Various schools of jurisprudence and theology appeared and disappeared, but all retained an Islamic composition. To the medieval Muslim, nothing existed outside the *umma*, or Islamic community, save small groups of Christians and Jews, whose wealth, power, and influence were perpetually and legally curtailed by both the state and the sharia.

THE ELITES WITHIN THE *UMMA*

The caliph stood at the head of the *umma* and, as successor to Muhammad (ca. 570–632), was Allah's representative. During the Abbasid regime in Baghdad, the caliph, as both religious and political leader, had absolute power. Through him came all position, privilege, and assigned political power. As head of the military, the caliph enforced his rule, often with the power of the sword. Unlike Christianity, with its division

between worldly and spiritual obligations (Jesus' admonition to render unto Caesar the things that are Caesar's and to God the things that are God's), Islam does not differentiate the religious from the political; indeed, political problems were often framed as religious problems. This lack of differentiation resulted in three civil wars over the course of the seventh and eighth centuries, stemming from disagreements over caliph succession, which resulted in the murder of three of the first four caliphs by coreligionists.

By the mid-10th century the pressures of administering a far-flung empire and internal strife over succession undermined Abbasid rule and fragmented caliphal power. Political power became increasingly decentralized and uneven, with real power held by regional governors. The caliph continued to be held in esteem, but thenceforth the legitimacy of military leaders was negotiated through the caliph's local representatives, the ulema, who administered the sharia. This accommodation continued after the fall of the Abbasid Caliphate, following the 12th-century Mongol invasion and destruction of Baghdad. Against this background developed the complex and often symbiotic relationship between the ruling military elites and the ulema, or religious elites, a relationship that created the upper tier of medieval Islamic society.

Medieval Islamic military regimes were usually of foreign origin, with officer ranks of Turkish or central Asian origin. Most spoke Turkish dialects, despite the instruction of soldiers in Arabic. Also, many were relatively recent converts to Islam who embraced their new religion with different levels of fervor. From Baghdad to Fès, victorious commanders understood that in practical terms they had to negotiate with local elites to maintain power. Within cities the ulema held the dominant social position, and it was to this group that the military ultimately looked to justify its rule.

What this alliance meant is that the members of the ulema became politically influential, representing local populations and extending their social and religious roles. Their main responsibilities were to formulate Sunni Islam's identity, train their successors, and transmit religious knowledge. They were administrators of charitable activities, enforcers of Islamic law, and intermediaries for the military regimes. They also provided scribes and midlevel bureaucrats for a regime's administration. These activities were distributed among the three main administrative departments of the Islamic state: The chancery was the source of all political correspondence from which a formal literary style developed. The exchequer or treasury concerned itself with the collection of taxes. The third department was the army, which was responsible for all military matters, including recruitment, armament, war making, supplies, logistics, and military finance. With pres-

ence in two departments, the ulema established deep local roots; this localization became its main source of power.

As a class, the ulema was neither a clearly defined nor an easily differentiated group. Many members came from wealthy families and were themselves engaged in commerce. Hence, there developed especially close ties between the urban mercantile class and the class of religious scholars. The ulema consolidated power and status by arranging for sons to inherit professorships, by nurturing dynasties of religious scholars, and by allowing individual scholars to sometimes hold professorships at several institutions simultaneously. Especially in the medieval period, the ulema was a fluid group through which wealth and social mobility could be achieved. In addition to prestigious professorships, the top scholar might win appointment as a *qadi* (judge) or preacher in a large mosque.

The interests of the military and the ulema intersected most notably in the administration of Islamic law, in which members of the ulema served not only as viziers (heads of the state administrative apparatus) and *qadi* but also in extended bureaucratic roles—especially in the Mamluk era—which included participating in public ceremonies and state occasions, leading emirs on campaigns, and sitting at the sultan's courts. But it was because the ulema defined Islamic identity and developed Islamic thought that its members were the custodians and enforcers of the sharia, establishing what behaviors lay inside and (more significantly) outside the Islamic mainstream; this gave the group its effective and sustained power. Several times from the 11th to the 14th centuries the ulema stepped in during periods of political chaos: in Nishapur (Iran), when the ulema agreed to recognize the Seljuk leader Toghril Beg (ca. 990–1063); when ibn al-Kashshad, a *qadi* from Aleppo (Syria) ruled the city upon the collapse of Seljuk rule; in the 13th century, when the religious leaders of Damascus negotiated surrender terms with the Mongol Ilkhanid ruler Ghazan (r. 1295–1304); and in the 14th century, when yet other religious leaders organized payment of tribute to Timur (1336–1405) after the Mamluk sultan Faraj fled to Cairo.

Given its reach in the exercise of political power, the ulema, as a group, could serve as a source of pressure on the military. Several elements came together to create and maintain this capacity: the foreign roots of the military, its need to negotiate power with local elites, and most significantly from the very understanding of the nature of authority within Islamic ideology. In return for stressing obedience to the state to maintain social order, the military's duty was to implement the sharia, which required the ulema to act in its capacity as enforcer. Prerogatives of the state—such as taxation—had to, at least nominally, nod to the requirements of the sharia. Rulers, for their part, sought to control the ulema largely through

control of its financial support and access to facilities. The ulema needed sources of salaries, stipends, and endowments, as well as funds for buildings, schools, mosques, and specialized housing facilities. This ongoing need bound its members to the military.

The net result of this arrangement was that neither the military nor the ulema exercised unchallenged power, and both required the other in order to function, with the military providing sources of finance for the ulema and the ulema legitimizing military rule, an arrangement that remained a characteristic feature of Muslim social organization up to the modern era.

THE URBAN BOURGEOISIE

Islamic government, culture, religion, and society developed largely in urban settings, with towns growing up around the military garrisons formed to house occupying detachments following the Muslim conquest. Towns became cities and some cities became great centers—notably Baghdad, Damascus, al-Fustat (later expanded to become al-Qahirah, or Cairo), Fès (Morocco), and Córdoba (Spain). Urban centers were characterized by the main market and central mosque, the two primary spaces around which city life revolved and which were located close to each other. Beneath the top tier of the military and clergy class, urban centers had a bourgeoisie composed of a merchant class and lesser military officers, government administrators, and mosque attendants. At the lower levels this bourgeoisie also included craftsmen, small businessmen, and various shopkeepers.

A great distinction existed between state-controlled crafts and free crafts. The state controlled the manufacture of armaments and other war-making objects, shipbuilding and maritime armaments, paper making, and construction of luxury fabrics (for example, gold-threaded brocades) for either royal costumes or gift giving. Mintage of coins was, of course, also under state control. The commissions for the manufacture of these items required contact with the upper civilian administration (scribes, translators, and tax collectors) and carried great prestige—as well as lucrative remuneration. Powerful merchant families evolved, carrying on international maritime trade with Europe, India, and Africa. It was from this upper-middle class that families groomed sons to enter the ulema in order to develop their cultural capital and extend their influence.

The free trades included banking and work in precious metals (gold and silver), textiles, and leather. Their relative prestige was defined by how close they were situated to the mosque and market, which was determined by their need for water resources. Generally, the closer a trade was to the market and central mosque, the greater its prestige. Banking

and goldsmithing—neither of which needed water—were located closest to the main mosque. The textile industry—with its weavers, spinners, dyers, and launderers—needed some water and was located farther away. The leather industry employed dyers, tanners, and other workers who required ample water resources, and the industry was thus located farthest away. Trade with nomads and peasants occurred just outside a town or near a city's ramparts and carried the least social status. For practical reasons, food purveyors were scattered throughout the city and fell outside this convention. In addition, the lower echelons of the ulema—muezzins (criers), Koran readers, prayer leaders, and rank-and-file soldiers—also populated this middle class. At the bottom were slave soldiers, who, because of their past unbelief, retained this status despite their conversion.

THE RURAL BOURGEOISIE

The countryside was itself stratified, with large landowners and town and village chiefs (who were also tax collectors) representing the upper tier of the rural population. The system of endowments, or *waqfs*, of land grants in lieu of military salaries gradually took hold; here, the income from a piece of property could be used for philanthropic purposes, such as the founding of a madrasa, or school, or the building of a mosque and provision of support for its staff. The owners of such *waqfs* gradually arranged for the income from these land grants to become hereditary; thus, a landed aristocracy evolved. Although officers with large *waqfs* and other large landowners retained a certain prestige, their impact on Islamic culture was limited. At the lower levels were landowning peasants and various agricultural workers—farmers, field hands, and slaves, whose lives were mean, short, and characterized by backbreaking manual labor.

THE SOCIETY OF FREE MUSLIM FEMALES

Medieval Islamic ideology stressed the need for unity and order within the *umma* and thus did not develop notions of individual liberty, freedom of conscience, and the pursuit of happiness—notions that might lead to social anarchy and moral decay. As guardians of the Koran, which they believed was Allah's ultimate revelation to humankind, the members of the ulema retained for themselves legislative power over Islamic law, especially the laws of personal status. Because they could also be appointed as judges or *qadis*, they had an enforcement role as well.

The ulema exercised these prerogatives by implementing three fundamental precepts. First, both men and women were required to declare the *shahada*, or statement of belief: "There is no god but Allah; Muhammad is the messenger of Allah," which forms the core of Islamic prayer. Second, Islamic ide-



Fritware bowl, painted with an enthroned ruler and his attendants, Kashan, Iran, 1187 (© The Trustees of the British Museum)

ology declared patrilineal kinship as a norm and as the primary determinant of personal status. What was important, above all, was paternal certainty and, therefore, female chastity, which was rigorously enforced. Third, the Koran requires that a man support all members of his household, which, in addition to wives, also typically included children, servants, slaves, and elder relatives.

In addition, the lives of women of procreative age were also characterized by modesty strictures on dress and segregation from men to whom they were not related. Public modesty was ensured by complete coverings that hid all body parts except for eyes, hands, and feet. This norm, though widespread, did not apply to prepubescent girls, who were not considered sexual beings, and was much less strictly applied to postmenopausal women, who were not considered sources of temptation to men. The physical segregation of women extended to the private sphere, with separate quarters set up to house women and their servants. However, only the wealthiest families could afford to seclude women completely, and this custom was enforced more rigorously in cities and towns than in the countryside, where the need for women's physical labor prevented either complete covering or total seclusion.

There is a Koranic basis for the unequal treatment of women in marriage, divorce, inheritance, and child custody. Women were allowed to own property before and after marriage, but marriages could be dissolved easily—by a husband's

simple verbal repudiation. Given the complications of settling property rights in the event of serial marriage and divorce, women were permitted to keep their property.

Despite segregation and unequal status, medieval Muslim women had a role model in the literary career of Aishah (614–78), Muhammad's child bride, who became an important source of Hadith (customary sayings) after his death. A controversial figure, Aishah was also famous for her presence at the battle of the Camel (656), where she observed the fight between Muhammad's supporters and those of his son-in-law Ali (r. 656–61)—the genesis of the Sunni-Shia split—from a covered litter atop a camel. Sunni Islam revered Aishah for her scholarly contributions, but she remained a symbol of women who meddled in public affairs.

SLAVES

Slavery was common to all major traditions in the ancient world, and pre-Islamic Arabia had a slave population. A body of laws pertaining to slave status, trading in slaves, the manumission (or freeing) of slaves, and who could own slaves evolved. Slavery was permitted by Allah and recognized and regulated by the sharia. Both the Koran and sharia permitted Muslim men sexual access to slave concubines. The offspring of such unions could be recognized and legitimized by Muslim fathers, and the same was possible for the slave mother herself. The slave mother achieved a certain status as *umm walad*, or the “mother of a child.” The Muslim world soon developed a large number of children of mixed racial and ethnic characteristics.

A person became a slave by being born to a slave woman; by being taken captive in jihad; by being offered as part of an annual tribute paid by the head of state of a conquered land; or by outright purchase. Slaves could only be non-Muslims, because the Koran presumed the natural freedom of human beings, but jurists determined that their original state of “unbelief” (in Islam) justified their continued slave status even after conversion to Islam. Conquered countries provided slaves, among them, Mesopotamia, Egypt, Iran, Africa, central Asia, and Spain. Skilled slaves came from Byzantium, India, China, and Southeast Asia and unskilled labor from Europe, the Eurasian steppes, and Africa.

Slaves were employed as domestic servants, agricultural workers, tradesmen, business agents, military recruits, and civil servants. Military slave commanders were at the top of the social hierarchy. Next were high-ranking slave civil servants, who sometimes rose to positions of influence. Eunuchs were next in the social strata, acting as guards of harems and custodians of mosques, tombs, and shrines. Slaves working for merchants and craftsmen in cities and towns occupied the middle ranks of the hierarchy. Some became

responsible for their masters' businesses and could act as the business owners' agents. Musicians, singers, and dancers were often slaves and were especially well regarded. At the lower levels of society were female slaves, who acted as domestic servants and concubines. At the very bottom were the agricultural workers or slaves working on large public works projects.

The sharia denied slaves any legal rights; they could not hold office, perform or participate at religious functions, have any authority over others, or present testimony in court. The sharia did not fix a penalty for maltreatment, although tradition frowned upon such practice. Slaves required their master's consent to marry. Their rights included food and shelter and duties that were not excessive.

DHIMMIS IN MUSLIM SOCIETY

Since Christians and Jews originated in the Abrahamic tradition, they were permitted their lives, certain property rights, and limited exercise of their faith, provided they accepted the sovereignty of Islam and the terms established by Caliph Umar ibn al-Khattab (r. 634–44) in the seventh century. But it was also perceived that Christians and Jews had corrupted the divine truths transmitted by God to Abraham, Noah, Moses, David, Solomon, and Jesus. The Koran held that Jews had corrupted the Torah, killed prophets, and falsely claimed to have crucified Jesus. Christians were to be condemned for having corrupted the Gospel, proclaiming Jesus as God's son and, worse for the rigorously monotheistic Muslims, declaring belief in the Trinity, which Muslims maintain is polytheism.

The 12th-century Syrian jurist al-Shayzari (d. ca. 1193) prescribed distinguishing clothing for *dhimmis*. All *dhimmis* were to wear a distinctive cloth, called a *ghiyar*. Jews had to display a red or yellow cord on their shoulders. Christians wore special belts and hung crucifixes around their necks. In the public baths *dhimmis* kept a steel, copper, or lead band around their necks.

As with the seclusion of women, enforcement of these guidelines differed according to period, region, class, and ruling regime. Despite elasticity, these laws—particularly the payment of protection money—were meant to demonstrate submission to Muslim authority and to enforce the social superiority of Muslims. Over the centuries the economic, social, and political discrimination reduced the *dhimmi* population. Still, Muslims were admonished to limit their interactions with them. Indeed, the 13th-century writer al-Nawawi interpreted one Koranic verse as a sanction against permitting non-Muslims into one's affairs, since anyone who was not a Muslim was to be considered an outsider and not fully trustworthy. Although greatly diminished, small *dhimmi* popula-

tions survived, enjoying greater or lesser degrees of liberty, depending on the prevailing attitudes of the ruling elites.

NON-MUSLIM FOREIGNERS

Islamic society also had small contingents of foreigners—agents of foreign governments, visitors, and international merchants and businessmen. This reality created an awkward situation, since such individuals were *ahl al-Harb* (people of war). Given the ongoing trade with Africa, India, and southern and western Europe and the concomitant need to establish diplomatic relations with foreign governments, embassies of various sizes had to be more or less permanently established in major cities to house ambassadors and support staffs. Theoretically, the goods carried by international merchants were to be taxed according to the religious confession of the merchants. This ideological stricture was often ignored, and commercial transactions were typically completed based

on the nature and quality of the merchandise rather than on the theology of the merchant.

See also ADORNMENT; AGRICULTURE; ALCHEMY AND MAGIC; BUILDING TECHNIQUES AND MATERIALS; CHILDREN; CITIES; CLOTHING AND FOOTWEAR; DEATH AND BURIAL PRACTICES; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FAMILY; FESTIVALS; FOREIGNERS AND BARBARIANS; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; LAWS AND LEGAL CODES; LITERATURE; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; ROADS AND BRIDGES; SETTLEMENT PATTERNS; SLAVES AND SLAVERY; SOCIAL COLLAPSE AND ABANDONMENT; TOWNS AND VILLAGES; TRADE AND EXCHANGE; TRANSPORTATION; WAR AND CONQUEST; WRITING.

Asia and the Pacific

~ Ancient Japanese Constitution (604) ~

1. Harmony is to be valued, and an avoidance of wanton opposition to be honored. All men are influenced by class-feelings, and there are few who are intelligent. Hence there are some who disobey their lords and fathers, or who maintain feuds with the neighboring villages. But when those above are harmonious and those below are friendly, and there is concord in the discussion of business, right views of things spontaneously gain acceptance. Then what is there which cannot be accomplished!

2. Sincerely reverence the three treasures. The three treasures: the Buddha, the Law, and the Priesthood, are the final refuge . . . and are the supreme objects of faith in all countries. What man in what age can fail to reverence this law? Few men are utterly bad. They may be taught to follow it. But if they do not go to the three treasures, how shall their crookedness be made straight?

3. When you receive the Imperial commands, fail not scrupulously to obey them. The lord is Heaven, the vassal is Earth. Heaven overspreads, and Earth upbears. When this is so, the four seasons follow their due course, and the powers of Nature obtain their efficacy.

If the Earth attempted to overspread, Heaven would simply fall in ruin. Therefore is it that when the lord speaks, the vassal listens; when the superior acts, the inferior yields compliance. Consequently when you receive the Imperial commands, fail not to carry them out scrupulously. Let there be a want of care in this matter, and ruin is the natural consequence.

4. The Ministers and functionaries should make decorous behavior their leading principle, for the leading principle of the government of the people consists in decorous behavior. If the superiors do not behave with decorum, the inferiors are disorderly: if inferiors are wanting in proper behavior, there must necessarily be offenses. Therefore it is that when lord and vassal behave with propriety, the distinctions of rank are not confused: when the people behave with propriety, the Government of the Commonwealth proceeds of itself. . . .

6. Chastise that which is evil and encourage that which is good. This was the excellent rule of antiquity. Conceal not, therefore, the good qualities of others, and fail not to correct that which is wrong when you see it. Flatterers and deceivers are a sharp weapon for

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the overthrow of the State, and a pointed sword for the destruction of the people. Sycophants are also fond, when they meet, of speaking at length to their superiors on the errors of their inferiors; to their inferiors, they censure the faults of their superiors. Men of this kind are all wanting in fidelity to their lord, and in benevolence toward the people. From such an origin great civil disturbances arise.

7. Let every man have his own charge, and let not the spheres of duty be confused. When wise men are entrusted with office, the sound of praise arises. If unprincipled men hold office, disasters and tumults are multiplied. In this world, few are born with knowledge: wisdom is the product of earnest meditation. In all things, whether great or small, find the right man, and they will surely be well managed: on all occasions, be they urgent or the reverse, meet but with a wise man, and they will of themselves be amenable. In this way will the State be lasting and the Temples of the Earth . . . will be free from danger. Therefore did the wise sovereigns of antiquity seek the man to fill the office, and not the office for the sake of the man. . . .

10. Let us cease from wrath, and refrain from angry looks. Nor let us be resentful when others differ from us. For all men have hearts, and each heart has its own leanings. Their right is our wrong, and our right is their wrong. We are not unquestionably sages, nor are they unquestionably fools. Both of us are simply ordinary men. How can any one lay down a rule by which to distinguish right from wrong? For we are all, one with another, wise and foolish, like a ring which has no end. Therefore, although others give way to anger, let us on the contrary dread our own faults, and though we alone may be in the right, let us follow the multitude and act like men. . . .

11. Give clear appreciation to merit and demerit, and deal out to each its sure reward or punishment. In these days, reward does not attend upon merit, nor punishment upon crime. You high functionaries who have charge of public affairs, let it be your task to make clear rewards and punishments. . . .

15. To turn away from that which is private, and to set our faces toward that which is public—this is the path of a Minister. Now if a man is influenced by private motives, he will assuredly feel resentments, and if he is influenced by resentful feelings, he will assuredly fail to act harmoniously with others. If he fails to act harmoniously with others, he will assuredly sacrifice the public interests to his private feelings. When resentment arises, it interferes with order, and is subversive of law. . . .

16. Let the people be employed [in forced labor] at seasonable times. This is an ancient and excellent rule. Let them be employed, therefore, in the winter months, when they are at leisure. But from Spring to Autumn, when they are engaged in agriculture or with the mulberry trees, the people should not be so employed. For if they do not attend to agriculture, what will they have to eat? If they do not attend the mulberry trees, what will they do for clothing?

17. Decisions on important matters should not be made by one person alone. . . . They should be discussed with many. But small matters are of less consequence. It is unnecessary to consult a number of people. It is only in the case of the discussion of weighty affairs, when there is a suspicion that they may miscarry, that one should arrange matters in concert with others, so as to arrive at the right conclusion.

From: W. G. Aston, trans., *Nihongi: Chronicles of Japan from the Earliest Times to a.d. 697* (London: Kegan, Paul, Trench, Trübner, 1896).

Europe

~ Charter of Homage and Fealty (1110) ~

In the name of the Lord, I, Bernard Atton, Viscount of Carcassonne, in the presence of my sons, Roger and Trencavel, and of Peter Roger of Barbazan, and

William Hugo, and Raymond Mantellini, and Peter de Vietry, nobles, and of many other honorable men, who have come to the monastery of St. Mary of

Grasse, to the honor of the festival of the august St. Mary: since lord Leo, abbot of the said monastery, has asked me, in the presence of all those above mentioned, to acknowledge to him the fealty and homage for the castles, manors, and places which the patrons, my ancestors, held from him and his predecessors and from the said monastery as a fief, and which I ought to hold as they held, I have made to the lord abbot Leo acknowledgment and homage as I ought to do.

Therefore, let all present and to come know that I the said Bernard Atton, lord and viscount of Carcassonne, acknowledge verily to thee my lord Leo, by the grace of God, abbot of St. Mary of Grasse, and to thy successors that I hold and ought to hold as a fief in Carcassonne the following: that is to say, the castles of Confoles, of Leocque, of Capendes (which is otherwise known as St. Martin of Sussagues); and the manors of Mairac, of Albars and of Musso; also, in the valley of Aquitaine, Rieux, Traverina, Hérault, Archas, Servians, Villatiitoes, Tansiraus, Presler, Cornelles. Moreover, I acknowledge that I hold from thee and from the said monastery as a fief the castle of Termes in Narbonne; and in Minerve the castle of Ventaion, and the manors of Cassanolles, and of Ferral and Aiohars; and in Le Roges, the little village of Longville; for each and all of which I make homage and fealty with hands and with mouth to thee my said lord abbot Leo and to thy successors, and I swear upon these four gospels of God that I will always be a faithful vassal to thee and to thy successors and to St. Mary of Grasse in all things in which a vassal is required to be faithful to his lord, and I will defend thee, my lord, and all thy successors, and the said monastery and the monks present and to come and the castles and manors and all your men and their possessions against all malefactors and invaders, at my request and that of my successors at my own cost; and I will give to thee power over all the castles and manors above described, in peace and in war, whenever they shall be claimed by thee or by thy successors. Moreover I acknowledge that, as a recognition of the above fiefs, I and my successors ought to come to the said monastery, at our own expense, as often as a new abbot shall have been

made, and there do homage and return to him the power over all the fiefs described above. And when the abbot shall mount his horse I and my heirs, viscounts of Carcassonne, and our successors ought to hold the stirrup for the honor of the dominion of St. Mary of Grasse; and to him and all who come with him, to as many as two hundred beasts, we should make the abbot's purveyance in the borough of St. Michael of Carcassonne, the first time he enters Carcassonne, with the best fish and meat and with eggs and cheese, honorably according to his will, and pay the expense of shoeing of the horses, and for straw and fodder as the season shall require.

And if I or my sons or their successors do not observe to thee or to thy successors each and all the things declared above, and should come against these things, we wish that all the aforesaid fiefs should by that very fact be handed over to thee and to the said monastery of St. Mary of Grasse and to thy successors.

I, therefore, the aforesaid lord Leo, by the grace of God abbot of St. Mary of Grasse, receive the homage and fealty for all the fiefs of castles and manors and places which are described above: in the way and with the agreements and understandings written above; and likewise I concede to thee and thy heirs and their successors, the viscounts of Carcassonne, all the castles and manors and places aforesaid, as a fief, along with this present charter, divided through the alphabet. And I promise to thee and thy heirs and successors, viscounts of Carcassonne, under the religion of my order, that I will be good and faithful lord concerning all those things described above.

Moreover, I, the aforesaid viscount, acknowledge that the little villages of Cannetis, Maironis, Villamagna, Aiglino, Villadasas, Villafrancos, Vitladenz, Villaudriz, St. Genese, Conguste and Mata, with the farmhouse of Mathus and the chateaux of Villalauro and Claromont, with the little villages of St. Stephen of Surlac, and of Upper and Lower Agrifolio, ought to belong to the said monastery, and whoever holds anything there holds from the same monastery, as we have seen and have heard read in the privileges and charters of the monastery, and as was there written.

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Made in the year of the Incarnation of the Lord 1110, in the reign of Louis. Seal of Bernard Atton, viscount of Carcassonne, seal of Raymond Mantellini, seal of Peter Roger of Barbazon, seal of Roger, son of the said viscount of Carcassonne, seal of Peter de Vitry, seal of Trencavel, son of the said viscount of Carcassonne, seal of William Hugo, seal of lord abbot Leo, who has accepted this acknowledgment of the homage of the said viscount.

And I, the monk John, have written this charter at the command of the said lord Bernard Atton, viscount of Carcassonne and of his sons, on the day and year given above, in the presence and witness of all those named above.

From: Teulet, *Layettes du tresor des Chartres*, trans. E. P. Cheyney. *University of Pennsylvania Translations and Reprints* (Philadelphia: University of Pennsylvania Press, 1898).

FURTHER READING

- Jonathan P. Berkey, *The Formation of Islam: Religion and Society in the Near East, 600–1800* (New York: Cambridge University Press, 2003).
- Michael Brett and Elizabeth Fentress, *The Berbers* (Oxford, U.K.: Blackwell Publishing Limited, 1996).
- Diane Z. Chase and Arlen F. Chase, "Archeological Perspectives on Classic Maya Social Organization from Caracol, Belize," *Ancient Mesoamerica* 15 (2004): 139–147.
- Georges Duby, *The Three Orders: Feudal Society Imagined*, trans. Arthur Goldhammer (Chicago: University of Chicago Press, 1980).
- John Winthrop Haeger, ed., *Crisis and Prosperity in Sung China* (Tucson: University of Arizona Press, 1975).
- Martin Hall, *The Changing Past: Farmers, Kings, and Traders in Southern Africa, 200–1860* (Chicago: University of Chicago Press, 1990).
- P. M. Holt, Ann K. S. Lambton, and Bernard Lewis, eds., *The Cambridge History of Islam*. Vol. 2, *The Further Islamic Lands, Islamic Society and Civilization* (Cambridge, U.K.: Cambridge University Press, 1970).
- Clifford H. Lawrence, *Medieval Monasticism: Forms of Religious Life in Western Europe in the Middle Ages*, 3rd ed. (New York: Longman, 2001).
- James E. Lindsay, *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- John Alden Mason, *The Ancient Civilizations of Peru* (Baltimore, Md.: Penguin, 1957).
- Patricia McKissack and Frederick McKissack, *The Royal Kingdoms of Ghana, Mali, and Songhay: Life in Medieval Africa* (New York: Henry Holt and Co., 1994).
- Robert Montagne, *The Berbers: Their Social and Political Organization*, trans. David Seddon. (London: Routledge, 1973).
- Susan Reynolds, *Fiefs and Vassals: The Medieval Evidence Reinterpreted* (New York: Oxford University Press, 1994).
- Emily W.B. Russell, *People and the Land through Time: Linking Ecology and History*, 2nd ed. (New Haven, Conn.: Yale University Press, 1998).
- Arthur F. Wright and Denis Twitchett, *Perspectives on the T'ang* (New Haven, Conn.: Yale University Press, 1973).

► sports and recreation

INTRODUCTION

It seems to be a part of the human condition that people want to have fun. It also seems to be part of the human condition that people want to take that which is fun and turn it into ritual, gambling, or symbolic contests of life and death. Sports and recreation had a variety of origins. Some began as children's play. For instance, kicking a ball around could become various sports in which balls are kicked but not touched by hands. In North America the sport of shinny, ancestor of ice hockey and field hockey, was associated with children's play even after grownups made shinny into an adult contest.

Sports and games sometimes arose out of efforts to teach children important ideas. The game *morabaraba*, which was played by cattle-herding cultures in Africa, may have begun as a way to introduce children to techniques for stealing cattle. Another form of African game involved complex thinking that introduced children to mathematics; this was a sowing game, often played with seeds or stones. The many African sowing games are often grouped under the term *mancala*, and they became so popular among adults that variations of them spread from Africa to Europe and all along the southern coast of Asia to Vietnam. Sowing games could involve mathematics so simple that the person who played first was likely to win but could be so complex that people would play them all their lives trying to master them. The elegance of a game can often be seen in how easy it is to set up: games such as *mancala* and eastern Asia's go required no more than open space where outlines of the board could be drawn in dirt and some pebbles as playing pieces. Signs of how much such games were enjoyed can be found in the discoveries by archaeologists of boards and playing pieces carved in valuable hardwoods with beautiful inlays. Games that taught children

lessons or helped adults keep their minds limber were useful as well as fun.

Another source for useful games was warfare. In much of the medieval world war was always a danger. It could come all at once in a rush of large armies or sporadically in skirmishes and raids. In either case, people needed to defend themselves and often had to practice their martial skills frequently. Perhaps to turn such skills into fun, certain martial skills inspired sports. In the Islamic world cavalry skills were at the root of exhibitions of horsemanship in which men showed off their control of their mounts and their ability to ride while using their weapons. In Japan this idea manifested itself in mounted archery competitions in which samurai would fire at targets while riding at a gallop. Indeed, archery contests were a common example of how people showed off their martial skills. In India contestants fired at targets that were high on poles; winners often won the right to marry a princess. Hunting was another way for people to show off their skills. In Europe, China, and India the aristocrats hunted for pleasure, often in game reserves created for their use to the exclusion of lower classes.

The stakes in sports and games varied from just finding pleasure in playing the sport or game to the shaping of kingdoms. In many areas where a sport or game was played by most people, those with superior skills were admired and drew audiences. Those who played polo could attract thousands of spectators. Exceptionally gifted runners could draw avid fans to their races—fans who wagered on the outcomes of contests. Wagering was at one time or another considered a problem in most medieval cultures. In India men sometimes squandered their families' fortunes in card games, dice games, or chess. In China addiction to mahjong could cause people to neglect their duties to their families and their government. Almost anything could be wagered on, from insect fights to wrestling to chess tournaments. In India a king lost his kingdom in a game of chance that took the place of waging actual war. Gambling could be very serious business, with contestants even wagering their freedom and, upon losing, becoming slaves. Such serious consequences took some of the fun out of sports and games, turning them into businesses that were often regulated by the state.

The banning of certain gambling contests or of all gambling seldom was effective for long. Even in the Islamic world, among people who took their faith very seriously and where such things were forbidden by Islamic law, gambling with cards and dice flourished. The lure of winning for by simply rolling dice or by betting on someone else's athletic prowess was a powerful attraction for people. Even so, it is worth remembering that for all the seriousness with which people took their sports and games, at bottom the exhilaration of

mastering a skill was a major attraction, even for people without athletic or gaming talent. Most people escaped the difficulties of their lives for a little while by running as fast as they could or by figuring out how to move a seed from one square to another to capture more seeds.

AFRICA

BY MICHAEL J. O'NEAL

Historians' knowledge about sports and recreation in medieval sub-Saharan Africa is limited. No written records exist, so much of what is known is based on two primary sources. One source is the reports of European explorers and colonists, who began traveling through the continent in the 17th century. The other is tradition. In the modern world forms of medieval recreation continue to exist; in some cases such items as games and game pieces are still created by craftsmen and are regarded as symbolic of the culture. Additionally, many games played in medieval Africa are still played today.

With regard to sports, little evidence suggests that sports competitions were in any sense organized. It is likely that boys and young men took part in numerous activities that are similar to modern sporting events, but they did so not in the spirit of athletic competition but as a way of learning the skills they would need to survive as adult members of the community. In general, many of these life-skills activities were an outgrowth of medieval African men's perceptions of masculinity and bravery.

Thus, such activities as running, swimming, wrestling and boxing, hunting and fishing, archery, stick fighting, climbing, feats of strength, and so on would be part of a boy's or young man's daily life. It is highly likely that competition developed between individuals to determine who was the fastest runner or swimmer. Some evidence suggests that organized competitions between villages or teams of individuals within villages took place, but this evidence is limited, and such practices became more commonplace after colonization by Europeans.

One competitive form of recreation was dancing, although historians are divided over the question of whether competitive dancing took place before the arrival of Europeans or began later. It is known that competitive dancing, with acrobatic moves, was a form of competition men took part in to compete for spouses.

Stick fighting was a form of competitive sport, one still practiced in Africa. The sport required a great deal of skill and often bore a resemblance to the martial arts. The game was played, of course, with each competitor carrying a large stick. Sometimes the stick was in the nature of a staff and sometimes it was more flexible and whiplike. Each competi-

tor also carried a shield. The fighters wrapped cloths around themselves to provide protection from blows, and many wore hats to protect their heads. Covering the hat in butter was a sign of wealth and status. The game was part of many cultures' spiritual traditions; it was a common activity after harvest time and was a way of giving thanks to the gods for the harvest.

The game typically began with some sort of provocation, usually symbolic. Thus, for example, a member of a village would hold the hand of the fiancée of a member of another village for a few minutes or possibly cut one of the bead bracelets she wore.

The woman's husband-to-be would "hear" about this provocation and respond by tying a piece of cloth somewhere on the "offending" man's house. The stick fight would then take place the following day, sometimes between two people and sometimes between two villages, with each village's men fighting collectively. Prayers were offered, for the game could sometimes be fatal. As the two "warriors" fought, the women of the village chanted and sang, celebrating their heroes as bulls, leopards, and similar noble animals while scoffing at the village's opponents as cowards and hooligans. The goal of the fight was generally to subdue the opponent, though sometimes the goal was more specific, such as leaving behind visible stripes on the opponent's back.

In some cases stick fighting was a means of resolving actual disputes. A judge watched the contest to ensure that each contestant followed the rules, one of which was that fighters had to keep their tempers in check. The contest was declared over when one of the combatants drew blood; the winner tended to his opponent's injuries, and the dispute was regarded as at an end.

Many forms of medieval African sport and recreation were considered to have a divine or spiritual component. Archery provides a good example. A bow, with its ability to bring down enemies or prey from a distance, was regarded as a reflection of the power of the gods. Similarly, music played a key role in medieval African culture in large part because it reflected the will and intentions of the gods. Medieval Africans, in common with people throughout the world, found order in the physical world through its rhythms, and very often these rhythms were aural. They listened to the babble of a stream, the song of birds, the crack of thunder, the roar of a lion, and the patter of raindrops, and all of these sounds gave meaning to their lives. They became part of a pattern in life, a patterning that was reflected as well in calendars, sundials, the zodiac, totem poles, and similar articles that measured and ordered life.

Thus, for example, a musical instrument as simple as a drum had spiritual dimensions. Among medieval Africans,

a drum, often made from a piece of a tree trunk, reflected the voice of the ancestors, locked in the trunk but released when a person played a drum made from it. Because of the spiritual dimensions of music, a community would have a repertoire of songs associated with key life events: birth, the arrival of puberty, harvest time. Singing and dancing were usually communal activities, binding the people together during life's major events. In the course of these celebrations, people often wore colorful clothing. Music was thought to be a way to drive off evil, and even in modern life drums often contain something like a small pea or stone representing the evil that is kept in check by the pounding of the drum. Many modern historians of music regard early African music, with its driving beat and strong emphasis on percussive instruments, as a precursor of American jazz.

Similarly, many board games were thought to represent powers of divination, or the ability to read the will of the gods. In this sense, many such games were a form of gambling, and later, after the beginning of the slave trade, many African men lost their freedom as a result of losing a board game or a similar game of chance. One such game, called *nigbé*, involved flipping four white cowrie shells filled with black wax. Winning and losing were determined by the number of shells that landed with the white or black side facing up. The winner collected the other player's cowrie shells. The game could be considered similar to rolling dice, and its element of pure chance could be compared to the simple game of picking a card from a deck.

One of the most popular board-type games in medieval Africa was *mancala*. Versions of this game were played virtually throughout the continent. The primary purpose of the game was to teach children how to count. One common form of the game consisted of two rows of six cups, although different numbers of rows could be used. The cups were placed in an area that included space for captured pieces. The game pieces may have consisted of seeds or balls made of ivory. The goal was to move the cups about, capturing the opponent's pieces. The best players relied not on luck but on mathematical calculations about the likelihood that various cups will contain the most pieces.

Many versions of *mancala* existed. The game had a variety of names—as many as 250—including *awale*, *awele*, *ayo*, *ourin*, and *wari*. In some cases, boards with pegs were used, and the game took on many of the characteristics of chess. Rules varied regionally, but in general the game was played in the same way and with the same goals.

A popular game among the people of east-central Africa was *abbia*. The game was played with chips carved out of either hard nuts or the bark of the calabash tree. Designs on the chips could include animals, people, or abstract forms.

Players sat in a circle and placed bets. One player tried to predict how the chips would fall when they were tossed into the circle. If the player's prediction was accurate, that player won the other players' bets.

Another game that involved tossing was called *panda*. Again, this was a game with a strong mathematical component. One player tossed an agreed-upon number of beans on the ground. The number could be as few as 20, but often many more were used. Then the challenger scooped up a handful of the beans. The other player was given a few moments to examine the beans that remained on the ground and then could request the first player to return one, two, or three beans to the ground, to result in a number of beans that was a multiple of four.

Many of these and other games were played by adults, but a number of games were designed specifically for children. One was called *quakela*. In this game a group of children sat in a circle. One player was sent away so that he or she could not eavesdrop on the group. Each remaining player in the circle hid a small object in his or her hand. Common objects included a bean or a stone. When the exiled player returned, each player in the circle held out two clenched fists. The returning player had to guess which hand contained the object and what the object was. If the child successfully guessed, he or she joined the circle and the player holding the object went to the center to continue the guessing process.

THE AMERICAS

BY RENEE MCGARRY

During the fifth century there were not great changes in sports in the Americas. Many traditional games continued to be played as they had for centuries. Ancient games, such as the Mesoamerican ball game, spread from civilization to civilization. This ball game, which existed more as a ritual than as a game, was still being practiced when the Spanish invaded the Americas in the 15th century. In fact, most written descriptions of the game date to the Aztec version that was played at the time of Hernán Cortés's arrival on the continent. The Spaniards were greatly struck by the use of rubber balls, a material with which they were unfamiliar, as well as by what they perceived as the bloodthirsty nature of the game. Each game ended with a ritual sacrifice of the losing team to the gods. Most archaeologists believe that this was a fertility ritual, seeking to ensure the survival of the Aztec people.

Much like the ball game, foot races were an ancient tradition that continued into the fifth century. In fact, these races became less ritual and more practical. Eventually, South American civilizations and North American tribes organized themselves into running societies in an effort to further communication and trade. One of the most organized of these

running societies, formed in Peru, was known as *chasqui*, meaning "to exchange" among the Inca. Young male runners in this society were able to communicate information over a 2,000-mile-long road system in Peru. They carried not only messages but also fresh fish from coastal areas to isolated, inland areas. The ability to navigate such a difficult road system and the stamina to do so were developed in the battery of foot races required of young Inca boys as initiation rites. The *chasqui* running society was more effective than horses, and the Spanish continued to use it after their arrival on the continent with beasts of burden.

While these ancient and traditional sports continued, new sports were developed. Lacrosse, or the racket game, originated around 1000, most likely in the southeastern United States. Lacrosse is clearly not an American Indian word, and there are many theories as to how the game was named. The most popular of these theories suggests that the French witnessed the Croix playing the racket game and named it after them. Lacrosse was generally considered a game only for men and quickly spread with relative consistency and zeal across North America.

Much like the ancient ball game and foot races, lacrosse was more than simply a sport. It also taught young male participants the skills necessary for warfare. It developed ruggedness, speed, and endurance and was believed to have been a fairly brutal and violent game. Unlike the ball game, there is no evidence of ritual sacrifice in games of lacrosse, but some archaeologists argue that it was not uncommon for players to become critically injured or even die during the game. Many members of the tribe spent months in preparation and training for a match, to develop the necessary stamina. During this period certain foods were taboo, including rabbit, which was believed to endow the player with elements of fearfulness. Most tribes danced and held ceremonies before lacrosse matches.

The matches, typically held between tribes, were generally large, with many spectators. Because of this intertribal communication, rules and play of the game were fairly consistent throughout the continent. The main difference was between southern groups, who played the game with two rackets, and northern groups, who used only one. These rackets were made of smooth sticks from 2 to 4 feet long. At the end of each of these sticks was a curved hoop with a net. Each of the players strove to keep the ball in that net and move it down the field from player to player. As with most ball games, contact with the hands was not allowed.

Lacrosse fields were very large, ranging in size from 500 feet to 1 mile long. Each end had goal posts. A team scored points by hitting the ball through the opposing team's goal. Balls were made of either wood, in the southern parts of the



Stone ball game yoke, Aztec culture, Mexico, ca. 550–1150 (Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 028212])

country, or buckskin, in northern parts. Games could last from a half day to a full day. Different groups varied play from season to season, with the most frequent lacrosse season being in late summer and early fall, in order to allow for crop harvest. The game was played naked except during the coldest times of the year. While the majority of tribes did not play the game ritualistically, those in the southeastern United States saw lacrosse as a ceremonial contest between teams and used a medicine man to put the ball into play.

Shinny is often understood as the female equivalent to lacrosse, as women were not allowed to play the more violent and brutal game. While lacrosse still exists in the modern sports vocabulary, shinny has evolved into ice hockey and field hockey. Shinny, like lacrosse, was practically universal among Native American groups in North America. Primarily women and children played the game, although on occasion men did play separately. Indians frequently refer to the mythological origins of shinny, but there is no evidence that it had a ceremonial component outside the Makah tribe in the Pacific Northwest, where it was used to celebrate the capture of a whale. The object of shinny is to drive the ball down the field and into the other team's goal using sticks. Again, there is no use of hands in this game. The sticks were 2 to 4 feet long and had a curved end for hitting the ball. The shinny ball was made from buckskin or wood and was decorated. The decoration varied from group to group.

Shinny was played on a long field similar to that of lacrosse, although during the colder months it could be played on frozen rivers and lakes. Each team had 10 to 50 players. The game started midfield, with the ball buried. A member of each team would attempt to dig out the ball and pass it to her teammates as quickly as possible. Although field hockey

and ice hockey today involve a series of small movements to move the ball, the main strategy of shinny was to hit it over the heads of many players, attempting to move it down the field in as few moves as possible.

Cat's cradle is a diversionary game that originated around the same time as lacrosse on the North American continent. Many tribes believed that it had mythological and supernatural origins. The southwestern Zuni and Navaho both believed that ancient spider people taught the skill to their ancestors. This belief led to myriad prohibitions and restrictions on where and when cat's cradle could be played. The Eskimo believed the game could be used to prevent the disappearance of the sun each winter. They sought to catch the sun in the web and keep it shining.

The object of cat's cradle is to use a series of strings to form a web that is patterned after an identifiable object, such as a house. In order to do so, Indians looped string around their hands, using their fingers to manipulate it. Some projects became so involved that children and adults alike resorted to looping the string around their teeth, toes, and other objects. The type of string depended on available material. The Pueblo of northwestern Mexico had access to cotton and used cotton fibers in the game. Others used yucca fibers and animal skin to form these elaborate creations. The goal was not simply to form a complex web of string but to remove it from its hand-held loom in just one movement.

Another pastime in North America was stilt walking, which became particularly popular among the Hopi of the southwestern United States and Shoshoni of the Great Plains. Stilts were made of sapling branches and kept each player up to 2 feet from the ground. Stilt walking was particularly important to the Maya civilization in Mexico, as it was used to honor their bird deity, Yaccocahmut. Stilt walking is thought to have been illustrated in the Maya manuscript now referred to as the Codex Troano, with those on stilts wearing the costume of this deity.

Just before the colonial period in the Americas the indigenous peoples played a wide variety of games that kept old traditions alive and added new diversions to their communities. Some of these games served simply as leisure activities, and others served more practical and ritualistic purposes. There was a strong culture of sports on the American continents before the arrival of Europeans, and much of that tradition continued into the colonial period.

ASIA AND THE PACIFIC

BY KENNETH HALL

Throughout Asia and the Pacific medieval societies participated in and enjoyed recreational activities that frequently

became public competitions having ritual as well as societal significance. One famous literary example is the account in the Indian epic the Mahabharata of a ritualized dice contest between a king and his opponent engaged in as an alternative to going to war, which ended in the king losing his kingdom on a gamble. Numerous festivals marked by merrymaking and procession included rich and poor participants, who temporarily forgot their social status to parade together in the streets with their neighbors.

Contests between animals and men were widely popular. Among the court-sponsored animal contests were spectacular fights between elephants, tigers, buffalo, and smaller animals. South and Southeast Asian kings collected elephants and rode them in real and mock battles that included hundreds of elephants. Thai and Burmese kings were well known for their excellence in elephant jousts. Elephants were also pitted against other animals, such as buffalo, rams, and tigers. Often these matches had ritual significance, as when the elephant, symbolic of royal order, faced a tiger, representative of danger, disorder, wildness, and the enemies of the state. The match was intended to end with the elephant throwing the tiger (usually handicapped in some way by being tied to a stake or having its claws extracted) high in the air with its tusks. The elite of South Asia participated in equally symbolic tiger hunts. Mounted on elephants, aristocrats would pursue a tiger until it was trapped by their servant beaters, who would encircle the tiger until their lords could come and kill it.

Bulls offered lively competitions and were normally victorious against a tiger. Cattle, buffalo, and horses were raced. In

southern India a bullfight matched an unarmed male against a bull in a wrestling match; the male competitor attempted to master rather than kill the bull. The event was considered a test of manhood and a demonstration of male virility; unwed girls watched the contests to select suitable husbands.

Mounted horsemen participated in jousts. As with jousts of the medieval West, the object was to force opponents from their mounts with a blunt spear. Medieval records report that competitors regularly died in such tournaments and also in assorted duels on horseback and on foot using spears, swords, and knives. Polo was a favorite recreational and ritual activity of central Asian nomadic tribesmen that spread to southern Asia and Southeast Asia. Legend has it that the original polo ball was the cloth-wrapped head of a vanquished opponent.

Cockfighting was the favorite competition in Southeast Asia, whether held as an individual event or as part of temple feasts and other sacred rituals. The blood sacrifice of a cock was necessary to ensure fertility and success in war and was an alternative to earlier human sacrifices. Cockfighting was extremely popular with the public. Many villagers raised prized roosters, which fought with sharp metal spurs on their feet in a combat circle. Cocks fought to the death or until one cock withdrew from the fight (thus the expression to “chicken out”). A rooster’s victory was symbolic of its owner’s personal prowess associated with his sexual potency.

Village competitions were lively affairs in which villagers bet on one or another cock. Betting took on social significance when bets would pit two villagers or village factions against each other. To bet against another was a personal



Ladies playing double-sixes, Song Dynasty, China, 10th to 11th centuries (Freer Gallery of Art, Smithsonian Institution, Purchase, F1939-37)

statement and often involved uttering negative proclamations in the midst of battle against an opponent's cock that could not otherwise be spoken in public. Thus the cockfight could be a public airing of previously unspoken rivalries that would have subsequent consequence, but it could also be a means of conflict resolution. It dramatized both the solidarity among kin groups, factions, and villages and the hostilities associated with their ongoing competitions for status. A cockfight might end in the loser resorting to violence or reduced to slavery owing to indebtedness or to the oral violation by insult of a more powerful opponent. To curtail the potential negative consequences, late medieval courts tried with little success to regulate cockfighting. The law code of 15th-century Melaka acknowledged that cockfighting was the occasion for gambling that might get out of hand but did not declare it illegal. However, if a cockfight resulted in a brawl and a consequent appeal to Melaka's authorities, disputed bets could be seized by the court's officials.

Boat races were popular competitions that also inspired heavy betting with social and ritual significance. (Kings expected their boat to win; a win or loss had symbolic implications.) Thousands would line the banks of the local river to root wildly for and bet on their favorites. Southeast Asian villagers prepared for annual boat races against their neighbors. A rowing team received preferential treatment from other villagers when its members were allowed time from their ordinary labors to train in preparation for the annual races. Royal rowers were professionals who were also employed as rowers of royal barges.

Kite flying was a special amusement throughout Asia. In Thailand and Java kites portraying animals had symbolic value that was associated with the changing of the monsoon seasons and the consequent fertility of the soil. Kite-fighting contests in which rivals would try to bring one another's kites down or cut their strings were the source of personal pride as well as heavy betting. Spinning tops was another pastime for boys, and the source of fighting competitions among men—spinning tops were sent flying to knock an opponent's top out. It was also a ritual activity that was associated with the ripening of crops.

Rounded seeds and nuts were widely used as marbles and balls in a variety of games in which a seed or ball was struck in attempts to knock against others. As an alternative to the throwing of dice, which was popular in India and China, in mainland Southeast Asia players cast six cowrie shells, the lowest form of money, and the number landing right side up was counted.

Mah-jongg, go, and Chinese chess were favorite games in medieval China. The object of mah-jongg was to remove more tiles from the board than an opponent, by collecting

two tiles with the same kind of markings. Medieval-era go was played on a square board, 19 squares long on each side and defined by nine star points in a rectangle around a central star. Players strategically placed colored stones at the 361 intersections of line points on the board to gain control over the board sections, until there were no opportunities to place another stone. In the Chinese version of checkers (commonly known today as Chinese checkers), game pieces were placed on the intersection of lines rather than in squares.

The Asian version of backgammon (originally a Middle Eastern game), called *nard* (battle on wood), developed in the northwestern borderlands of India in the early medieval era and passed into Southeast Asia and China, where it was called *tashubu*, and Japan, where it was called *sugoroko*; both the Chinese and Japanese versions were played on a circular board. In the Indian version the board had 12 lines, representing the 12 months of the year; 24 points, representing the hours of the day; and 30 points, representing the days of the month. The dice stood for the seven days of the week and the colors of the checker pieces the night and the day.

Card playing, using a 60-card deck, was widely popular in China and was a favorite pastime among women. Chess was being played both at Asia's courts and by commoners when Europeans arrived in the early 16th century. Chess is initially thought to have developed in India using an eight-by-eight square board, requiring four players and the rolling of dice to control the moves. Known as *chaturanga*, "the four elements of an army," the game represented a competition among elephants, horses, chariots, and foot soldiers. In the Southeast Asian version chariots, which were never used in local warfare, were replaced by boats. Chinese claim their version to be older. In China the chessboard was divided in the middle by a river. Elephants ("ministers") advanced to the near riverbank; soldiers ("pawns") achieved promotion when they reached the far bank. Armies guarded and attacked the general and two mandarin officials, who guarded castles and palaces.

In the Sanskrit version of the Indian Gupta era (320–550) the king and his minister (the queen in the English equivalent) were the most powerful among the competitors. The elephant in Indian chess became the bishop in the English version, and the horse the knight, the chariot the castle, and the foot soldier the pawn. While Asia's elite used elaborately carved and jeweled game pieces, commoners played with game pieces made of local materials—in Thailand the soldier was symbolized by a cowrie shell; island Southeast Asians used bamboo game pieces.

A form of kickball, in which participants formed a circle and kept a ball in play by knee or foot kicks, preferably with the inside sole of the foot, was widely popular. In Southeast

Asia the original balls were hollow, made of woven rattan or other natural fibers. A skilled player could keep a ball in play by repeatedly kicking a ball to himself with elaborate kicks hundreds of times before passing it on to another player. Most often this was a display of personal skill and a group exercise rather than a competition; in Japan it became a ritual and meditative activity intended to promote proper thought among court elite and Shinto priests. Southeast Asians modified the ball into a feathered shuttlecock made by sticking chicken feathers into a small bamboo tube, kept in the air by competitors using wooden bats—which became the basis of modern badminton.

Chinese martial arts (wushu), originated as a means of hand-to-hand combat and mental discipline in war and by the medieval era had evolved into popular physical exercise and meditation, based in the rich wushu philosophical tradition. Wushu emphasized foot and leg kicking and tripping, hand strikes at various areas of the body, and throwing an opponent to the ground and gaining control by use of joint locks, tendon and muscle stretching, striking nerve points, and obstruction of breath or blood flow. Modern kung fu is wushu but adds tumbling and rigorous basic training skills to traditional styles.

There were three traditional wushu methods: internal and external styles, southern and northern styles, and Shaolin, Wudang, or Ermei. The latter were specific styles that developed among the medieval-era militant monks at the Shaolin Buddhist Temple in Henan province and at the Wudang Daoist temples in Hubei Province and the Ermei Daoist temples in Sichuan Province. Southern and northern styles also referenced points of origin, while internal and external distinguished whether the natural strength was from the torso and legs (internal, *qi*) or from the training of specific arm and leg muscles (external). Generally, wushu competitions and performance emphasized empty-hand forms, weapon forms, choreographed routines involving two or more people, group practices, sparring competitions, and power demonstrations (*qigong*).

Empty-hand combat was of the long-fist (*chang quan* and Shaolin styles) and southern-fist (*nan quan*, *Wudang*, and *Ermei*) types, which were external styles, and “spontaneous” shadowboxing or “ultimate fist” (*taiji quan*), “mind fist” (*xingyi quan*), and “eight-directions fist” (*bagua quan*) types, which were internal styles. There were also imitating styles, such as Praying Mantis, Eagle Claw, Monkey, Tiger, Leopard, Drunken, Duck, Snake, and Rooster. Wushu could include the use of 18 standard weapons (out of 400 medieval-era Chinese potentials): several broadswords, straight sword, spear, staff, Kwan sword, double swords, double straight swords, double hook swords, double-ended spear, nine-section whip,

rope dart, chained hammer, three-sectional staff, two-sectional staff, daggers, and double short staff.

Wushu training improved physical ability, health, and willpower and became an art form, a means of self-defense, and a competitive sport. Chinese wushu spread to Korea, where it influenced the development of Korean tae kwan do, which emphasized swift kicking techniques. In Japan it was called karate and stressed open-handed punching and kicking techniques as descended from southern Chinese boxing forms; judo, which emphasized throwing techniques derived from Chinese wrestling; and jujitsu, developed from Chinese *qinna*, the art of locking joints or muscles by knowing the pressure points and the body vulnerabilities of an opponent. Similar martial arts traditions developed widely in southern Asia, Southeast Asia, and Tibet. Medieval-era Thai and Burmese courts developed a style of boxing using both the feet as well as the hands.

EUROPE

BY AMY HACKNEY BLACKWELL

Medieval Europeans engaged in many recreational activities. Some of these activities, such as chess, backgammon, and horseshoes, were purely for fun. Others, such as archery contests and tournaments, served as practice for soldiers who needed to keep their skills sharp for battle. Almost all types could include a gambling component. The gambling that went with recreation caused numerous church officials and rulers to try to ban certain activities, efforts that almost always failed.

Medieval people enjoyed playing various casual games. In horseshoes, they would throw horseshoes at a stake, trying to hook the shoes on the stake. Bowls was similar to the modern Italian game called bocce; players would throw balls in an effort to reach a goal and prevent their opponents from reaching it. Skittles was a form of bowling in which players would roll a ball to knock down pins. Javelin throwing and hammer throwing were common tests of skill. Some people enjoyed participating in or watching footraces, horse races, and wrestling matches. There were also some team sports, such as the Irish game known as hurling, which is somewhat similar to lacrosse. Polo was popular in the Byzantine region throughout the medieval period.

An early form of chess seems to have first arrived in Europe in the 800s. The game was probably invented in India and traveled to Europe through the Islamic world. By 1000 it was common in Europe and was a popular game for the aristocracy. Knights enjoyed playing it because it involved battle strategy, but women also learned how. The modern European form of the game developed in Italy or Spain between 1200 and 1475.



A bone ice skate, Britain, 12th century (© Museum of London)

Dice games were extremely popular among all social classes throughout the medieval period. Some people even went to school to improve their skills at dice games. Simple dice games involved throwing dice in the hopes of achieving particular numbers, sometimes for money. The more complicated dice and board game called backgammon was extremely popular in France between the 11th and 13th centuries, and grew so all-consuming that King Louis IX (r. 1226–70) tried to ban the game in 1254. Despite his efforts, the game spread throughout Europe.

Playing cards seem to have first appeared in Europe in the late 1300s. The medieval deck, adapted from a deck created in China in the ninth century, was quite similar to the modern deck, with 52 cards and four suits. The cards for the queen and the knight, now called the jack, appeared in the 1400s. Card games became wildly popular throughout Europe during the late 1300s.

Golf appears to have been invented in the 1100s in Scotland and to have spread from there to the Netherlands. By the 1400s the game had elaborate rules and had already been outlawed in some places. The golf course at Saint Andrews in Scotland had an established route with 11 holes. Golfers would play these holes in order and then turn around and work their way back. The point of the medieval game was the same as the modern one. Golfers used clubs or bats to knock balls into holes in the ground. There is some evidence that medieval Europeans played other games with sticks and leather balls that had to be hit into targets. One example is the French game called mail, which involved a ball and a mallet and might be a predecessor of croquet and cricket. Tennis also existed in medieval times. Players used rackets to hit a ball back and forth in the air. Whoever missed the ball lost the point.

Animal baiting was a popular spectator sport. People would capture a fierce animal such as a bear or a badger, chain

it or trap it in a cage, and let dogs attack it. Onlookers would cheer and place bets on the participants. Both dogs and prey could be injured or killed in these events. Horse and chariot racing were well-liked sports in early medieval Europe, especially in southern and eastern Europe, where old Roman circuses still existed. In Constantinople, the Hippodrome was a central element of the city's social life. Huge crowds of people packed into the building to watch chariot races and bet on their favorite teams. The rivalry between the two main teams, the Blues and the Reds, infected the entire population of the city and occasionally led to riots or even civil wars, such as the major riots of 532. The Palio di Siena, an annual event in which horses race around the central piazza of the town, seems to have developed from annual horse races through the entire city in medieval times.

The nobility of medieval Europe loved to hunt. Nobles kept for themselves the right to hunt on the lands they owned, sometimes punishing severely any peasants who dared kill animals on their land. Both men and women hunted. Most hunting was done on horseback. Hunters used a variety of weapons, including bows and arrows, crossbows, spears, clubs, and even swords. Hunters carried horns that they used to communicate with one another while galloping across the countryside. Dogs ran with the hunters to track quarry and hold it at bay. Medieval hunters often carried birds of prey with them to help hunt. Medieval falconers would take months to train hawks and falcons to ride with humans and return to them with the prey they had flown out to capture. Hunters pursued a variety of animals, including deer, boars, and foxes. Hunting, like many medieval sports, was quite dangerous, and numerous hunters were killed or injured by falling off their horses, being accidentally shot, and by other misadventures.

Medieval people enjoyed watching and participating in archery contests. These contests tested the participants'

skill at hitting a target with an arrow shot from a bow. Targets could take various forms. One of the most popular was a narrow strip of wood called a wand. The wand was fairly long and positioned vertically, which made the competition especially challenging when wind was blowing. Some competitions resembled a game of golf with a course of different targets. Competitors would shoot at a target such as a flag, a wooden stake, or any other object that could receive arrows. They would then walk to the target, score their shots, and shoot at the next target from there. Sometimes people participated in team archery competitions that simulated battle conditions.

Tournaments, also called tourneys, were mock battles between groups of knights. These events served the double purpose of entertaining spectators and letting soldiers practice their military skills. In the early medieval period, tournaments consisted mainly of groups of soldiers fighting without much organization. They could be divided into two teams or they could simply all fight on their own. This chaotic early form of tournament was called a *melée* in French. The *melée* could be quite dangerous and even deadly because the soldiers used their actual weapons and fought without much in the way of rules or referees.

During the 11th century people began making rules for tournaments that made them somewhat less deadly to participants. A tournament might begin with the two teams on horseback, throwing javelins at one another and chasing one another down. The soldiers wore armor, carried shields, and often wore full-face helmets to protect themselves from the onslaught. After the teams finished throwing javelins, the teams would charge at one another, trying to knock their opponents off their horses with lances, and the soldiers would engage in hand-to-hand combat on horseback and on foot. Knights would capture one another for ransom. The fighting could go on for hours and sometimes covered a large area as the *melée* became less and less organized.

Medieval nobles held tournaments throughout the year except during Lent. Large tournaments attracted hundreds of knights and followers, who might travel for many miles to participate. Teams were generally formed according to loyalties, with the knights from the local area fighting for the home team and visitors from greater distances forming the opposition. Before and after the tournament the participants engaged in feasting and merrymaking, using the opportunity to socialize with people they rarely saw, to flirt, and to make alliances. The feast following the tournament was an occasion to present awards to the bravest and most successful participants.

Tournaments were immensely popular, but they also caused problems. Knights were frequently killed or injured.

They also tended to become drunk and disorderly and were known to rob people, destroy property, and generally cause mayhem. Because of this, several kings and popes in the 12th and 13th centuries tried to outlaw tournaments or at least to regulate them, restricting them to specific sites and requiring participants to use blunted weapons instead of their ordinary swords and knives.

By the beginning of the 14th century, tournaments had become less popular. They disappeared entirely by the end of the century, replaced by the more gentle jousting. Jousting was a competition in which two knights carrying long lances faced each other on horseback. They rode their horses at each other and each tried to knock the other to the ground with his lance. The knights participating in a joust often used weapons blunted for the purpose, such as lances with rings on their ends instead of sharp points. Jousting was still dangerous, but it was much safer and better organized than a *melée*. Like tournaments, jousts were major social events that attracted huge crowds and provided an occasion for feasting and socializing. Good jousts could win large amounts of money as prizes. Courtly love played an important part in jousts. Knights would solicit favors, gifts such as scarves, from the ladies they loved, and they would carry these items while jousting to show their loyalty.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In almost the entire medieval Islamic world there were people who took delight in playing sports and games and in competitions. Those who resisted the popularity of recreational activities seem to have been a minority. The pressure to raise children to bring honor to their families sometimes caused parents to restrict their children's lives to studying. Children who were precocious in memorizing the Koran brought prestige to their families; children who became good scholars earned praise for their parents. Both boys and girls could be raised without toys and without playing games inside or outside. Some medieval Muslim scholars thought this was bad for the children, arguing that play taught children valuable social and survival skills that they would be able to use in life outside schools and scholarly retreats. Those who held this view advocated allowing children to play. In most Muslim households play seems to have been encouraged, and toys and games were common.

Pleasure in competition seems to have been an essential part of the Arabian roots of Islam. Before Muhammad's time and after, when Arab tribes gathered, poetry competitions were held. These were not occasions of dry recitations by introverted poets. Instead, they were exuberant events

with much showmanship and audiences riveted by words and action. Audiences of poetry competitions hoped to learn some clever new phrases and compelling new images that they could later quote when home or among friends. Professional girl singers, who were often slaves chosen for their voices and dancing skills, were frequently the presenters of the new poems. Music could coincide with the singing and dancing. When Muslim armies conquered most of the Near East, they brought with them the Arabian love of poetry, and poetry competitions became common in their new lands. In the former Sassanian Empire, in particular, poetry competitions contributed to a renaissance for the Persian language as a literary language, and medieval Persian poems written for public presentation remain to this day popular among many Near Eastern readers.

Common outdoor toys included seesaws and balls for kicking. In much of the Near East even grown women continued to enjoy playing on seesaws, and ball games were popular among grownups of both genders as well as among children. The most popular ball game of them all may have been polo, because it combined two passions of medieval Muslims: horses and competition. Displays of horsemanship were common in the Near East, with riders exhibiting skills in maneuvering their horses and in the techniques used in hunting and in battle. Such displays could be put on as parts of festivals, tribal gatherings, or market days. Where polo began is disputed among historians, with good possibilities being China, Persia, and Afghanistan. By no later than the first century and possibly as early as the 500s B.C.E., polo was

played in Iran, and it is likely that Muslims learned the sport from the Sassanians. Another possible source is central Asia, where Chinese troops played the sport when the Muslims invaded the area. It would have been one of many cultural legacies the Islamic world would have absorbed from the Chinese. The word *polo* may have derived from *pulu*, Tibetan for “ball.”

Among the Sassanians, both men and women played polo, and this practice continued among Muslims. Among the Muslims of central Asia and the northern Near East, women were especially prominent in the sport. Among Turks and others from central Asia, both girls and boys learned to ride horses before they could walk, making polo a sport that was natural to their way of life. Muslims wrestled with the issue of whether it was proper for women to participate in any kind of sport. In general, the dress code of Islamic law was applied to both men and women competitors. Men had to be covered from their navels to their knees at all times, and women had to be more thoroughly covered. Even in places where polo was played extensively by women, the women wore robes that enveloped them completely below their necks, including their feet. Only their faces were exposed. Even though this must have been uncomfortable on hot days, women from queens to commoners participated in polo contests. Islamic law forbade women from playing sports with men.

Another popular sport was wrestling. It was common in North Africa and much of the Near East and was the favorite sport of Turks and others from central Asia. It was controver-



Glass gaming pieces, Islamic Egypt or Syria, 13th century (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA [M.2002.1.516a-c])

sial among Muslims because it tended to require men to be only semiclad and because it was associated in their thinking with the ancient Greeks, who were a pagan people whose sports carried pagan associations. Male wrestlers wore garments that covered them from their navels to their knees. Garments could include straps over the shoulders. Much is known of the history of wrestling among the Turkish peoples because their wrestling tradition continues to be very popular in Turkey. In medieval times wrestlers were often famous and admired for their athletic feats. Turkish wrestlers wore leather garments called *kisbets*; before they made contact with Greeks, they wrestled freestyle. After interacting with Greeks after the 1000s, they took to covering their bodies with olive oil, as had Greek wrestlers. To show their respect for each other, two wrestlers who were about to compete against each other would spread oil on each other. Among the variations of wrestling contests was one in which wrestlers would try to insert their arms under the straps of their opponents. There were no time limits, and contests could continue all day without a winner. Near Edirne in Turkey a wrestling tournament was established in 1362, perhaps because it was near a sultan's summer residence. The tournament is still held for three days each summer.

Among the games for which Muslims had a passion was chess. It was called *shatranj* in Arabic, probably deriving from Sanscrit's *chaturanga*, a term used for the traditional four divisions of an army in Hindu cultures. In India the game was played by four people seated at a square board on a table. Sometimes the table had the squares of the board inlaid into its surface. Iranians learned the game from Indians, and it was probably through them that the Islamic world acquired the game, carrying it across North Africa. It is likely that Europeans had already learned the game from the Sassanians. There were several versions of *shatranj* in the medieval Islamic world, but its general appearance would be familiar to modern players of chess. The contest was between two players. The board would have resembled those used today, and the pieces would have been arrayed similarly to those used in modern times, although the placement of the king varied from region to region.

The pieces in India were *raja*, *mantri*, *gajah*, *ashva*, *ratha*, and *padati*, meaning "king," "minister," "elephant," "horse," and "soldier," respectively. These pieces corresponded to the modern king, queen, bishop, knight, castle (or rook), and pawn. The term *rook* derived from Persian *rukh*. In Arabic the pieces became *shah*, *firz*, *al-phil*, *fars*, *ruhk*, and *baidaq*. The word *firz* referred to a sultan's vizier or chief minister. The conversion of the minister into the queen seems to have been a European innovation. In the game as played in the medieval Islamic world the *firz* (the queen piece) was notably

weak. It could move only one space diagonally. The *fars* (the bishop piece) could move only two spaces at a time diagonally. *Baidaqs* (pawns) could move only one space on their first move; upon reaching the far edge of the board, they could only change into *firzes*. Only in the late 1400s in Italy or Spain did pawns first acquire the ability to go two squares on their first moves and gain the maneuver of capture now called "en passant." The maneuver called "castling" was probably a later development.

In the medieval Islamic world the requirements for winning a game of *shatranj* varied from place to place and from time to time, but the idea of winning by checkmate had already developed in Iran. The word *checkmate* probably derived from the Persian phrase *shah mat*, roughly meaning "the king is at a loss," perhaps indicating that the king could not move. Chess games were used to reenact actual battles, and military officers typically were very skilled in the game. The idea of a real battle being reenacted is hard to picture with the traditional board and pieces, but archaeologists have uncovered numerous variations of the board in the Near East, including one with over 100 squares. Thus, it may have been that boards could vary enough to allow scope for reenacting a large battle. Further, the variations of rules regarding movements and requirements for victory may have developed out of the desire to reenact particular battles. Generals would sometimes set up boards and use chess pieces to show their sultans how a particular battle had progressed. The pieces themselves had been figures of people and animals in India, but during the medieval era Islamic pieces became abstract in order to avoid offending those who believed living things should not be depicted in figures.

A more controversial game was backgammon. This game appeared in the Near East in about 3000 B.C.E. The oldest boards known were discovered by archaeologists in Iran. They predate one found in Mesopotamia by about 200 years. Variations of the game were popular in the ancient Mesopotamian civilizations and in ancient Egypt, and it was likely already well known to Arabs before the era of Muhammad. The number of playing pieces, usually just stones, seems to have varied considerably. Although there probably were variations in the rules of the game, little of these rules survives before medieval Muslims wrote about the game. Just as Muslims published studies of the strategy of chess, they also published studies of the strategy of backgammon. Dice carved out of ivory, wood, seeds, or stone were used with the game. The dice were six-sided, looking much like modern backgammon dice. The controversial aspect of backgammon is that it was often used for gambling. Although gambling was forbidden by Islamic law, many medieval Muslims were avid gamblers, betting on athletic contests, horse or camel races, or animal

fighting matches as well as gambling with dice or playing cards. People even bet on who would win a chess match. In the case of backgammon, gamblers would agree beforehand on how much a point was worth, and they would play until a player won the game or until each player agreed to stop playing. There was no doubling die.

See also CHILDREN; CLOTHING AND FOOTWEAR; CRAFTS; DRAMA AND THEATER; FAMILY; FESTIVALS; FORESTS AND FORESTRY; HUNTING, FISHING, AND GATHERING; LITERATURE; MILITARY; MUSIC AND MUSICAL INSTRUMENTS; NUMBERS AND COUNTING; RELIGION AND COSMOLOGY; WEAPONRY AND ARMOR.

Asia and the Pacific

Excerpt from the Mahabharata (fifth century B.C.E. to fourth century C.E.)

BOOK 2: SABHA PARVA

Sakuni said,—O thou foremost of victorious persons, I will snatch (for thee) this prosperity of Yudhishtira, the son of Pandu, at the sight of which thou grieveest so. Therefore, O king, let Yudhishtira the son of Kunti be summoned. By throwing dice a skilful man, himself uninjured, may vanquish one that hath no skill. Know, O Bharata, that betting is my bow, the dice are my arrows, the marks on them my bow-string, and the dice-board my car.

Duryodhana said,—This Sukuni skilled at dice, is ready, O king, to snatch the prosperity of the son of Pandu by means of dice. It behoveth thee to give him permission. . . . Men of the most ancient times invented the use of dice. There is no destruction in it, nor is there any striking with, weapons. Let the words of Sakuni, therefore, be acceptable to thee, and let thy command be issued for the speedy construction of the assembly house. The door of heaven, leading us to such happiness, will be opened to us by gambling. Indeed, they that betake to gambling (with such aid) deserve such good fortune. The Pandavas then will become thy equals (instead of, as now, superiors); therefore, gamble thou with the Pandavas. . . .

Then king Dhritarashtra, possessed of learning, summoning Vidura the chief of his ministers, said:—Bring prince Yudhishtira here without loss of time. Let him come hither with his brothers, and behold his handsome assembly house of mine, furnished with countless jewels and gems, and costly beds and carpets, and let a friendly match at dice commence here. . . .

Vaisampayana said,—When the play commenced, all those kings with Dhritarashtra at their head took their seats in that assembly. And, O Bharata, Bhishma and Drona and Kripa and the high-souled Vidura with cheerless hearts sat behind. And those kings with leonine necks and endued with great energy took their seats

separately and in pairs upon many elevated seats of beautiful make and colour. And, O king, that mansion looked resplendent with those assembled kings like heaven itself with a conclave of the celestials of great good fortune. And they were all conversant with the Vedas and brave and of resplendent countenances. And, O great king, the friendly match at dice then commenced.

Yudhishtira said,—O king, this excellent wealth of pearls of great value, procured from the ocean by churning it (of old), so beautiful and decked with pure gold, this, O king, is my stake. What is thy counter stake, O great king,—the wealth with which thou wishest to play with me?

Duryodhana said,—I have many jewels and much wealth. But I am not vain of them. Win thou this stake.

Vaisampayana continued,—Then Sakuni, well-skilled at dice, took up the dice and (casting them) said unto Yudhishtira, Lo, I have won! . . .

Yudhishtira said,—Thou hast won this stake of me by unfair means. But be not so proud, O Sakuni. Let us play staking thousands upon thousands. I have many beautiful jars each full of a thousand Nishkas in my treasury, inexhaustible gold, and much silver and other minerals. This, O king, is the wealth with which I will stake with thee!

Vaisampayana continued,—Thus addressed, Sakuni said unto the chief of the perpetuators of the Kuru race, the eldest of the sons of Pandu, king Yudhishtira, of glory incapable of sustaining any diminution. Lo, I have won!

Vaisampayana said,—During the course of this gambling, certain to bring about utter ruin (on Yudhishtira), Vidura, that dispeller of all doubts, (addressing Dhritarashtra) said, O great king, O thou of the Bharata race, attend to what I say, although my words may not

be agreeable to thee, like medicine to one that is ill and about to breathe his last. When this Duryodhana of sinful mind had, immediately after his birth, cried discordantly like a jackal, it was well known that he had been ordained to bring about the destruction of the Bharata race. Know, O king, that he will be the cause of death of ye all. A jackal is living in thy house, O king, in the form of Duryodhana. Thou knowest it not in consequence of thy folly. Listen now to the words of the Poet (Sukra) which I will quote. They that collect honey (in mountains), having received what they seek, do not notice that they are about to fall. Ascending dangerous heights, abstracted in the pursuit of what they seek, they

fall down and meet with destruction. This Duryodhana also, maddened with the play at dice, like the collector of honey, abstracted in what he seeketh, marketh not the consequences. Making enemies of these great warriors, he beholdeth not the fall that is before him. It is known to thee, O thou of great wisdom, that amongst the Bhojas, they abandoned, for the good of the citizens a son that was unworthy of their race. The Andhakas, the Yadavas, and the Bhojas uniting together, abandoned Kansa.

From Kisari Mohan Ganguli, trans.,
The Mahabharata of Krishna-Dwaipayana
Vyasa, (Calcutta, India: Bharata Press,
1889–1896).

Europe

Statuta Armorum (Statutes of Arms, ca. 1260)

Here begin the Statutes of Arms.

At the request of the Earls and Barons and of the Chivalry of England, it is ordained and by our Lord the King commanded, that from henceforth none be so hardy, whether Earl, Baron, or other Knight, who shall go to the Tournament, to have more than three Esquires in Arms to serve him at the Tournament; and that every Esquire do bear a Cap of the Arms of his Lord, whom he shall serve that day, for Ensign.

And no Knight or Esquire serving at the Tournament, shall bear a sword pointed, or Dagger pointed, or Staff or Mace, but only a broad sword for tourneying. And all that bear Banners shall be armed with Mufflers and Cuishes, and Shoulder-Plates, and a Skull-cap, without more.

And if it happen that any Earl or Baron or other knight, do go against this statute, that such knight, by assent of all the Baronage, shall lose Horse and Harness, and abide in prison at the pleasure of our Lord Sir Edward the King's son, and Sir Edmund his brother, and the Earl of Gloucester, and the Earl of Lincoln. And the Esquire who shall be found offending against the statute here devised, in any point, shall lose Horse and Harness, and be imprisoned three years. And if any man shall cast a knight to the ground, except they who are armed for their Lord's service, the knight shall have his horse, and the offender shall be punished as the Esquires aforesaid.

And no son of a great lord, that is to say, of an Earl or Baron, shall have other armor than mufflers and cuishes, and Shoulder-Plates, and a skull-cap, without more; and shall not bear a dagger or sword pointed, nor mace, but only a broad sword. And if any be found who, in either of these points, shall offend against the statute, he shall lose his horse whereon he is mounted that day, and be imprisoned for one year.

And they who shall come to see the tournament, shall not be armed with any manner of armor, and shall bear no sword, or dagger, or staff, or mace, or stone, upon such forfeiture as in the case of Esquires aforesaid. And no groom or footman shall bear sword, or dagger, or staff, or stone; and if they be found offending, they shall be imprisoned for seven years.

And if any great lord or other keep a table, none shall bring there any Esquire but those who are wont to mess in their Lord's presence. And no King at Arms or Minstrels shall bear secret arms, nor any other besides their swords without points. And the Kings at Arms shall have their mantles without more, etc.

From: A. Luders, ed., *The Statutes of the Realm: Printed by Command of His Majesty King George the Third, in Pursuance of an Address of the House of Commons of Great Britain, From Original Records and Authentic Manuscripts*, 11 vols. (London: Record Commission, 1810–1828).

FURTHER READING

- John Marshall Carter, *Medieval Games: Sports and Recreations in Feudal Society* (Westport, Conn.: Greenwood Press, 1992).
- Stewart Culin, *Games of the North American Indian* (New York: Dover Publications, 1975).
- Donn F. Draeger, *The Weapons and Fighting Arts of Indonesia* (Rutland, Vt.: Tuttle, 2001).
- James E. Lindsay, "Entertainments," in his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- Horace Mann, "Sports, Games, and Recreation in Medieval Muslim Societies." Available online. URL: <http://www.sfusd.k12.ca.us/schwwww/sch618/Sports/Sports.html>. Downloaded on November 3, 2007.
- Eugene B. McCluney, "Lacrosse: The Combat of Spirit," *American Indian Quarterly* 1, no. 1 (1974): 34–42.
- Peter Nabokov, *Indian Running: Native American History and Tradition* (Santa Fe, N.M.: Ancient City Press, 1987).
- Joseph B. Oxendine, *American Indian Sports Heritage*, 2nd. ed. (Lincoln: University of Nebraska Press, 1995).
- David Parlett, *The Oxford History of Board Games* (New York: Oxford University Press, 1999).
- G. M. Wickens, "What the West Borrowed from the Middle East," in *Introduction to Islamic Civilization*, ed. R. M. Savory (New York: Cambridge University Press, 1976).
- Sally E. D. Wilkins, *Sports and Games of Medieval Cultures* (Westport, Conn.: Greenwood Press, 2002).

► storage and preservation

INTRODUCTION

During the medieval era people needed to store and preserve water, textiles, and food, including grains, root and other vegetables, fruits and meats. Continual access to good drinking water was always important, and storing it was vital in areas prone to droughts or those with little annual rainfall or with only seasonal rainfall. Textiles were vulnerable to decay, so preserving and storing them securely mattered, especially to people who could not afford much clothing or bedding. Depending on the environment, people in the medieval period needed to protect foods and textiles from moisture, which could lead to rotting of stored food and decay of fabrics, and from such pests as insects, worms, mice, rats, and squirrels.

For nomadic peoples storage containers were often limited to what could be carried. Burying items in the ground to be recovered later left the items vulnerable to worms. In places as far apart as Australia and southwestern Africa nomadic peoples relied on animal skins to transport water, and they dried or smoked meats to preserve them. Drying was a common way for people to preserve food, and it was used almost everywhere in the medieval world. The drying process usually involved setting out food such as grains and fruits in the sun. Once the moisture evaporated from the food, the food could be stored, sometimes for years, depending on

the dryness of the climate. Meats posed a problem because they were susceptible to rotting during the drying process. People often draped the meat over a spit above a smoky fire or hung the meat inside a smokehouse, often just a hut, in which a slow fire was kept burning. The smoking enhanced the flavor of the meat. This process was a life-and-death matter for people who depended on seasonal meat, as many fishermen did. They needed to have dried fish to help them survive during periods when seasonal fishes such as salmon were unavailable.

The storing of fish sometimes involved keeping the fish alive in ponds or shallow water. In East Africa fishermen sometimes would use netting or basketry to wall off tide pools in which they kept fish that they caught; the water could get in, but the fish could not get out. In the Americas people sometimes made storage ponds in which they kept live fish. A somewhat similar principle was at work for beef, mutton, pork, and other meats from livestock. Sometimes people followed herds such as reindeer in northern Siberia, but usually they directed the movements of their livestock. Whether following or directing their herds, people were in essence storing their meat on the hoof. Nomadic pastoralists were dependent on seasonal rains and open pastures to maintain their herds; settled peoples often kept their livestock fenced in on a particular plot of land and had to provide the animals with food. This led to the need to store and preserve animal feed such as hay.

To do so, people followed practices they used for storing grain safely. They usually built a granary. This was not always the case; for instance, many western and central Africans built huge jars set on the ground or into the ground for holding harvests. The most common granary was built above ground. For instance, the Japanese placed their granaries on stilts to make them difficult for mice and rats to reach. In some societies, granaries served the entire population of a village or town; in others, each farming family had its own granary. Often in medieval times governments took a strong interest in storing grain in an effort to ensure that there was enough stored to get the population through bad harvests.

The importance of water storage varied according to climate. In North Africa and the Near East large basins were maintained underground; water, sometimes directed by aqueducts or canals to a city, drained into the basins from which the water could be withdrawn. Southern Arabia had an ancient tradition of building dams to hold rainwater, enabling the people of Yemen, in particular, to develop a vigorous agricultural economy. During wars one side or the other might poison wells and other sources of water to prevent the enemy from having fresh sources of water. Ice from glaciers

could be used to preserve fresh fruits and vegetables in the course of shipping to markets. In some very dry places water would be left in caves and would vaporize so fast that the water temperature dropped faster than the water could evaporate, turning it into ice.

AFRICA

BY BRADLEY A. SKEEN

The agricultural revolution (ca. 10,000–8000 B.C.E) of the Neolithic marked the transition from hunting and gathering wild sources of food to agriculture based on the use of domesticated plants and animals. The reliance of the new farmers on a small number of food crops meant that large amounts of food in general could be reliably obtained only once a year at the harvest; therefore, it was necessary to store and preserve a year's worth of food. This was accomplished by developing several new technologies or new uses for existing technologies. The most basic of these was the granary. This is an architectural structure not fundamentally different from a house or barn. Its purpose was to store large amounts of grain in an enclosed, roofed-over space to protect it from the elements and from the intrusion of large animals, such as wild cattle, that might otherwise eat the grain as well as smaller vermin, such as rats, and, insofar as possible, insects. Of course, storing grain in a tightly enclosed space also created new risks, such as its destruction by molds or fungus if the granary was not kept dry and properly ventilated. Similar to granaries were storage buildings for fruits or vegetables (a larder) or for animal food, such as a hay barn.

Smaller amounts of grain and other foodstuffs, even cooked food for a short period of time, could be stored in woven baskets or ceramic pots. Surprisingly perhaps, the relatively simple technologies of basket weaving and pottery making seem not to have existed in earlier times to store gathered food but were developed as a result of the large surpluses of the agricultural revolution. The earliest pottery was made by joining together coils of clay, but soon the more sophisticated technique of throwing ceramics on a potter's wheel was developed. Most early homes consisted of one or very few rooms; pots and baskets full of food would simply have been stacked on the floor wherever it was convenient. Cooking would have been done at a detached oven away from the house. Separate rooms of the house with built-in ovens and specialized kitchens were a development of urban culture that did not become very widespread in Africa even as late as medieval times. Liquids such as water and wine (where it was available, such as in Egypt and Ethiopia) or palm wine frequently were stored in leather bags. The use of leather and basketry for storage, however, usually has to be deduced from

later practices, since these perishable substances rarely show up in the archaeological record.

Egypt was the wealthiest grain-producing region in the world. Because of the fertilizing effect of the annual inundation of the Nile, crops in Egypt generally returned 20 times as much grain as had been planted, compared with returns of 2:1 to 7:1 for most of the rest of the world. Because of this abundance, the country was filled with granaries, from small structures owned by individual farmers through larger structures belonging to great landowners (including temples), with the largest facilities owned by the state used to regulate the grain supply of the whole country and build up surpluses against times of famine. Granaries also existed throughout Egyptian cities to store grain about to be processed into food products for urban dwellers. By late Roman times large granaries also existed in the capital city of Alexandria and other ports to store grain before transport overseas, since Egyptian grain was especially important to supply the large populations of the Roman capitals of Rome and Constantinople.

In the last century and a half before the Arab conquest, Egypt participated fully in the commercial network of the Roman Empire. This means that the main form of storage used in the country (as well as in the rest of Roman North Africa) was the amphora. These were large ceramic jugs made in standard sizes ranging from about 20 to more than 40 inches in length, with long, thin necks and relatively slender bodies tapering to a point on the bottom. They were fashioned with two handles mounted between the neck and body of the jar and could be fitted with a lid. Amphorae were generally mass-produced in industrial-scale workshops. Because of the pointed bottom, they could not stand up by themselves, but because the amphorae were standardized in size for storage, every house and other building that needed amphorae had racks specially built in to hold them. The racks consisted of a wooden or ceramic framework supporting two loops of unequal size that would hold the amphorae in much the same way a modern-day test-tube rack supports its contents. These racks existed not only in buildings but also on ships, since almost all commodities were shipped inside amphorae.

Amphorae held not only grain and other foodstuffs but also salt, oil, water, wine, honey, and almost every other conceivable product, including items like nails. Vendors in markets would naturally store their foodstuffs in amphorae. Taverns stored stews and other cooked foods in racks of amphorae for sale to day laborers and others who could not follow the usual custom of returning home for lunch. Because the infrastructure for the production of amphorae broke down after the Arab conquests and the collapse of the Western Roman Empire, the amphora was quickly replaced by other forms of storage in the seventh and eighth centuries.

Baskets also were used as a common means of storage in late Roman Egypt, probably mostly in households and by small shopkeepers. Basket weaving was a specialized profession, if a very humble one. It was considered decorous for Christian monks who had dedicated themselves to a life of poverty to make and sell baskets as a way to earn the small amounts of money they needed to buy the food with which they infrequently broke their fasts.

Before the Arab conquest the Nubian peoples of the upper Nile (Sudan) enjoyed the same level of storage technology as Egypt, although they did not use the amphora system (though many amphorae entered Nubian and even Ethiopia through commerce). Very high-quality pottery was produced locally using the wheel and was fired in brick kilns. Basketry was also made out of local palm fibers and grasses. A bronze bowl from Kerna made in the period of the kingdom of Meroë (which ended in about 350 C.E.) shows that ceramic jugs were used in milking cattle. (Interestingly, some of the jugs depicted bear decoration meant to make them resemble woven baskets, suggesting, perhaps that ceramic ware was sometimes used to replace basketry in certain functions—though baskets could most likely never held milk.) Although this piece dates from just before the Middle Ages, there is no reason to think that practice changed substantially before the Arab conquest.

Medieval Ethiopia had large urban centers, especially Axum in the early period, and must have had a very sophisticated technology for agricultural storage, but very little in this way has been clarified so far by archaeological research. However, given that wine was fermented locally in rock-cut vats carved out of stone outcroppings, it is likely that Ethiopians turned their remarkable stoneworking skills to making granaries that have not yet been identified as such. The quality of Egyptian pottery was remarkably good, considering that it was coil made without the potter's wheel.

About 9000 B.C.E. the agricultural revolution became widespread among the peoples of the Sahara, which was then a far wetter environment than it is today. The technology to store agricultural produce moved south with agriculture itself and reached almost all of Africa (except for those few tribes that maintained a hunter-gatherer way of life) by the Middle Ages. The ancient town of Nok in central Nigeria seems to have been a point of transition for many technologies that were developed (or at least existed) in the Neolithic Sahara (although Nok itself was abandoned around 200 C.E.). Nok seems to have been the point of origin for the spread of basketry and ceramics to much of sub-Saharan Africa. The pottery types current in Nok in the Middle Ages were hand-made from clay coils without the potter's wheel. The quality of ceramic wares at Nok was nevertheless very high. Pots were

made in a variety of shapes and were often decorated with painted patterns or impressed textures.

Pottery of the same type and quality spread throughout western Africa during the Middle Ages. By about 1000 C.E. sophisticated coil pottery making had spread into central and southern Africa, though in many areas inferior wares were produced and always with considerable local variation. Most often pots were clamp-fired; that is, they were hardened in an open bonfire rather than in a kiln. Even the civilization of Great Zimbabwe, notable for its stone-coursed walls, did not use any significantly different pottery-making techniques. However, the people of Great Zimbabwe manufactured large numbers of vessels equivalent in size, shape, and use to clay pots, but carved out of soapstone, a soft mineral native to the area.

Granaries used in Sub-Saharan Africa in the early colonial period (postmedieval) were usually made of perishable materials, either unfired mud bricks or timber products, including thatch. The chances of finding such structures from the medieval period are slight, although there is little reason to think they were not in use.

THE AMERICAS

BY MICHAEL J. O'NEAL

Medieval Americans had to store and preserve three primary resources without the benefit of modern refrigeration and materials such as plastic. One was fresh water for drinking and cooking, and often this water had to be preserved through dry seasons and periods of drought. A second was seeds to be used for the following year's planting of crops. The third was food, in the form of short-term storage in the household and longer-term storage for the community as a whole. Their adversaries in storing these vital resources were temperature, moisture, pests (insects and rodents), and microorganisms that produced rot, spoilage, and molds.

Medieval Americans preserved food in ways similar to their ancient ancestors. A common method was drying. Drying food reduces the moisture content that fosters the growth of microorganisms. Meat, for example, was cut into thin slices and dried on racks in the sun or over a fire, similarly to modern-day jerky. Vegetables, too, could be dried and then, throughout the winter months, be rehydrated by adding them to soups and stew or simply soaking them in water.

Smoking had an effect similar to drying. Meats were placed in sealed huts, where a smoky fire was kept burning, preferably using chips of hardwood, which burn hotter than such woods as pine and can be kept smoldering without open flames. This process also reduced the moisture content of the meat so that it would keep for many months, and substances

from the smoke itself discouraged the growth of microorganisms. The smoke also added flavor to the meat.

Those who lived in cold climates were able to take advantage of freezing temperatures to preserve meat. In the Arctic north, hunters harvested sea mammals such as seals and then froze the meat until it was ready to be consumed, when it could be thawed over a fire. In the southern Andes of South America, people used a freeze-drying technique to preserve such foods as potatoes. They sliced the potatoes and laid them out to freeze. Freezing reduced the moisture content; the potatoes could be reconstituted by cooking or soaking in water. In less frigid regions, such as Canada and much of North America, deer, bison, and other game animals were harvested late in the autumn and frozen over the winter months. The same technique could be used to preserve fish. Native Americans also preserved meat in the form of pemmican, a mixture of meat, berries, and fat.

In storing vegetable seeds, humidity could be a major obstacle. Native Americans in the desert regions of the American Southwest and Mesoamerica were able to store maize (corn) seeds for up to three years because the air was dry. In contrast, the climate of the Yucatán Peninsula was much more humid, so seeds could be stored for only a year.

The most common method of storage at the household level used pots and baskets. Throughout the Americas, people—usually but not always women—wove baskets out of materials at hand. In the north, for example, baskets were made of such materials as grasses, ash, and birch bark. Those in the Northwest relied on swamp grasses, cedar bark, and spruce roots, while those in California wove baskets of sumac, yucca, and willow. Open-weave baskets were lighter and could be used for such purposes as gathering firewood. Such baskets were also useful for fish and clams because the openings in the weave allowed excess water to run out. More tightly woven baskets, on the other hand, were more suitable for storing seeds and nuts.

In addition to basketry, Native Americans became accomplished potters, particularly as cultures became more sedentary and adopted agricultural ways of life. These pots, often clay-fired but sometimes not, were used to store seeds, nuts, acorns, beans, rice, and similar dry items. Many of these ceramic pots, especially in the Mayan culture, were highly decorated with paintings and hieroglyphic texts. Pots sealed with some type of resin were used to store water, although the Maya of the Yucatán Peninsula in Mexico stored water in reservoirs in the ground. After digging holes, they plastered the bottoms to prevent water from running out the porous limestone bottoms. These reservoirs could hold enough water to last up to 18 months during periods of little or no rain.



Ceramic vessel in the shape of a jaguar, Maya culture, Mexico, ca. 950–1200 (Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 236335])

A considerable amount of food storage and preservation took place at the household level. However, in more complex cultures, communal storage of foodstuffs was more the norm, particularly in the larger cities. For example, among the mound-building cultures of the Mississippi River valley, including the Cahokia culture in the region around modern-day Illinois, large granaries were built on the mounds. Similarly, the more highly developed cultures of Mesoamerica and the Inca of South America constructed communal granaries.

A good example is the Paquimé culture. Paquimé, in northern Mexico, was the center of the Casas Grandes culture for some 300 years. It attained the height of its power around the 13th century, and the city may have reached a population of 10,000. Archaeologists have found granary systems in the northern Sierra Madres and at other sites with such names as Schoolhouse Point Mound, Punkin Center, Canyon Creek, as well as in the San Pedro Valley, parts of Arizona, and the Mimbres region of southwestern New Mexico. Many of these granaries are still well preserved.

With respect to Mesoamerica, archaeologists are divided over the question of whether kivas at Chaco, which flourished from about 650 to 1130, were used as granaries. Usually, kivas, or round, underground buildings, have been regarded as strictly ceremonial and cultural centers. Some archaeologists believe that many of these kivas were used for long-term grain storage, specifically for maize. Put differently, they argue that the kivas, in addition to having a ceremonial and religious

function, were put to a variety of uses depending on longer-term needs. During periods of prolonged drought, the most critical of those needs was storage of grain.

A major piece of evidence supporting this view is the ventilation systems built into the kivas. This ventilation could control humidity levels and provide air circulation. They also supplied air to the fireplace hearth. Evidence also shows that substances in the wood that was burned, specifically tannins, functioned to preserve the grain from rodents, mildew, molds, and insects. Because the humidity level has to be below 12 percent for corn not to develop mold, the builders of the kivas may have included latticework floors that allowed circulation of warm, dry air. Interestingly, the people had no tools for measuring humidity, but modern-day evidence, in the form of people who use the same techniques, suggests that they somehow just knew when the humidity level was correct. Additionally, the hearth and ventilation systems introduced carbon monoxide into the air. Carbon monoxide is an effective pesticide that has no effect on the food being stored. Very small quantities of charcoal briquettes provided ten times the amount of carbon monoxide needed to eradicate pests.

Again, the notion that kivas were used for grain storage flies in the face of conventional belief—that they were used strictly for religious and ceremonial purposes. Archaeologists who argue otherwise suggest that the religious-ceremonial purposes became predominant only later, after the culture turned away from the storage of surplus grain to more of a subsistence form of agriculture. As the structures were left empty, they were converted to other uses. The archaeologists who take this view also note that throughout the world religious structures are generally (but not always) not round but that granaries almost always are round—just as kivas are. Further, they point to the existence of other structures that clearly were used for religious and ceremonial purposes, suggesting that the kivas had other uses. Another bit of evidence is that the Paquimé kivas are set in rows, similar to the rows of grain-storage facilities throughout Mesoamerica and in other parts of the world.

One way of preserving fish for human consumption is to keep them alive until they are needed. Archaeological evidence suggests that this may have been a common practice in the Bolivian Amazon region of South America. There, archaeologists have found the remains of earthworks that suggest not only a high degree of building and engineering skill but also the ability to convert a poor environment into one that may have supported a larger population than it has in modern times.

In the flat, seasonally flooded Baures region of Bolivia, scientists have found an immense network of artificial earthworks. These earthworks cover an area of 326 square miles.

All of them are interconnected in a zigzag pattern. These structures functioned as fish weirs, or traps. During periods of seasonal flooding the weirs trapped fish that migrated and spawned in the flooded area. These weirs, along with artificial ponds, amounted to a system of aquaculture. They were easily managed and provided the people with a rich source of food high in protein.

The weirs measured about 3 to 6 feet in width. Their height ran from 7 to 20 inches. Every 30 to 100 feet the weirs changed directions. At the places where the structures formed sharp angles, 3- to 6-foot-long openings in the shape of a funnel directed fish into nearby ponds that measured some 90 feet in diameter, where they could be harvested as needed. The Bolivian fish-storage systems are fundamentally different from other such systems throughout the Americas. Generally, such systems of weirs were temporary. They were built on permanent bodies of water and then rebuilt when necessary, usually each year. The Bolivian system was just the opposite: The system of weirs was permanent, but the water was seasonal. The zigzag pattern, while not unique, was denser and more complicated than that of other fish weirs. The structures were abandoned in roughly 1700.

ASIA AND THE PACIFIC

BY MARK W. ALLEN

Archaeologists frequently note that the development of sedentary societies in the past was closely linked to the development of storage and preservation technology. Indeed, one of the key differences between agriculturalists and hunter-gatherers is that the latter usually do not store large quantities of food. An intensive agricultural system that produces vast surpluses absolutely depends on effective ways to store and preserve food. Asia during medieval times was nearly everywhere dependent on large-scale agricultural production of rice, wheat, millet, and other crops. Domesticated animals provided protein. These products were produced through high investments of labor, such as irrigation, fertilization, multicropping, and plowing. Over thousands of years a number of food-preparation techniques and technologies evolved to ensure that bountiful harvests of food or drink did not go to waste. They could be set aside for lean times, to be reinvested in supporting armies or other large groups such as workers or craftspeople or used to trade for other commodities.

In the Pacific islands agriculture was generally less intense. It relied mainly on root crops and arboriculture. Irrigation was rare, and most gardening was done with simple digging sticks. Nevertheless, sometimes large surpluses were produced both for food and as political capital to be expended at the right time. Storage and preservation was indeed central

to this cultural area, as foods had to survive transplantation across vast ocean distances via double-hull voyaging canoes such as those of the Polynesians.

Asian agriculturalists, like nearly all early agriculturalists, were heavily reliant on one key storage technology—ceramics. Pottery is often a good archaeological indicator of at least some degree of agriculture. It is crucial for storing grains and other crops because it seals and protects food from pests, moisture, and dryness far better than basketry. Jars are typically used as storage containers, while bowls often are used for food preparation or presentation. Medieval Asian ceramic technologies, particularly those of China, produced some of the finest examples of porcelain ever made (used for storage and other functional purposes but often most important as a status good or for trade). In southern Asia areas such as India produced a wide variety of different kinds of pottery to be used for particular kinds of food or liquid storage. Storage facilities, such as granaries and silos, also were used in areas with production of grain such as wheat and millet. Such crops usually were ground into flour to increase their longevity.

Food and drink were also preserved through natural processes augmented with cultural techniques and technologies. In Asia one of the key ways to preserve food and drink was to use fermentation—the natural decay of sugars and carbohydrates into acids and alcohols in anaerobic (without oxygen) environments. Numerous alcoholic beverages were produced through fermentation in medieval Asia, including rice wine. Soy sauce and other similar liquids were also made through fermentation. Fruits and vegetables were preserved by specialists through this process, producing a wide variety of pickled foods. Korean kimchi, or fermented vegetables, is a good example, but there were literally hundreds more types of such preserved foods. Fermented dairy products, such as yogurt, were common in central Asia and India. Grains were fermented with yeasts to produce various forms of bread in many areas. There were other ways to preserve food as well, such as the Chinese method for preserving eggs by coating their shells with salt and ash (though it turns them into blue jelly). Salt was used to preserve meat, fish, and other foods. In short, there was a diverse set of techniques to preserve food and liquid in medieval Asia.

Another key form of Asian storage was the use of large, stone-lined reservoirs to store the monsoon rains in Southeast Asia for use during the dry season. This was an absolutely critical resource for this area, as can be seen by their vast numbers and sizes in the ruins of medieval towns and cities in present-day Cambodia, Thailand, and Vietnam. Such reservoirs often were regarded as the property of rulers or the priestly classes and were viewed as sacred parts of the landscape, particularly within Hindu cultural areas.

When the first ocean voyagers left the relative safety of island Southeast Asia and New Guinea and headed east to explore and colonize faraway islands, their canoes were loaded with stored water and food (for the voyage and for transplanting crops to new islands). Some such voyages covered more than a few thousand miles and lasted several weeks at least. The major period of long-distance exploration and colonization in the Pacific corresponds fairly well to the medieval period, though it began a few centuries before 500 C.E. Micronesians and Polynesians spread out to find and colonize nearly every habitable island in the Pacific Ocean. They relied heavily on technology and knowledge to accomplish this. Double-hulled canoes could be at sea for more than a month with enough provisions and people to begin a new colony on some new island. This meant, of course, that they needed food for the voyage and crops to plant on new islands—they brought their economy with them.

The foods they carried, however, were quite different from those of mainland Asia. They relied mainly on tropical root crops (sweet potato, taro, yams) and arboriculture (coconut, breadfruit, bananas). Some foods for these voyages would be dried or smoked, such as fish and pork. Such products could be stored for months, perfect for long voyages. As in Asia, fruits and other plants in the Pacific often were fermented to last long periods of time.

Another interesting difference from Asia is that for the most part Pacific islanders eventually quit making ceramics for both storage and cooking vessels. They instead turned to wooden containers for storage and serving food and earth ovens for cooking. In addition, Pacific islanders had a fairly wide variety of storage facilities (such as store houses, pits, and racks). In Melanesia elaborate “yam houses” were constructed to house harvested tubers; they were often named and decorated and were considered very much a prestige symbol when jammed full of yams. The yams were adorned with woven masks and were often nearly anthropomorphic. Such storage facilities usually were mounted on poles or stilts to help keep rodents and other pests out of the food supply.

In many islands breadfruit was stored for months or even years. This is a tree crop rich in starches, so when it is placed in pits in the ground the fruit ferments into a paste. Reportedly, it is edible for more than 30 years. Polynesians often stored breadfruit as a backup in case other foods failed. Usually the islands were kind to people, for they provided nearly limitless tree crops, fish, and good gardening locations. On the other hand, catastrophes such as storms, tsunamis, or volcanic eruptions were a very real threat. Any of these natural disasters could wipe out an entire economic system in a matter of minutes. Stored breadfruit was the key insurance for such scenarios.

Perhaps the most involved storage facilities of the Pacific were elaborate covered pits in the Polynesian islands of New Zealand. The Maori (the indigenous Polynesians of New Zealand) were faced with a major problem, since their rugged islands were far south of the equator. Frosty winters and poor soil conditions nearly prevented the successful establishment of the traditional Pacific tree and root crops. The Maori adapted to this by focusing on hunting and gathering and fishing for several hundred years. Around 1500, however, a new storage technology developed that allowed the spread of sweet potatoes to the extent that they became an important food source. Tubers were stored on racks inside subterranean pits covered by insulated roof structures that gave protection from frost and cold winter rains. Drainage ditches were dug around the pits to channel runoff water away from the stored food, since moisture could quickly destroy them. These spread quickly, and the visitor to New Zealand can still see the archaeological remains of pits scattered across the landscape in former gardening areas. The reliability of the storage pits allowed the sweet potato to become an extremely important status food that symbolized productive lands and people. The Maori also smoked and dried fish, birds, and freshwater eels. Airtight gourds were used to seal in some foods such as salted birds for long-term storage.

Of course, there is one more important storage system in the Pacific islands. This one, however, is natural rather than cultural. The coconut was widely available across the vast ocean, as it readily survives long periods of time in the sea. Once washed up on a beach, new trees sprout. Pacific islanders could usually count on finding coconuts on most islands (except New Zealand, which was too cold). The coconut can store its milk and “meat” for long periods of time. It is truly one of the most important foods of the Pacific.

EUROPE

BY CHARLES W. ABBOTT

Food storage is crucial for human communities. Bread (or some form of porridge) was the staple food over much of Europe, yet field crops were harvested once a year. Fruit harvests were similarly concentrated, and vegetables were in season only periodically. All of these products could be eaten outside limited times of harvest abundance only if they could be preserved and stored. With grains this was a matter of the utmost importance, since for the average person they provided most dietary calories throughout the year.

Animals and animal products presented similar challenges. In theory animals might be maintained alive until needed, storing meat “on the hoof” until it was harvested by slaughter for consumer needs. In practice, this could not be

fully carried out: There simply was not enough forage to sustain all animals through the winter. Thus the need to preserve crops was partially paralleled by the need to preserve meat. The only perishable items for which storage was not necessarily a problem were animal products that yielded at constant rates, such as milk and eggs. Even with these items, storage and preservation were still desirable for transportation and marketing. Fluid milk was so bulky, unwieldy, and perishable that it could be marketed only within a narrow radius of its production. Cheese and butter were more valuable by weight, kept longer, and existed in more transportable form.

Medieval Europe was a land without modern refrigeration, preservatives, or pest control. Glass was a luxury product and steel a semiprecious metal; hermetically sealed containers had not been invented (modern canning was finally pioneered during the Napoleonic Wars). The preferred containers for many products were wooden barrels or clay-fired pots and jars. Without the availability of modern methods and materials, a variety of simple techniques were used to preserve and store food. Many of the practices predated medieval times. Technologies were generally folk technologies, practiced when necessary by the average household. Certain techniques were limited to artisans—some were craft skills in the hand of experts; others were specialties arising from the division of labor and the concentration of inputs in a limited number of hands. (Fish preservation, for example, was done by specialists soon after the catch was landed in coastal settlements.)

The most common techniques for preservation were few in number and elementary in concept: drying, curing with salt (sometimes combined with smoking), pickling, and sweetening. The goal of each is to alter the food’s vulnerability to spoilage by making it less hospitable to the growth of destructive microorganisms (such as bacteria or molds), which would make food inedible. Drying does this by lowering the moisture content and salting by making moisture unavailable. Smoking was combined with salting, and it facilitates moisture reduction and adds chemical resins and flavors. Pickling makes food too acid for decay; the addition of sugars reduces available moisture and makes it too sweet. A few foods were preserved through the opposite technique: controlled spoilage. This involves facilitating the progression of biological changes known to preserve edibility (such as the fermentation of grape juice or a starchy water mix to produce wine or beer or the fermentation of milk curd to produce cheese).

Drying was by far the most common technique and the one used for most vegetable products low in protein, such as grains, legumes, many fruits, and herbs. Sunshine on a warm, dry day was the preferred drying source when possible for

bulk crops; barns were used to ward off moisture and preserve and extend the drying process. Small items in regular use, such as herbs, could be hung from the rafters of houses. The drying of higher-value goods was also pursued in a more determined manner through the use of ovens and kilns. Fruits were cut into thin slices to aid drying.

If drying was the technique for products low in protein, salt curing (sometimes combined with smoking) was the technique for meat. Much of medieval Europe walked a tight-rope between three simultaneous shortages: grain for people, forage for animals, and animal traction to draw the plow. The forage constraint appeared quickly at the onset of winter, when animals could no longer be fed on green pastures on the outskirts of the village but were turned out to graze on crop stubble. The response was to slaughter all excess animals so that an adequate core of the best ones could be fed till spring arrived and the forage constraint was eased.

The best and most robust technique was to salt meat to the point that it was inedible for people (for also for bacteria). One common mixture, Ann Hagen found, was salt, bay

salt (an inferior salt variety with many impurities), saltpeter, honey, and black pepper. The meat would later have the excess salt soaked out of it before it was cooked and served. Smoking was a supplementary technique using with salt curing; the burning of certain types of wood added flavor and beneficial chemicals. Similar techniques were used to preserve ocean-caught fish in large quantities in the vicinities where it was landed. Fish was cleaned, sliced open, salted, and then dried on special racks in the open air, exposed to wind and sun.

Pickling was primarily used for such products as cabbage; in actuality, the sugars in cabbage ferment and produce vinegar, which is acidic and contributes to preservation. Sweetening fruits to produce items such as jams and jellies was constrained by the low supply of sugar (which was an expensive imported good that was treated more like a spice) and the relatively small amounts of honey (the most common source of sweetener) available to the average household. A common technique was to boil fruits down to concentrate them in their own sugars, later adding honey.

Milk was a versatile product and apparently a larger source of protein than meat for the average person. Milk could be drunk fresh or made into yogurt. The cream was often skimmed off and made into butter. Milk could also be kept until it curdled—the whey was then drunk separately, and the curds were used to make cheese. Cheese making was typically performed at the household level; its production requires simply milk and rennet (derived from cow stomachs) to speed and complete fermentation. It is thought that the consumption of aged cheese was a good marker of affluence: The poorer a family was, the fresher the cheese they ate. This is consistent with our knowledge of the production of high-quality cheeses by monasteries.

Storage buildings such as barns were used to hold large amounts of products such as grain and legumes. Wheat was sometimes stored in barns while still in sheaves; beans and peas were usually threshed first. The cellars of houses (if available), root cellars, and various types of pits in the ground (covered with earth and straw) were used to store products when the primary concern was the achievement of a low, predictable temperature. Turnips were stored in this way. Flour, once milled from grain, could be stored in chests or bins that were relatively secure from vermin. Cats were kept to reduce the rodent population.

An overarching technique was also watchfulness—an attitude of vigilance and periodic inspection to detect spoilage in its early stages or pest infestation. Monasteries and lords maintained institutional stores where a steward was responsible for monitoring supplies to detect incipient spoilage. When it was discovered, the impacts of spoilage often could be minimized by disposing of the bad portions before



Red clay jar with green and blue glaze used to store hazardous or precious ingredients, Beauvais, France, ca. 1500 (© Museum of London)

contamination spread. Peasant households were crowded with household stores. Various products would hang from rafters—not just herbs but sausages and fresh cheeses tied up with string and yet to be consumed. Crocks of pickled products and jars would line the walls or be half-buried in the dirt floor. Livestock were sometimes kept inside at night to warm the building and guard against pilferage.

Barrels were the preferred container for wet goods, and they often stored wine at the beginning of their storage life. When beer was made in large quantities (rather than at home), barrels were used to store it and also to transport it if it was not to be sold on the brewing premises. Crocks with well-constructed lids could serve as something close to an airtight environment when sealed with vegetable oil or clarified butter.

Salt was required in large quantities; it was used to cure meat and in cheese and butter making. It extended the life of butter. The exact role of spices in the medieval diet continues to be debated, but some beliefs that were previously conventional wisdom are now questioned. For example, historiography long stressed Europe's craving for exotic spices brought from the Middle East or farther afield through the spice trade. It was asserted that pepper was in high popular demand in Europe partly in order to mask the taste of spoiled meat. This claim is now questioned, though it is yet to be conclusively debunked.

It is difficult to find much evidence of technical progress in storage and preservation during the period. Agriculture was revolutionized by the horse collar, the horse shoe, the three-field system, and the heavy plow, but progress in storage and preservation was minimal. It may be that food technology improvements in medieval Europe were in production, milling, and transport rather than in techniques of storage and preservation.

A robust finding of economic historians is that the interest rates were shockingly high in the High Middle Ages. We can see this trend directly in financial records but also indirectly in the monthly increments in the price of grain after harvest time had passed. Researchers have noted that civic leaders and households struggled endlessly to build up stores of grain and other supplies as insurance against crop failure and disruptions in trade, because society as a whole lived very close to crop failure and hunger if not famine.

THE ISLAMIC WORLD

BY AMY HACKNEY BLACKWELL

The inhabitants of the medieval Islamic world had to be able to store food for long periods of time. Fresh foods were available for only short times every year, right after harvests; in or-

der to have food for the rest of the year, people had to be able to preserve fresh items. They also needed convenient foods that could easily be carried and eaten on journeys. Most preservation techniques involved drying, which took advantage of the climate of much of the region.

Legumes were the main source of protein for people throughout the Islamic world. Every year farmers would grow chickpeas, lentils, split peas, fava beans, and other pulses. These were almost all preserved by drying. After harvest people would spread their legumes on cloths in the sun, which would quickly dry them rock hard. Dried beans would keep for months or even years as long as they were kept away from moisture. People stored them in cloth sacks, baskets, or earthenware jars.

Dried fruits were essential to the Islamic diet. People took fruits such as apricots, grapes, and plums and laid them on cloths in the sun. The resulting dried fruits would keep for months as long as they stayed dry. Salted dried lemons were an essential flavoring to many Arabic dishes. Herbs were perfect material for drying. People collected wild herbs from the countryside or picked them from their own gardens and hung them up in bunches until they were dry.

Dates were a staple food because they were nutritious, cheap, edible to both humans and camels, easy to eat and transport, and readily preserved. Although people ate fresh dates when they were available during the harvest season, for the rest of the year dried dates were essential. Dried dates were so important in some areas that people used them to pay taxes or make charitable contributions as required by Islamic law. Some dates were harvested by hand and dried on the ground. Other dates were left on the tree until the full crop had ripened and dried somewhat, and then the entire growth of fruits and branches would be cut off at once. Sometimes dates were dried individually, harvested, and placed carefully so that they would not be crushed and their skins would remain intact. Ideally, the skins would remain dry and not become sticky with juice from inside the fruit.

Different species of dates had different properties when dried; some kept their shapes better than others. Flesh texture could be soft and syrupy or stringy. To make pressed dates, growers would fill rectangular sacks or baskets woven from date palm leaves with fresh dates. The sacks or baskets would be stacked inside a date press. About 4 to 5 percent of the dates' mass would come out in the form of liquid date syrup, which was a desirable product in its own right. The rest of the dates would be drier and have a higher sugar concentration than fresh dates, between 70 and 85 percent. This sugar concentration helped preserve the dates, which could stay edible for over a year. This process produced food that both humans and camels could eat.



Luster-painted pottery jar, Syria, late 13th century; this jar is thought to have been used for storage and not decoration. (© The Trustees of the British Museum)

Grains such as wheat and barley were a major source of calories. Grain left in seed form did not always keep well, so people devised ways of preserving it by precooking and drying it. These methods had the advantage of creating foods that functioned much like modern instant cereals. One simple method of preserving grains was to toast them in a dry skillet and then grind them into powder. Often people would add spices to the mill to create spiced flour. This could be mixed with water and olive oil to make lumps that could be eaten on the fly, while working or traveling. It could also be made into a drink.

Bulgur was a cereal made from dried wheat, usually durum wheat. The process of making bulgur simultaneously preserved the wheat and precooked it, making it into a sort of instant cereal. Women generally made bulgur once a year, after the wheat harvest. This was often something of a festive event in medieval towns. The women of a town would go out to a special mill in the countryside with many sacks of wheat and would boil the kernels until they were swollen. They would then spread them in the sun to dry, often using flat rooftops for this purpose. Once the kernels were dry, they

would grind them in the mill. They would then use a series of sieves to separate the bulgur by grain size. They would use the larger grains in soups and pilafs and the smaller grains for stuffing vegetables and in salads. Properly prepared bulgur would keep for months and made a very convenient foodstuff that could be stored easily in a dry location and also carried on trips.

Couscous was another type of dried wheat cereal. It was the staple foodstuff in much of North Africa starting around the 11th or 12th century. By the 13th century it was known throughout the Mediterranean region and in the Levant. Couscous usually was made with durum wheat, though it could also be made from millet or barley. Ground durum wheat, or semolina, does not keep well in warm weather, quickly growing moldy or attracting weevils, so people had to come up with a method of preserving it. Like bulgur, couscous was made once a year in a big event after the harvest. The women of the town would first grind their semolina into coarse flour. They would then wet the flour and use their hands to roll it into tiny balls. They would place these balls in the sun to dry. Couscous could keep for several months and ideally would last until the next harvest. To eat it, people would steam it and serve it with a stew of vegetables and meat.

The Bedouin and other desert dwellers of Arabia and North Africa looked for food that was easy to carry and readily preserved and that would stay edible in a wide range of temperatures, from below freezing to well over 100 degrees Fahrenheit. Bedouins often carried with them a type of dried ready-made food called *ba-theeth*. This consisted of chopped dried dates, parched flour, and a type of clarified butter called *samn*, mixed together and pressed into lumps or bars. *Ba-theeth* could be eaten without additional cooking, rather like a modern granola bar.

Goats and sheep were common throughout much of the Islamic world, and people devised several ways of preserving their milk. Yogurt was one of the first methods devised for keeping milk from spoiling. The fermentation process that produced yogurt consumed natural sugars in the milk and increased its acidity, which prevented undesirable bacteria from growing and making people sick. Although the earliest yogurts were probably made accidentally, by the medieval period yogurt was largely a household staple. To make yogurt, the cook would heat fresh milk and mix it with some existing yogurt, which contained the bacteria needed to ferment the milk. The bacteria would make the milk thicken and turn sour.

Milk could be made to last even longer by salting and drying. Many people made dried yogurt lumps that were good travel rations. The cook would drain the yogurt by placing it in a cloth and hanging it to let the excess water drain out. She would then salt it and place dabs of it on a cloth in

the sun. These lumps would dry rock hard and keep for a long time. They could be reconstituted in water or eaten dry. People made a similar food called *kishk* or *trahana*, which was made with a mixture of yogurt and grain such as bulgur or wheat flour and salt, formed into lumps and allowed to dry.

People also made milk into cheese. They could use either rennet or the whey from existing cheese to make the milk form into curds. A cook would mix the milk with the rennet or whey and heat it, which would cause the milk to separate into liquid whey and solid curds. She could collect the curds and use a weight to press out excess liquid. To store the cheese, she would place the solid cheese into a jar, pour salted whey over it, and seal it to keep air out. This cheese would keep for several weeks.

Butter would not keep in the hot climate, so people made *samn*. To make *samn*, people would churn fresh milk into butter by agitating it. The Bedouin accomplished this by putting the sour milk into a goatskin bag and blowing into it. The resulting butter would be heated with flour and spices such as cumin and coriander. The solid part of the butter would sink to the bottom of the pot, and the cook would skim off the clarified liquid fat with a spoon so as not to mix it with the solids. The *samn* would be placed in a storage container, such as an earthenware jar or a goatskin bag. *Samn* could be stored for months if the container was airtight. *Samn* production was often a winter activity, done while herds were not on the move.

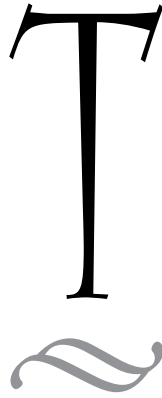
Olives were a staple food throughout much of the Islamic area. To preserve olives, people would soak them in plain water for several days, weighting them down to keep them submerged. They would then drain the olives, place them in an earthenware or glass jar, pour saltwater over them, add flavorings such as garlic if desired, and seal the jars. After sitting in their brine for a few weeks, the olives would be ready to eat. They would keep for several months. It was not unusual for the surface of the olives and brine to develop a coating of mold, but this was not considered cause for concern as long as the olives below the surface had not rotted.

Olive oil was also extremely important. Most olives, in fact, were turned into olive oil and were not eaten whole. To make olive oil, people crushed olives in a mill and then pressed them in an olive press, which pushed out the oil. The olive oil was stored in earthenware or glass jars and would keep for many months.

See also AGRICULTURE; ARCHITECTURE; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; ECONOMY; FESTIVALS; FOOD AND DIET; GENDER STRUCTURES AND ROLES; HOUSEHOLD GOODS; HUNTING, FISHING, AND GATHERING; NATURAL DISASTERS; OCCUPATIONS; SACRED SITES; SEAFARING AND NAVIGATION; TRADE AND EXCHANGE.

FURTHER READING

- Nell Du Vall, *Domestic Technology: A Chronology of Developments* (Boston, Mass.: G. K. Hall, 1988).
- Richard D. Fisher, "Long-term Corn Storage." In *Paquimé: The Anasazi Rosetta Stone*. Available online. URL: <http://www.canyonsworldwide.com/fisher/cornStorage.htm>. Downloaded on December 7, 2007.
- Frances Gies and Joseph Gies, *Cathedral, Forge, and Waterwheel: Technology in the Middle Ages* (New York: HarperCollins, 1995).
- Ann Hagen, *Anglo-Saxon Food and Drink: Production, Processing, Distribution and Consumption* (Hockwold cum Wilton, Norfolk, England: Anglo-Saxon Books, 2006).
- Kate Melville, Rusty Rockets, and Richard Taylor, "Pre-Columbian Fish Farm." Available online. URL: http://www.scienceagogo.com/news/20001008173027data_trunc_sys.shtml. Downloaded on December 7, 2007.
- D. P. S. Peacock and D. F. Williams, *Amphorae and the Roman Economy: An Introductory Guide* (London: Longman, 1986).
- Dorie Reents-Budet and Ronald Bishop, "What Can We Learn from a Maya Vase?" *Archeology* 56, no. 2 (2003). Available online. URL: <http://www.archaeology.org/0303/abstracts/mayavase.html>. Downloaded on December 7, 2007.
- Paula Wolfert, *Mediterranean Grains and Greens* (New York: Harper Collins, 1998).



► textiles and needlework

INTRODUCTION

For the study of the lives of people in medieval times, textiles can be more valuable than gold. Gold work is flashy and often shows the best craftsmanship a society had to offer, and it can also reveal something of the wealth of a society. But textiles speak not only to what was valuable but to what was ordinary as well. Textiles decay, usually more quickly even than wood, so when even a fragment of a medieval rug, blanket, or other textile is discovered, archaeologists and historians react with excitement and treat it carefully, because even the fibers can speak to them about who used the textile, where it came from, and why it was made.

Textiles were made from threads. The threads were made from animal hair or plant fibers. One of the fundamental curiosities of medieval cultures is that people in both the Old World and the New World figured out how to spin cotton into fibers, how to turn those fibers into threads, and how to make those threads into textiles. Also curious is that someone worked out in ancient China how to take caterpillar cocoons and turn them into the most coveted thread of the ancient and medieval worlds. Governments of the Western world eagerly sought to learn the secrets of making silk; when they did, they invested much money and resources into mastering both the production of silk and the manufacturing of silk cloth. Although silk was highly desirable for clothing and cotton could be made into light, comfortable cloth, neither

material was always preferable for all purposes, instead often serving for embroidery of textiles made of tougher stuff.

For instance, rugs could be made for decoration, but for everyday use not even monarchs could afford to replace frequently ones made entirely of silk. For most rugs, animal hairs were the stuff of tough threads able to withstand frequent treading of feet. Wool from sheep or alpacas and hair from goats, horses, or llamas were woven together to create sturdy textiles. Even so, such tough textiles, when used as rugs, were valuable enough to occasion the special custom of always removing one's footwear when entering a home, extending the life of rugs in the home.

In the creation of textiles out of threads there were two fundamental techniques: knotting and weaving. In each case medieval textile makers used warp and weft to form their textiles. The warp consisted of threads that formed the muscle of a fabric; it would provide the strength of a textile and therefore was usually made of dense, tough threads. The weft was made up of threads woven into the warp at a right angle. The weft usually gave a textile its color and designs; some medieval cultures strove to make the warp invisible, easier to do with knotting than weaving. Knotting had variations, but its essence was the tying in a knot of weft thread around individual warp threads. This required the intense use of hands and great patience from the textile maker. Weaving used looms, which came in many shapes and sizes. Another of the curiosities of textiles is that looms were invented in different parts of the world seemingly independently of one another. Nomadic

peoples tended to use looms made of light wooden frames that could be easily taken apart and carried. Settled peoples tended to use looms made of heavy wood—sturdy devices intended to endure a great deal of use.

Given the amount of labor that went into textiles, they were likely to reflect the needs of their makers. As the medieval world created cash economies, one need was to earn money. This resulted in textiles made to appeal to potential buyers, and the creation of appealing designs and colors became a matter of intense competition in the marketplaces of the medieval world. The frequent use of Arabic script in the textiles of the Islamic world speaks of a buying public interested in the written word; in East Asia the common depiction of dragons and other exotic creatures tells of buyers' interest in mystical symbolism. Many textiles were made not for sale but for family use. In many medieval cultures, looms were a common part of the everyday lives of ordinary people and were used to make fabric for clothing, curtains, pillows, beds, rugs, caps, gloves, and other everyday artifacts. Through these artifacts, people of our time can make an emotional connection to the people of the past, for they speak of the weavers' loved ones, the weavers' sense of duty, and the weavers' disciplined imagination, which created colors and images to be seen and enjoyed each day.

AFRICA

BY MICHAEL J. O'NEAL

The chief problem historians and archaeologists have in studying textiles and sewing from medieval Africa is that the materials involved in textile production do not survive the passage of long periods of time. This applies both to the fabrics and clothing produced and to the means of producing them. Cloth fabrics produced hundreds of years ago could not survive the climate, nor could the wooden looms used to weave cloth or the wooden spindles used to make thread.

Some evidence of weaving and embroidery survive from the kingdom of Meroë in Sudan. Other bits of fabric have been found in the modern-day Republic of Niger, dating from about the second half of the eighth century. Most of the surviving fabrics, though, were produced late in the medieval period and beyond. The earliest archaeological remains are exceptions, so historians have to rely primarily on artwork that depicts the kinds of cloth and dress people wore. They also look at written records, but even written records are unreliable, for many were compiled by Middle Eastern and European explorers based on personal observations that vary widely. In many cases historians have to extrapolate backward from modern hand-weaving practices that are hundreds of years old.

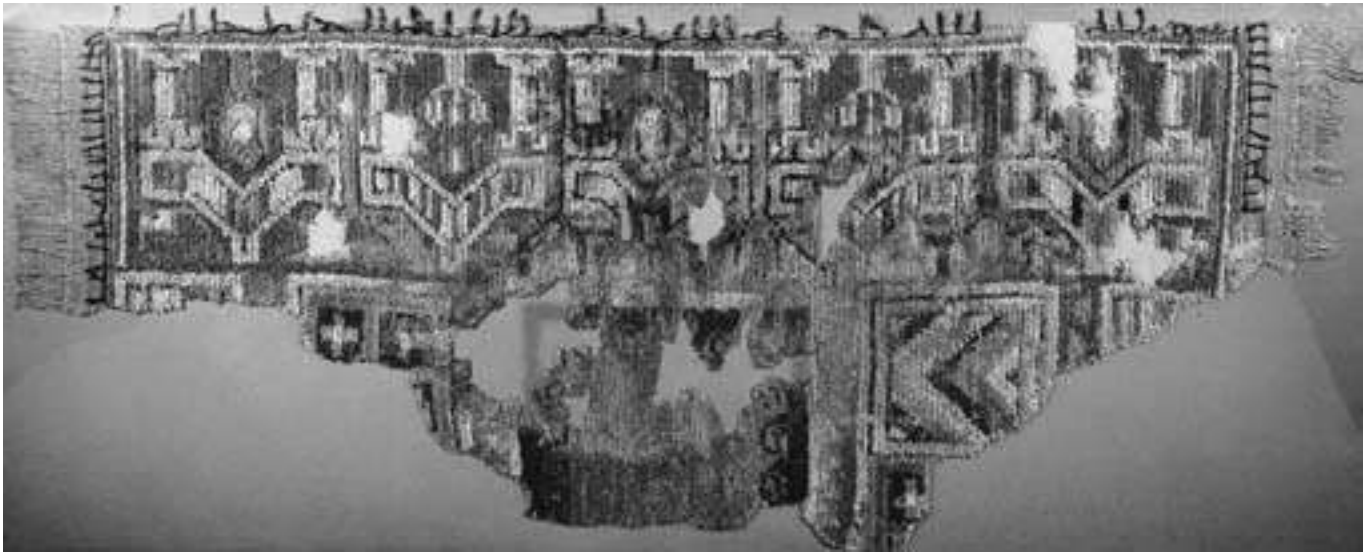
Another factor complicating the issue of weaving and sewing in sub-Saharan Africa is that many woven goods, along with weaving technologies, were imported into the region along extensive trade routes. Many of these goods and the technologies that produced them came from Islamic countries to the north and from the Middle East. Islam played a major role in the production and trading of fabrics with sub-Saharan Africa because of Islamic rules regarding personal modesty and the need to cover the body.

These goods became prestige goods and hence were worn by members of elite classes. However, among the social elites, lack of personal adornment was regarded as a sign of carelessness, a signal that the person was unable to fulfill his or her obligations to those lower in the social order. Members of lower classes had to make do with locally produced cloths and fabrics. Nevertheless, fabrics and items made from fabric were important trade goods because they were useful and easy to transport. Also traded were materials such as plants that were the source of dyes. Examples include saffron, safflower, and various types of woods.

To understand the nature of medieval weaving in Africa, it is necessary to understand a few basic weaving terms. Weaving is done on a frame that interlaces the threads of a piece of fabric. One set of threads, called the warp, is fixed to the frame. The other set, called the weft, is interwoven over and under the threads of the warp. For the process to work, a gap has to be produced between the alternate strings of the warp. This is done by string loops around every other thread. This set of string loops is called a heddle. When only a single set of alternate warps is attached to a heddle, the loom is called a single-headed loom. When two sets are attached, the loom is said to be double-headed. Many textile historians classify medieval African cultures according to whether they used single- or double-headed looms.

Additionally, the weaver can produce different types of cloth depending on the relationship between the warp and the weft. The simplest type of fabric is the plain weave, consisting of single strands, one warp and one weft, similar to a simple potholder. A basket weave is made with pairs of threads, and various types of patterning and "brocade" can be made by changing the proportions of threads in the warp and weft. In some instances African weavers were able to produce cloth that gave the appearance of virtually no warp, giving the fabric a sense of extreme delicacy.

Other forms of classification are used as well, and generally, one scheme of classification does not exclude others. For example, historians note whether a culture relied on horizontal "ground looms" or upright looms used primarily to produce raffia, a type of cloth made from the raffia palm, primarily in rain forest regions. Some historians believe that both of these



Fragment of a multicolored woolen rug from a tomb at Qasr Ibrim, Egypt, Coptic Period, fourth to sixth centuries (© The Trustees of the British Museum)

variants originated somewhere in the Nigeria/Cameroon area. The chief evidence supporting this view is fragments of cloth from these regions that date to the ninth century.

Another scheme of classification is whether the loom produces narrow strips of cloth or wider ones. Historians have found evidence of both types in Sierra Leone, which may have been where the oldest narrow-strip looms originated. In burial caves in Mali, along the Bandiagara cliffs, archaeologists have found bits of cloth dating to the 11th century, the oldest cloths produced by a narrow-strip loom. An example of the use of written records to shed light on the history of African weaving is the work of al-Bakri, an Arab traveler who recorded his observations. He wrote that he watched a narrow-strip loom being used in the town of Silla, in Mauretania, in 1068.

The labor of weaving and sewing was often divided by gender. For example, it is likely that most of the weaving on double-headed looms was done by men. Additionally, men in East Africa did the work using what is called a pit loom, or a loom positioned over a pit dug into the ground, giving the operator a place to put his legs (rather than having to lean over the loom). In contrast, women were more likely to operate upright looms in such places as Nigeria and Cameroon, though in these regions raffia and ground looms were operated by men.

The jobs of spinning and weaving also were allocated by gender. Typically, in such places as Sierra Leone, women did most of the spinning of thread, typically with handheld spindles. These spindles throughout western Africa consisted of a thick stick with a baked clay whorl at the lower end. The

whorl was a round or trapezoid-shaped section that served as a kind of pulley. The spinner then gathered a cluster of fibers and drew them out, twisting them into yarn as they pulled. Depending on the use to which the yarn and any fabric made from it would be put, the spinner pulled the fibers more or less tight, creating a yarn that was more or less dense. Women, as spinners, were often thought of as the “owner” of the project, and they hired others to turn the thread into woven cloth. That said, in some cases weavers, usually men, purchased thread from women; often their own wives and daughters worked as spinners. The weaver, then, was regarded as the owner of the project.

Weaving was related to the social structure of the culture. In such places as Mali weaving was an occupation that was practiced by a member of a hereditary caste, or social class. In this respect, weaving was analogous to pottery making or blacksmithing. Weaving was thought to bring the weaver into contact with the spiritual world. Very often, weavers were, in effect, slaves of noble families. In other cultures, though, weaving occupied no particular social niche; it was regarded as simply an occupation one followed, although many people became spinners, weavers, dyers, and sewers because they were members of a family that had traditionally practiced the trade. Typically, in a family compound, all boys would be taught the arts of weaving, while all girls would be taught to spin, dye, and sew. All of these activities would take place under the watchful eye of a master, who supervised younger, less experienced workers.

The earliest fabrics sub-Saharan Africans used were made of tree bark. The bark of certain types of trees was care-

fully removed, and then an inner layer was pounded with a mallet to make it more flexible, softer, and wider. Later, softer materials, such as raffia, were found, and later still, cotton was the fabric of choice. Not all fabrics were made as a result of the spinning and weaving processes. In some cases, fibers were twisted together into heavier threads by hand, and these threads were woven and plaited into fabrics that could be used as cloths and to make clothing. Articles of clothing commonly manufactured included hats and lengths of cloth wrapped around the body. A typical method of manufacture was to produce squares of cloth that were then sewn together into larger pieces. The cloth could have an infinite range of characteristics, depending on the nature and color of the pieces being assembled.

Many fabrics were not extensively dyed, for medieval Africans lacked binding chemicals that made the dye stick. Nevertheless, indigo was used to produce shades of blue, particularly among the Yoruba, who repeatedly dyed fabrics in a compound that contained high concentrations of the active ingredient in indigo (indigotin) and then beat the fabric until it virtually glowed with a coppery color. In the Congo threads were blackened and used for embroidery on raffia cloth, which was beige. Additionally, a wild silk was used to produce a silvery-beige fabric. Among the Mali iron-rich mud was used to print dark designs on natural cotton fabric.

Medieval Africans also used a technique called resist dyeing, meaning that the fabric was dipped in a dye but the parts the dyer did not want tinted were somehow blocked off to prevent the dye from reaching them. One such technique, similar to modern tie-dye, was called *plangi* and consisted of tying the cloth. Another, similar to modern batik, was to paint the fabric with a dye-resistant substance. One example is a starch paste made with cassava flour. Dyeing was typically regarded as a female activity.

THE AMERICAS

BY JULIA MARTA CLAPP

Textiles are particularly difficult to trace throughout the pre-Columbian history of the Americas because the medium is so perishable. This is compounded by the fact that many regions of the Americas have damp climates, which accelerate deterioration. The greatest knowledge about textiles of the Americas comes from regions that are dry, like much of the Andean region of South America.

The importance of textile production to South American artistic traditions cannot be overstated. From the Moche civilization (ca. 100–700) archaeologists have found fabric woven in cotton and wool (from llama and alpaca). These samples are few, but they are a testament to skillful Moche craftsmanship.

The tapestries were woven with a back-strap loom. Although the colorful and geometrically patterned Moche tapestries may appear abstract, their designs represent specific figures, such as warriors or mythological scenes. The Moche buried textiles and other items of value, such as jewelry and pottery, with elite citizens.

The Wari civilization (ca. 600–1000) flourished during the Middle Horizon period. The Wari, like many South Americans before and after them, tended to weave tapestry in lieu of creating monumental sculpture. Tapestry is created by weaving dyed threads through undyed threads, forming a pattern. The designs that weavers skillfully incorporated into their tapestries are colorful and also appear quite abstract, as did the tapestries of the Moche. The images are not meaningless, however; rather, they are representations of deities or supernatural beings (but never humans). These images are simplified to the extent that it is difficult for us to “read” them.

As in the later Inca period, the culture’s government strictly regulated the production of textiles; it is likely that designs were standardized and monitored, though weavers did have a significant degree of artistic license as well. Most important, however, was the importance of textiles for establishing and maintaining political control. It was also a way of demonstrating prosperity: the nearly unimaginable quantities of thread required for the finest Andean weaving indicated the wealth of the ruler who commissioned a given textile. The most common figure depicted in Middle Horizon tapestry is the staff god, a part human, part bird supernatural being who has wings and holds a staff. This figure also appeared on monumental architecture of the period, so he was undoubtedly a central figure in religion or myth.

During the Inca period (ca. 1450–1530s) textiles were used in trade and were socially and culturally important. The Inca were notoriously adept at organizing labor, and textiles were produced in great quantities for the benefit of the empire. When the Spanish arrived in South America in 1533, they were astonished to discover warehouses full of surplus textile goods. Because the Inca Empire was spread over widely varying terrain, from the Andean highlands to the coast, weavers used different materials depending on their location. In the highlands they created thread out of the wool of vicuña, llama, and alpaca. On the coast they used cotton.

Inca textiles had varying degrees of roughness and smoothness. Rougher weaves were used as carpet. A second type of weave formed everyday clothing. Finally, a very fine and soft weave called *cumbi* was used for tapestry and the clothes of elites. *Cumbi* cloth was extremely valuable, and the women who wove the finest of it were sequestered and had been trained since childhood in its production. Occasionally, feathers from tropical birds such as the macaw, parrot, and



Fragment of a textile panel, camelid fiber and cotton, Peru, ca. 600–850 (Los Angeles County Museum of Art, The Phil Berg Collection, Photograph © 2006 Museum Associates/LACMA [M.71.73.242])

flamingo were attached to *cumbi*. This yielded a fine, vibrant, and soft surface that was a true testament to the skillful weaving and feather working in the Americas at this time. It is

only by virtue of the very dry climate that such delicate pieces have survived over the centuries.

The designs that weavers incorporated into textiles during this later period were also overwhelmingly abstract, often geometric patterns. This reflected a shift from earlier eras, in which ancient South Americans tended to depict various gods and other important figures. In the Inca period designs were extraordinarily complex. In order to create a tapestry or tunic with an intricate pattern, the weaver would have to possess both creative and mathematical facility in order to plan scrupulously in advance. Sometimes a certain pattern would require that the piece be woven sideways or upside down, necessitating even greater proficiency.

In the ancient Andes the arrangement of textiles on the body was performed thoughtfully and held social significance. In other words, Andeans did not drape textiles in the offhand manner in which we might absentmindedly put on a pair of jeans today. Tunics were woven so that certain patterns would be accentuated and sometimes so that the underside of a garment was as finely finished as the front.

It is probable that textiles were a major part of production in Teotihuacán (ca. 1–ca. 650), but they—like other perishable items, such as those made of wood—have not survived. The same is overwhelmingly true of the Maya, though tapestries do appear in Mayan art, giving us at least a glimpse of the skill with which they produced textiles. Weaving was performed by women of varying social statuses, though the materials used would have been commensurate with a woman's position in society. Like many pre-Columbian Americans, they wove on a back-strap loom. Mayan women also made patterns from batik (fabric with designs made through a wax-coating process), tie-dye (fabrics with designs produced through tying part of the material so as not to absorb dye) and embroidery.

Archaeological excavations in the former Aztec Empire (ca. 1300–1500s) in central Mexico have not yielded the fruitful remains that work in the Andes has. Modern-day Mexico City is the site of the former Aztec capital, Tenochtitlan, and its primary temple, the Templo Mayor, which was rediscovered in the 1970s. Excavations from the Templo Mayor have yielded some textiles, and one bundle, in particular, was believed to be part of a priests' wardrobe. Nevertheless, we know from manuscript depictions of the Aztec that elites and warriors were clothed as sumptuously as pre-Columbian South Americans. The Aztec used textiles as currency in economic exchange, as did the Andeans. In the Aztec Empire provinces were required to pay enormous quantities of tribute to the ruling city's leaders in Tenochtitlán; fabric was a major part of this system of taxation and political control. Weaving was the work of Aztec women, particularly commoners.

In the Mississippian era in North America (ca. 750–ca. 1500) native peoples inhabited the eastern portion of the United States. Like other civilizations before them, such as the Adena (ca. 1000 B.C.E.–200 C.E.) and Hopewell (c. 200 B.C.E.–400 C.E.), they were mound builders: They made large hills out of the earth in varying shapes and sizes. These hills had varying functions (often ceremonial); in the case of the Mississippians, many served as burials. From this period archaeologists have found fragments of cloth, such as one from the Craig Mound at a site called Spiro (located in Oklahoma). The fragment, probably from the 13th or 14th century, is a very small piece relative to contemporary examples that have been better preserved in other regions of the Americas. It is too small to be able to interpret, but some scholars believe that it depicts the wings of a bird or someone dressed ceremonially in a bird costume.

We have limited information about Caribbean textile production. We do know that, as in the rest of the Americas, the Taíno (inhabitants of the Caribbean islands between about 1200 and 1500) wove clothing for garments, a task that probably belonged to the women of the society. In addition, a noteworthy and relatively unique aspect of their creative production included woven fibers that were incorporated into art objects. While it is surmised that other pre-Columbian Americans adorned molded or carved figurines with cloth, feathers, human hair, shells, stones, or other materials, often they have been lost or destroyed over the course of time. One *zemi* (a ritualistic object thought to have magical powers) from the Dominican Republic is formed of shell and human bones as well as cotton. The cotton has been fashioned into a material by a means of braiding, and into this bundle is stuffed various materials. The result resembles a doll-like idol.

ASIA AND THE PACIFIC

BY KENNETH HALL

Many medieval era Asians and Pacific islanders wore high-quality indigenous textiles made of inner tree and shrub fibers (bast). Bark cloth and other early textiles were made exclusively by women, who cleaned and spun the threads and wove the patterns. Quality local textiles resulted from beating tree bark that had previously been soaked in water until it was soft, with the resulting threads woven into garments. Bark cloth for everyday use was plain or very simply decorated with dyed or painted geometric symbols or stylized depictions of humans or animals. Among tribal groups bark cloth was used in numerous rites of passage: birth, circumcision, tooth filing, tattooing, marriage, and death. Tattooing was a symbolic complement to the minimal coverage afforded by bark cloth. Since bark cloth had to be removed lest

it disintegrate in the rain, tattooing was a continuous means of protecting a man (or a woman) from supernatural harm.

Southeast Asian textile weavers initially incorporated magical Indian religious symbols into their bark cloth production and, by the late 15th century, began to duplicate the images of the more durable imported Indian cotton cloth. Silk was generally less popular in island Southeast Asia, although mulberry trees and silk worms were indigenous. By contrast, on mainland Southeast Asia, Burmese and Thai used locally produced silks and cottons. Only in Vietnam, because of its substantial China connection, was silk widely produced, using advanced and meticulous technology similar to that of China, Korea, and Japan.

By the 12th century Southeast Asian and Indian ports were importing Chinese silk for court consumption. In the 15th century India-based merchants were also trading their own silk and cotton cloth for Southeast Asian spices. In this first mass market Indian cotton textiles became the commodity of exchange most demanded by pepper growers and spice collectors. There were technical reasons for the success. The spread of Islam into India in the 14th century introduced carding bows and spinning wheels, which made cotton production more efficient. With this new technology Indian weavers were able to offer greater variety in pattern, color, texture, and size. Southeast Asia did not have to import cotton. Regions with a sufficient dry season, such as eastern Java, central Sumatra, Bali, Lombok, southern Sulawesi, Sumbawa, Luzon, Cebu, and Cambodia, produced and sold raw cotton, which was cultivated alongside wet-rice fields. From the 13th century on some Southeast Asian cotton yarn and cloth was even taken back to China by returning traders from ports in Java, Luzon, and Vietnam.

Making Javanese batik cloth involved the application of wax in designs to prevent dyes from penetrating the protected portions of a cloth. After the wax was removed from the dyed fabric, the pattern created by the wax was apparent. Among the favored designs were floral and symbolic symbols of plants, animals, pavilions, and mountains that replaced previous realistic depictions of humans and animals. Tie-dyeing, where cloth was wrapped, tied, or stitched together before dying so that the bound areas did not absorb dyes, was another local innovation.

Indian *patola* cotton cloth from Gujarat became the market standard by the 15th century. Because of Indian mastery of permanent dyes, these were more brightly colored than local cloth and came in wider widths. Owing to market competition for Indian, Chinese, and local cloth, local populations could dictate their market preferences for colors and designs. Commonly, the base colors were the colors of life itself: brown of the earth, blue of the heavens, and white of the air.

The 13th-century Italian traveler Marco Polo was fascinated with the embroidery designs he observed on Asian carpets, robes, wall hangings, pillows, curtains, and table covers. While evidence of Chinese embroidery dates to the third century B.C.E., the use of embroidery reached its peak in the era of the Tang Dynasty (618–907). Chinese embroidery was influenced by China's silk culture, which made available high-quality threads and fabrics to artisans who adorned garments and other items with flowers, birds, bold flowing lines, and abstract motifs. Among the most exquisite embroideries were those on the Chinese emperors' and bureaucrats' robes, which were lavishly decorated with traditional motifs on a dark silk background, the color and embroidery of which distinguished the individual's rank. China's styles of embroidery set the standard for others. Its embroidery especially inspired Japan's artisans, who also decorated colored silks with long soft stitches of untwisted silk threads, as demonstrated in the embroidery of women's kimonos in the late medieval era.

Yue embroidery, often called Cantonese embroidery because it originated in the southern regions of China, became popular in the era of the Tang Dynasty. This style is known for its complicated variety of visual accents using silk or cotton threads that draw attention to a central subject. It is smooth embroidery on silk or cotton, with little of the three-dimensional texturing found in other styles. Commonly, Yue embroidery featured several objects or animals, such as birds and dragons. Early Yue artisans used twisted pieces of peacock feathers as their thread, to produce accents and to blend separate objects together. Yue artisans also used course thread derived from the tail of a horse to stitch outlines that accentuated the patterns, colors, and objects of the main design.

Xiang embroidery, which had its origin in the earliest embroidery tradition of China's Hunan Province, used loose threads and rich colors on transparent chiffon silk. The silk threads were dyed and then soaked in water containing oil to make the thread soft. Stitching was seemingly random and uneven but produced colors and textures that were effectively mixed. Animals, people, and landscapes were brought alive by the colors and three-dimensional effect created by thick knots and stitching. The most famous examples of Xiang embroidery used tigers as their subject. Xiang embroidery was usually two-sided, with different patterns or images on each side of the transparent chiffon.

Shu (Shuzhou) embroidery, which developed in Sichuan Province, became prominent in the Song Dynasty (960–1279). Shu embroidery is characterized by its very detailed silk thread depictions of a variety of subjects on silk and satin cloth, although panda bears and fish (especially carp) were favorites. Some Shu pieces were two-sided, in this case repeat-



Tapestry: fruit trees and hollyhocks, China, Ming Dynasty, 1368–1644
(Freer Gallery of Art, Smithsonian Institution, Gift of Charles Lang Freer, F1916-542)

ing the same pictured embroidery on both sides. The stitching was done with fine silk threads that were almost impossible to see. Repetitive stitching resulted in very dense embroideries. Shu embroidery was so detailed and intricate that it was often considered artwork and was prominently displayed. It also was used to produce embroidered silk maps, wall hangings, screens that separated rooms, and curtains.

So-called Oriental carpets were produced in medieval-era China, Egypt, India, and Persia (now Iran). The Chinese carpet had its origin among the seminomadic populations of China's northwest Xinjiang steppe region. Drawing on the common practice among central Asian tribal populations, traditional Chinese carpets were made of wool or goat and camel hair. Later Chinese carpet weavers frequently used silk to add distinctive colors as the light source changed. Since

silk threads were also cool to the touch, Chinese carpets were often thought to be “magic carpets.”

Chinese carpet designs were largely symbolic rather than decorative and used colors that were considered to be both elegant and in good taste, such as black, blue, red, white, beige, and yellow. Red indicated great joy and happiness, yellow symbolized royalty and longevity, white represented mourning and death, blue meant immortality, and black and beige conveyed the sense of solitude. Chinese carpets were initially small wool temple floor mats, prayer rugs, and wall hangings that were feltlike in texture and which held Daoist and Buddhist sacred symbols, such as the swastika and the yin and yang motif.

During the medieval era the manufacture of wool pile carpets spread from its original Silk Road roots, as regional styles developed among carpet-weaving centers in northern China. In common with the earliest ritual use of carpets, medieval-era Chinese carpets displayed designs that had precise meanings and were not meant to be primarily decorative. Among these designs were three script characters that represented long life, luck, and wedded bliss, which were contained in central medallions. Animals and objects each also had symbolic meaning, as in the case of the dragon, the symbol of a powerful deity, the sovereignty of the forces of nature, and the emblem of the emperor. The bat was popular, since the word bat (*fu*) was the same as that of the script symbol for good fortune. Other common depictions included the phoenix, elephants, and horses. The chrysanthemum, a symbol of longevity, and the peony, the symbol of nobility, wealth, and affection, were favored flowers.

Indian carpets, which became popular in the post-1000 era, mimicked the symbolism of their Iranian neighbors. Small floral designs, such as plants, rosettes, and leaves, were repeated over the carpet surface. Border motifs were similar to the featured designs. Maroon was a favored color, as were light and dark green and burnt orange.

EUROPE

BY JEAN SHEPHERD HAMM

After gaining significance as early as 1000, the manufacture of textiles during the Middle Ages gave rise to Europe's first major industrial development. Fabric had long been crafted by individuals to make their own clothing and to sell in local markets. In their manors lords and ladies appropriated the best raw materials and weavers for their own fine garments. However, not all textiles used in a region were indigenous products. Even during the Middle Ages trade ships carried textiles from one country to another so that woolen, linen,

silk, and hemp fabrics could be found almost anywhere on the continent.

With the expansion of trade routes to the East and the development of new shipping lanes through European waters, the demand for textiles increased. Nobles not only willingly paid for fine fabrics for garments but also began to decorate their homes with textiles. Woven rugs and tapestries adorned manor houses and castles and helped make them warmer by closing off chilly drafts. The production and trade of textiles in all forms contributed significantly to the economy of medieval Europe by providing a livelihood for individuals at all levels of society. In 1297, during a dispute with Edward II (r. 1307–27), English barons purported that one-half the country's wealth was in its wool. Although this proportion was exaggerated, wool exports represented a major part of England's economy. The Italian Medici family's rise to prominence began with the textile trade. They purchased raw wool and sold it to spinners. Then they purchased thread from the spinners to sell to the weavers and bought fabric from weavers to sell throughout the world. In Germany the Fugger family followed much the same route to wealth with the production of linen from flax.

Certain regions of Europe became known for the quality of their raw products or textiles. For example, English wool generally garnered the highest prices because of its superiority; however, prior to the Hundred Years' War (1337–1453) most of the wool was exported to Flanders for weaving into fabric. The woolen cloth produced in Flanders was then the most desired. Cloth manufacturing did not become a major industry in England until the 14th century. Although the population of Europe decreased dramatically as a result of the Black Death, rising wealth increased demand for textile products and led the industry to seek better production methods.

Spinning, weaving, embroidering, knitting, and other textile-related labors provided women with one of the few occupations considered suitable for them. These textile arts began in homes as women prepared clothing for their own families. When it became profitable to trade in textiles, men entered into the manufacture of textile products at all levels. Male weavers formed guilds in towns and villages, worked with other related guilds, and gained control of the manufacture and distribution of textiles. Nevertheless, women were still employed as spinners, weavers, and seamstresses. Contemporary art depicts women at looms and spinning wheels, and several representations of the Madonna show her knitting or constructing garments. Geoffrey Chaucer's (ca. 1342–1400) 14th-century Wife of Bath, a weaver by trade, boasts that she made fine fabrics that “rivalled those of Ipres and of Gaunt (Ypres and Ghent).”



Ribbon, tablet-weave gold metal thread, Great Britain, ca. ninth century (Los Angeles County Museum of Art, Los Angeles County Fund, Photograph © 2006 Museum Associates/LACMA [55.57.1])

In the 13th century groups of women known as the Beguines formed. They lived in communal houses but were not nuns and were not under the authority of bishop or church. Many of the women were from middle- and lower-

class families who could not afford the dowry required for becoming a nun. Many Beguines supported themselves by weaving.

Early weavers practiced their craft in small cottages on horizontal looms. Weaving had to be done from the sides of the loom and produced long, narrow pieces of fabric. With the development of the broad loom in the 13th century, yarn could be woven more quickly into fulled or felted “broad-cloth.” The increased speed of weaving created a demand for yarn to be spun more quickly. Wool, flax, and cotton were combed into yarn with the use of a distaff and a spindle. The raw material was wrapped around the distaff, and a thread was pulled from it and spun with the turn of the distaff and whorl. The carding of yarn, begun in the early 14th century, shortened the time for its production and yielded thread suitable for wefts. The introduction of the spinning wheel in the late 13th century also aided the manufacture of textiles by making it possible to spin greater quantities of thread. About 50 years later a foot treadle was added to the wheel, again speeding the process of spinning. Water-powered fulling mills also reduced the time and labor involved in textile production. By this time weaving had moved from primarily a cottage industry to a manufacturing concern that was controlled by guilds.

Usually, different guilds developed for the different steps in the manufacturing process: spinners, weavers, fullers, dyers, and wool merchants. In the late Middle Ages merchants gained more control over the process in what was known as the “putting out” system. Cloth sellers purchased wool from farmers and hired spinners, weavers, and dyers; then they sold the finished product. This system was the first step in what later became factory production of textiles by a single company.

Basic fabric could be altered by several methods, including adding other materials during the weaving process, dyeing before or after weaving, and adding needlework to the fabric or garment. Early weavers produced an amazing variety of fabric, from sheer silks to heavily felted woolens. They also experimented with combining materials to create diverse effects and patterns. Fustian fabric was created by combining linen and cotton threads. Substances as varied as horsehair and even metals, such as thin strands of silver and gold, were woven into some of Europe’s finest textiles. Using yarns that were dyed prior to weaving could produce stripes, plaids, and wonderfully intricate patterns.

After the 13th century, and using artists’ drawings for patterns, the most skilled weavers created complex tapestries depicting biblical, mythological, and hunting scenes. They used a technique known as weft-faced weaving, which hid the warp threads and allowed only the weft to show in the

patterns. The resulting tapestry was not only decorative but also stronger and heavier. The seven Unicorn Tapestries (15th century), showing scenes of a group of nobles pursuing and capturing a unicorn, hang in the Metropolitan Museum of Art in New York. A similar series called the *Lady and the Unicorn* survives at the Musée de Cluny in Paris.

Fabric dyeing developed into an industry of its own, with its artisans carefully guarding their secrets for producing signature colors. As dyestuffs could be very rare and expensive, the colors added to yarn or fabric could significantly increase its price. Red, the most expensive dye, was derived from several sources, each yielding a different hue. Sumptuary laws, enacted in many areas, prohibited the lower classes from wearing certain garments or colors, particularly scarlets. These laws had little actual effect on what was worn, however, since few nonnoble individuals could afford the expensive fabrics they were denied by law.

Dyes were produced from both plant and animal substances. Purples were produced from mollusks belonging to the whelk family. Dyers also experimented with exposure to sunlight and different combinations of additives to the mollusk mucus to create a wide range of colors. Several small insects from the Coccidae family (shield lice, kermes, cochineals, and others) provided sought-after deep-red dyes and were actually cultivated for the textile industry. Indigo and the common woad plant provided dyers with shades of blue. Weld and saffron yielded tints of orange and yellow. Browns and greens could be obtained from several types of lichens. Various combinations of dyestuffs and more than one dye bath could be used to make a wide spectrum of other shades.

The term *scarlet*, which today describes a shade of red, originated not as a color but as an indication of the best grade of fabric produced. Wool merchants identified the softest and highest-quality raw wool to be sold for weaving into scarlets, longer and wider than other fabrics. Thus, medieval sources mention scarlets in various colors, including white scarlets. Modern usage derives from the fact that the expensive red dyes added more value, making red scarlets the most highly prized fabrics.

Knitting, crocheting, and lace making (tatting) were all popular in the Middle Ages. In addition, embroidery using all types of thread embellished the garments of clergy and nobility, and its extent and intricacy, as well as the base fabric, indicated one's relative wealth.

The best-known example of medieval textile art, the Bayeux Tapestry, is not a tapestry at all but an embroidery piece. The tapestry is a piece of linen approximately 20 inches high and more than 230 feet long. Woolen embroidery creates more than 70 scenes that tell the story of the Norman Conquest of England in 1066. The narrative covers

the time from the visit of King Harold III (r. 1045–66) to Normandy in 1064 to the death of Harold at the Battle of Hastings in October 1066. The last scene shows his troops fleeing. The end of the tapestry is missing, so it is impossible to tell whether there were more scenes in the original. Legends report that the embroidery was completed by Matilda (d. 1083), the wife of William the Conqueror (r. 1066–87), but there is no reliable evidence to support these assertions. Some historians suggest that Odo (ca. 1036–97), William's half brother and bishop at Bayeux, commissioned the work. Still others believe that the work was embroidered in England. The Bayeux Tapestry is housed in the former bishop's palace at Bayeux and serves as a rich source of historical evidence of clothing, battle gear, ships, and other aspects of life in 11th-century Europe.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Studies of medieval Islamic textiles tend to focus on rugs and carpets, because many people throughout the world have a passion for the beauty of Islamic rugs and carpets. Much is known of Islamic textiles from about 1500 on, because this passion has fueled many studies of Islamic fabrics. Information for rugs and other textiles is thin for the period prior to 1500, because textiles are perishable, not only from environmental causes but because they were intended to be used by people and they wore out from use. In general, the hotter and drier the climate, the better chance for fragments of textiles to survive, although the oldest-known textile was saddle covering from a cold grave in central Asia. Part of its significance, apart from its beauty and the skill that was required to make it, is that it used a knotting technique that was later used in Islamic societies and is still used in Turkey today.

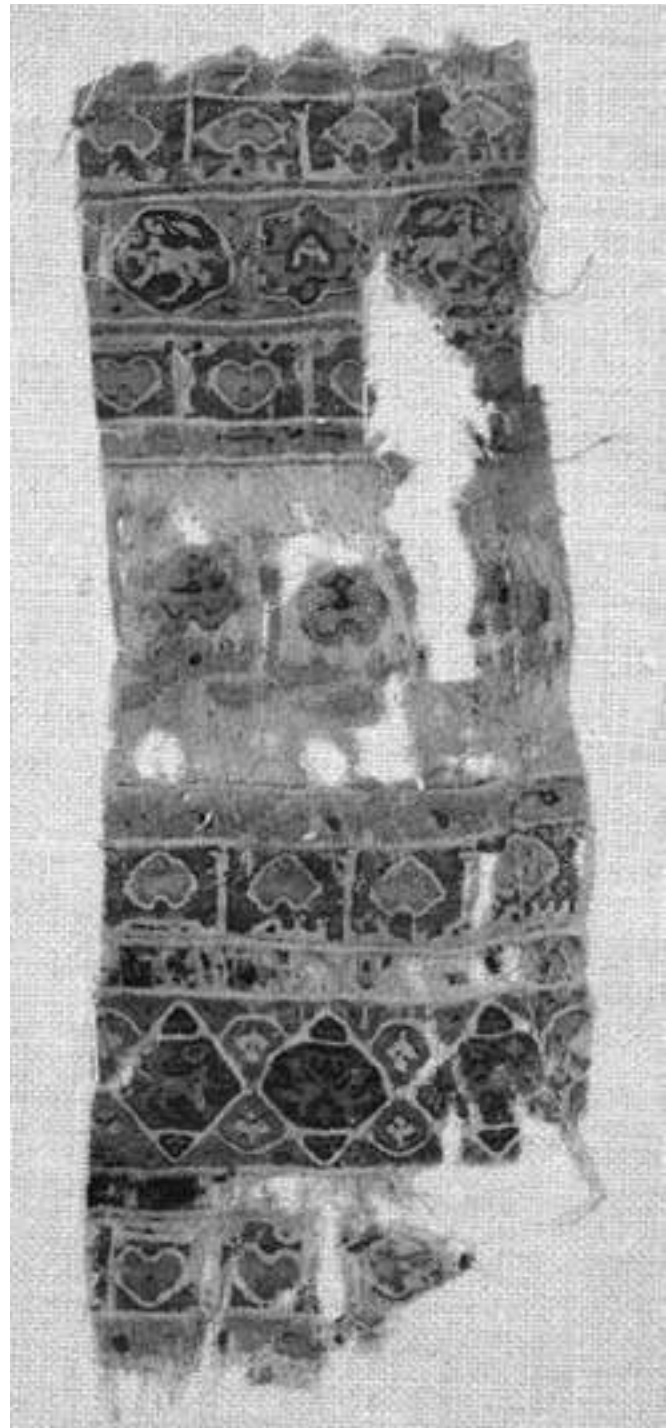
Rugs were very important from the beginning of the Islamic era. Rugs were useful to nomadic Arabs because they could be carried on pack animals, and they were also used for praying. Thus, rugs often had niches in their designs that could be pointed toward Mecca when the rug was laid out in preparation for prayer. Medieval Islamic rug makers used two different techniques to manufacture their products: the knotting technique and the weaving technique. The knotting technique had the advantages of requiring only a little equipment that was easy to carry; moreover, it had the flexibility to be used almost anywhere by one person or several people. A drawback was that it required very painstaking work that was harsh on the maker's hands. A single rug could require several months of working long hours every day. In the first few centuries of the Islamic era the knotting technique was used primarily by nomads and was common among central

Asian and Iranian tribes. It was a production process almost completely controlled by women and often was a source of income for women, who were excluded from most commercial activities.

Important to understanding how medieval Islamic people made their textiles are the concepts of warp and weft. The warp consisted of the lengthwise, usually vertical, threads in textiles, and the weft were the threads that were interlaced crosswise, or horizontally, in the warp. The warp for rugs usually consisted of wool. Woolen thread or yarn was made with hand-twisted spinners that were dangled in the air from a hand; spinning wheels were rarely used. The two most important kinds of wool in the medieval Islamic world were from Persian sheep and merino sheep. Sheep were probably first domesticated in northern Iran, and the first use of wool in textiles most likely occurred in Iran. The yarn made from Persian sheep tended to be coarse; in central Asian Islamic societies, it was often mixed with the hair of goats, making for coarse but tough textiles. Merino sheep were bred in Spain, and during the second half of the medieval era their wool was the finest in the Islamic world and was favored for making fabrics for clothing, draperies, and the best rugs.

The weft was wool, cotton, or silk. Among Turkish societies wool tended to be used for the weft, but in much of the rest of the Islamic world cotton was preferred. Silk was reserved for special textiles, such as those intended to be rugs for caliphs or sultans. It was used primarily to give rugs a glistening appearance that was much desired during medieval times. In knotted rugs the weft was interlaced with the warp in one of two ways: the double loop and the single loop. With the double loop the weft had two loops per knot per thread of the warp, whereas the single loop dipped and rose once around each thread. Single-loop knotting was easier than double-loop knotting. In this process, it was helpful to have the upper ends of the warp thread weighted down or held together by someone. Both kinds of knotted rugs were usually laid out flat, and the maker moved along the rug as she made the weft. The single looping went much faster than double looping, and it resulted in flatter, smoother rugs. Double knotting resulted in a thicker, more durable pile.

A pile was the fabric that projected out at right angles to the warp and weft. Part of the manufacturing process for both kinds of knotted rugs was to lay out the finished product and use shears to even the pile and remove stray bits of thread. Although knotted rugs were usually manufactured inside or outside homes or inside or outside tents, sometimes factories were established in villages or cities, typically to mass-produce carpets; these workshops were often controlled by monarchs, because textiles such as rugs were a valuable



Tiraz textile fragment, silk tapestry weave on plain weave linen, Islamic Egypt, 12th century (Los Angeles County Museum of Art, Mr. and Mrs. Allan C. Balch Fund, Photograph © 2006 Museum Associates/LACMA [M.55.12.11])

commodity for international trade. Double-knotted rugs predominated in northern areas of the Islamic world, and single-knotted ones prevailed elsewhere.

Woven textiles are likely to be more familiar to modern readers than knotted ones, because they more easily lend themselves to modern industrial manufacturing methods. In the medieval Islamic world looms were used to weave not only rugs and carpets but draperies, clothing, and blankets as well. There were two basic kinds of looms: the horizontal loom and the vertical loom. The horizontal loom is often called the nomadic loom because it was favored by nomads. The horizontal loom was fairly simple and light. As its name implies, it was laid out flat, usually on the ground. Its frame consisted of four pieces of wood that were easy to assemble and to take apart and bundle together. There were two long pieces that went the length of the warp and two somewhat shorter pieces that were set as crossbars through holes in the long pieces and set with pegs. These crosspieces limited the width of the product. Another bar was set through the warp threads, separating odd from even, and another bar was set across the frame with warp threads across it held tight to keep them taut for the weaver. Usually the weaver using a horizontal loom moved along the fabric as she interlaced her weft threads.

In the case of a vertical loom, the weaver almost always remained in place while the fabric was moved toward her. Vertical looms were favored in settled communities and in workhouses in cities. There were many variants of vertical looms. The simplest configuration had two large, heavy wooden posts set vertically in the ground. The main crossbars were also stout and tended to be rounded, with pegs at their ends that passed through holes in the posts. Both were intended to be turned during the manufacturing process. The bar that separated the odd and even warp threads tended to be left freely suspended amid the threads, although it could be fixed to the posts. The bar used to keep the warp threads taut tended to be in front of the weaver, where she could easily control it. The weaver would usually sit before the loom, passing the weft threads amid the warp threads. A common variation did not have the warp threads wound around the top crossbar, moving when the crossbar was turned, but instead had the threads stretched over the top crossbar, with the ends of the warp threads gathered in bundles and tied to weights. One process required an assistant, probably a child, to hold the upper ends of the warp threads.

By and large weavers did their own dyeing, using a variety of organic sources. In India a coveted red was created from crushed insects. Purple often came from crushed mollusk shells. Red dye derived from madder roots and henna, blue from indigo plants, and other colors from fruit skins, tree bark, and nut shells. Before being dyed, silk required a soapy process of cooking in water to strip it of its stickiness.

Two techniques were favored for weaving several colors together. One was the slit weave, and the other was dovetailing. Each was used to achieve different visual effects.

The slit weave has the colored weft thread interlaced only with the warp threads for its pattern, and the weft thread does not link with warp thread outside of its designated area. This method results in a slit or gap between warp threads where different weft colors meet. This technique was used for draperies, sheets, and light clothing. Slit weaves would not hold up well with heavy use. Dovetailing may have been the most common alternative to the slit weave. Where different fields of color met, the colored weft threads would each loop around the same warp thread that marked their boundaries. This worked well for heavy clothing and rugs. In general, slit weaving would have been favored for silken textiles in which sharp images or patterns would be required.

When a fabric was fully woven, its edges would be stitched together or tied in decorative knots. Rugs were often laid out in the sun to set their dyes and to fade colors that were too bright. Other textiles might be stiff when removed from the loom and were handed over to fullers, who would process the fabrics to soften them. Plain white and plain black cloth frequently was favored, and white cloth would sometimes be left out in the sun to bleach it whiter.

Not much is known about medieval Islamic needlework, such as embroidery. In general, needlework on textiles seems to have been favored in India and the western Near East. In the 700s metalsmiths in Syria began producing very finely pointed needles that enabled people to stitch silk and fine cotton threads into detailed patterns in fabrics. Silk tended to be reserved for fine garments or coverings for special objects. In general, the use of silk in men's clothing was frowned upon, perhaps because it seemed feminine. Little needlework from medieval Islamic societies survives, so historians typically have to rely on depictions of textiles in paintings and illustrations. Some lace fabric has survived. Most needlework seems to have been done by women at home for textiles to be used by family members. Needlework in clothing, curtains, and covering cloths for sale may have been done in shops by men rather than women in Iran and the regions of modern-day Pakistan and Afghanistan.

See also ALCHEMY AND MAGIC; ADORNMENT; ARCHITECTURE; ART; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; CRAFTS; DEATH AND BURIAL PRACTICES; ECONOMY; EMPLOYMENT AND LABOR; FAMILY; GENDER STRUCTURES AND ROLES; HOUSEHOLD GOODS; INVENTIONS; OCCUPATIONS; RELIGION AND COSMOLOGY; SOCIAL ORGANIZATION; TRADE AND EXCHANGE.

Europe

Procopius: "The Roman Silk Industry" (ca. 550)

About the same time there came from India certain monks; and when they had satisfied Justinian Augustus that the Romans no longer should buy silk from the Persians, they promised the emperor in an interview that they would provide the materials for making silk so that never should the Romans seek business of this kind from their enemy the Persians, or from any other people whatsoever. They said that they were formerly in Serinda, which they call the region frequented by the people of the Indies, and there they learned perfectly the art of making silk. Moreover, to the emperor who plied them with many questions as to whether he might have the secret, the monks replied that certain worms were manufacturers of silk, nature itself forcing them to keep always at work; the worms could certainly not be brought here alive, but they could be grown easily

and without difficulty; the eggs of single hatchings are innumerable; as soon as they are laid men cover them with dung and keep them warm for as long as it is necessary so that they produce insects. When they had announced these tidings, led on by liberal promises of the emperor to prove the fact, they returned to India. When they had brought the eggs to Byzantium, the method having been learned, as I have said, they changed them by metamorphosis into worms which feed on the leaves of mulberry. Thus began the art of making silk from that time on in the Roman Empire.

From: *Procopii Caesariensis historiarum temporis sui tetras altera. De bello Gothico*, trans. Claudius Maltretus, rpt. Roy C. Cave and Herbert H. Coulson, eds., *A Source Book for Medieval Economic History* (Milwaukee: Bruce Publishing Co., 1936).

The Islamic World

Excerpt from The Itinerary of Benjamin of Tudela (late 12th century)

Thence it is two days to Bagdad, the great city and the royal residence of the Caliph Emir al Muminin al Abbasi of the family of Mohammed. He is at the head of the Mohammedan religion, and all the kings of Islam obey him; he occupies a similar position to that held by the Pope over the Christians. . . . Within the domains of the palace of the Caliph there are great buildings of marble and columns of silver and gold, and carvings upon rare stones are fixed in the walls. In the Caliph's palace are great riches and towers filled with gold, silken garments and all precious stones. He does not issue forth from his palace save once in the year, at the feast which the Mohammedans call El-id-bed Ramazan, and they come from distant lands that day to see him. He rides on a mule and is attired in the royal robes of gold and silver and fine linen; on his head is a turban adorned with precious stones of priceless value, and over the turban is a black shawl as a sign of his modesty, implying that all this glory will be covered by darkness on the day of death. He is accompanied by all the nobles of Islam dressed in fine garments and

riding on horses, the princes of Arabia, the princes of Togarma and Daylam (Gilan) and the princes of Persia, Media and Ghuzz, and the princes of the land of Tibet, which is three months' journey distant, and westward of which lies the land of Samarkand. He proceeds from his palace to the great mosque of Islam which is by the Basrah Gate. Along the road the walls are adorned with silk and purple, and the inhabitants receive him with all kinds of song and exultation, and they dance before the great king who is styled the Caliph. They salute him with a loud voice and say, "Peace unto thee, our Lord the King and Light of Islam!" He kisses his robe, and stretching forth the hem thereof he salutes them. Then he proceeds to the court of the mosque, mounts a wooden pulpit and expounds to them their Law. . . . He does not leave the palace again for a whole year. He is a benevolent man.

From: Marcus Nathan Adler, *The Itinerary of Benjamin of Tudela: Critical Text, Translation and Commentary* (New York: Phillip Feldheim, Inc., 1907).

FURTHER READING

- Jose J. Arrom, Ricardo E. Alegria, and Fatima Berch, *Taino: Pre-Columbian Art and Culture from the Caribbean* (New York: Monacelli Press, 1997).
- Rita Bolland, *Tellem Textiles: Archaeological Finds from Burial Caves in Mali's Bandiagara Cliff* (Amsterdam, Netherlands: Royal Tropical Institute, 1991).
- David S. Brose, James Allison Brown, and David W. Penney, *Ancient Art of the American Woodland Indians* (New York: Harry N. Abrams, 1985).
- Young Yang Chung, *Silken Threads: A History of Embroidery in China, Korea, Japan, and Vietnam* (New York: Harry N. Abrams, 2005).
- Elizabeth Crowfoot, Frances Pritchard, and Kay Staniland, *Textiles and Clothing, c. 1150–c. 1450*, new ed. (Rochester, N.Y.: Boydell Press, 2001).
- Frances Gies and Joseph Gies, "The Arabs, Transmitters and Inventors," in their *Cathedral, Forge, and Waterwheel: Technology and Invention in the Middle Ages* (New York: HarperCollins, 1994).
- "Islamic Textile History," *TextileAsArt.com*. Available online. URL: <http://www.textileasart.com/weaving.htm>. Downloaded on November 8, 2007.
- "Islamic Textiles," *Islamic Architecture*. Available online. URL: <http://www.islamicarchitecture.org/art/islamic-textiles.html>. Downloaded on November 15, 2007.
- Désirée G. Koslin and Janet Snyder, eds., *Encountering Medieval Textiles and Dress: Objects, Texts, Images* (New York: Palgrave Macmillan, 2002).
- Colleen E. Kriger, *Cloth in West African History* (Lanham, Md.: AltaMira Press, 2006).
- Venice Lamb, *West African Weaving* (London: Duckworth, 1975).
- Robyn Maxwell, *Textiles of Southeast Asia: Tradition, Trade, and Transformation* (Hong Kong: Periplus, 2003).
- David Nicolle, "Textiles as Treasure," in his *Historical Atlas of the Islamic World* (New York: Checkmark Books, 2003).
- Manouchehr Saadat Noury, "Origins of Carpet Weaving in Iran," IranDokht. Available online. URL: <http://www.irandokht.com/editorial/print.php?area=pro§ionID=8&editorialID=1116>. Downloaded on November 8, 2007.
- Sheila Paine, *Embroidery from India and Pakistan* (Seattle: University of Washington Press, 2001).
- Esther Pasztory, *Pre-Columbian Art* (New York: Cambridge University Press, 1998).
- John Picton, "Tradition, Technology, and Lurex: Some Comments on Textile History and Design in West Africa." In *History, Design and Craft in West African Strip-Woven Cloth* (Washington, D.C.: National Museum of African Art, 1992).
- John Picton and John Mack, *African Textiles: Looms, Weaving and Design*, 2nd ed. (New York: Harper and Row, 1989).
- Charles Rostov and Jia Guanyan, *Chinese Carpets* (New York: Harry N. Abrams, 1983).
- Rebecca Stone-Miller, *To Weave for the Sun: Ancient Andean Textiles in the Museum of Fine Arts, Boston* (New York: Thames and Hudson, 1992).
- James C. Y. Watt and Anne E. Wardwell, *When Silk Was Gold: Central Asian and Chinese Textiles* (New York: Metropolitan Museum of Art, 1998).

► towns and villages

INTRODUCTION

The reasons people created villages were manifold, affected by their culture, their environment, and the politics of their region. In general, in the medieval world villagers lived lives apart from people in cities; their outlook on society could be very different from that of city dwellers. Villages sometimes arose only reluctantly, when people were pressed to form social units larger than the nuclear family. For instance, in Britain, even when it was ruled by the Roman Empire, most people preferred to live in homesteads: a house, perhaps a barn, and sometimes a surrounding wall, far from their neighbors. During the medieval era the British were compelled to form villages and towns for mutual protection from bandits and warlords as well as for cooperating on public works such as irrigation.

Indeed, some historians and archaeologists think that public works projects may have given rise to the first towns in ancient Mesopotamia, where building and maintaining irrigation canals required people to work together and enabled them to farm more land that allowed more people to live close together, eventually giving rise to full-blown cities. This complex process whereby people came together to form ever-larger settlements can be oversimplified, as if homesteads that were clustered together became villages, which prospered and attracted enough people to become towns, which in their turn became cities. This seemingly linear development rarely happened; indeed, sometimes urban cultures such as that of the Maya transformed themselves into rural cultures. An ecological disaster (and possibly relentless wars) seems to have made Mayan urban life unbearable, and the Maya left their cities to live in villages in forests and fields.

What makes a village, and what makes a town? Sometimes archaeologists try to define villages and towns by their populations. A village would rarely have more than a few thousand residents, whereas a town would have as many as 10,000 residents. Cities have populations larger than 10,000 people. This way of defining settlements is intended to be a simple shorthand for classifying social units that could vary greatly in their structure from one culture to another. Another way of distinguishing villages and towns would be by their political structure. In many parts of the medieval world villages were composed of related families, in the form of clans—that is, people claiming descent from a common ancestor, real or mythological. The laws governing a village would be kinship rules that defined who was to be respected and what duties a person was expected to perform based on his or her gender and relationship to other members in the village. In some African and central Asian cultures this resulted in a language

that made refined distinctions in how someone was to address another person based on that person's relation as uncle, aunt, cousin, in-law, and so on. In that sense, a village was a place where everyone knew everyone else and everyone's place in the society of the village.

Thus, a town could be defined in part as a settlement where not everyone knew everyone else, related or otherwise. In a town, social structure would have to account for the possibility that two people upon meeting would not know each other. In a western African village, it was possible for a person to be acknowledged the village leader based on his or her standing in the community. In a process anthropologists call *social banking*, a person would do favors for others and accumulate a social debt that everyone in a village would know about. In a town it would not be possible for everyone to keep track of everyone else's status in that way. Some towns in the medieval world tried. For instance, towns in the Islamic world often were subdivided into districts that were inhabited and governed by particular clans. This often resulted in a social breakdown in which no one had control of a town. Muhammad was invited into Medina to resolve just such a problem.

Therefore, a town in most of the medieval world was a settlement in which a political structure existed that allowed people to know who was in charge of what. In those cases, there would be a civil authority that was either elected or appointed. Replacing incompetent leaders could be difficult, because towns could develop small bureaucracies and politically elite families that would strive to hold on to power. This could result in civil unrest, in which case in cultures as diverse as those of China, India, and the Islamic world outside authorities would impose a political structure on the town. Governors or monarchs were expected to remove bad political leaders and replace them with better political leaders in towns. Sometimes towns organized themselves in ways intended to enable them to avoid such actions by governors or local nobility, perhaps because the townspeople preferred their leaders to the unknown leadership that could be imposed from outside. For instance, in medieval Europe craftspeople in towns sometimes formed communes through which they asked for charters from monarchs that would make the towns independent of local nobility.

AFRICA

BY AMY HACKNEY BLACKWELL

Medieval Africa was a rural society predominantly. Most people supported themselves through agriculture, herding, or hunting and gathering. They did not trade extensively with one another. Because of this, African towns and villages were small, located near fields or pastures, and inhabited by people

who were closely related, such as brothers and their wives and children. In many cases, people lived in settlements that could only barely be described as villages; they were very small and often temporary.

People who engaged in agriculture built the largest and most permanent towns and villages. There were a number of towns and villages in Ethiopia. These towns were home to a thriving Muslim and Christian population. Houses were built of stone, and neighborhoods were divided by paved roads. These towns were often surrounded by stone walls. Within the towns were cemeteries, mosques or churches, and courtyards. In 2006 archaeologists found traces of three Muslim towns that they believe date from the 10th through the 16th centuries. These towns seem to have been sparsely populated and surrounded by stone walls.

The Ibo people of present-day eastern Nigeria lived in villages that housed between 100 and 2,000 people. Each village was part of a larger group of villages that were connected by kinship, culture, and shared government. The villages within a group were typically less than a mile away from one another. The village was surrounded by farmland that was divided into several sections, most of which were allowed to lie fallow to regain their fertility. The village was surrounded by a band of palm trees grown for oil and raffia fibers. These palms also lined the paths between villages.

The houses of a village were built around a central area or two areas if the village was large. People used the open space for group meetings and ceremonies, placing logs around the perimeter of the square to serve as seating during festivities. The men of the village would also build and maintain a mud hut with a thatched roof in the square as a place for male social gatherings. Surrounding the square were several groups of houses. Family groups all lived in the same part of town, often in formally defined compounds. A family compound contained numerous mud-and-thatch houses that shared walls with one another. The houses opened onto narrow alleys, and the compounds themselves opened onto the central town squares. Families adorned the entrances to their compounds with decorated gateways.

The Hausa people of what is now northern Nigeria had numerous towns and villages in addition to a number of larger settlements that could be classified as cities. Towns and villages were made up of compounds, each of which housed a large number of people. A compound was surrounded by a high mud wall. At its entrance was a hut where visitors could announce themselves. Just inside the entrance to the compound was a courtyard where animals were stabled and young men slept. Beyond this was a wall leading to an inner courtyard. Inside it were a number of mud huts with thatched roofs, one hut for each wife of the compound's owner. These huts

could be round or rectangular and might have porches and were separated from the compound's entrance by interior walls and courtyards. The women's quarters were arranged in such a way that it was difficult for someone standing outside to see into them. The inner courtyard contained a cooking area where the women prepared food for the family. It might also have a well. Off to the side were a latrine and bathing area.

The outer walls of the town's or village's compounds defined streets. Most towns and villages were surrounded by large walls designed to keep out invaders. Each town had a market area, often on its periphery. Here merchants and customers gathered every week or so. Towns and villages within the same area would coordinate their market days so that they would not overlap. Towns also contained mosques and palaces for chiefs. Villages formed the smallest unit of local administration. Villages themselves were divided into wards, each with its own head who would handle land distribution and other matters.

The Ganda people of present-day Uganda built villages that contained between 30 and 80 houses. These houses were circular beehive-shaped structures about 20 feet in diameter made entirely of thatched cane. Each house had a front and a back room. A family might inhabit several houses and small huts, all encircled by a fence to form a compound. Some of the family's farmland would be enclosed inside its compound. A chief's compound contained many houses and huts that accommodated all the chief's wives, children, and servants. The chief's compound served as the social center of the village, and the village people would congregate there to eat, drink, and talk with one another. Ganda territory was typically hilly or swampy. The villages were built on the sides of hills. The people used the rougher hilltops and swamps as pasture or marginal farmland. Although people tended to live near relatives, it was not uncommon for the Ganda to move from village to village to escape bad chiefs, unfriendly neighbors, or sorcery. The Ganda built their villages in clusters surrounding the homes of their chiefs. This semicentralized building structure made it easier for chiefs to collect tribute from their subjects.

The Swazi of what is now South Africa organized their dwellings into homesteads that housed the dependents of headmen or chiefs, and these homesteads, in turn, were grouped into villages. A Swazi homestead was built around a large enclosure where cattle were kept and grain was stored. The living quarters, which consisted of a number of huts made of reeds, stood at one end of the enclosure. The largest hut was the home of the most important woman, usually the chief's mother. The man's wives lived in the surrounding huts. Each woman had her own space in which to sleep, cook, and store her food. Boys and men lived in separate huts.

Kings and chiefs used this village structure to spread their power across large territories. A king had many wives, and he would try to distribute them in different villages. This allowed him to control a large amount of surrounding farmland and made it possible to separate wives or other relatives who could not get along with one another. People who sustained themselves by herding lived in clusters of dwellings but usually did not build permanent towns as farmers did. The herders of present-day Kenya, such as the Masai, lived in small, temporary villages that they could easily abandon when they moved their herds to new grazing areas. When a group decided to stay in one place to let the cattle graze, the women would build small, round houses out of sticks and cattle manure. They would build a fence around the cluster of houses out of thorny sticks. Women and children were the primary occupants of the village, while the men spent most of their time out with the cattle.

The nomadic pastoralists of modern-day Somalia built temporary settlements within the territory that their clans grazed. They abandoned their hamlets and moved to new locations whenever they needed to find better pastures or water sources. They did not think of settlements as permanent fixtures of the landscape. A Somali settlement consisted of several huts made of wood frames and animal skins. Each wife owned her own hut, which could be dismantled and moved on the back of a camel when necessary. The settlement was encircled by a fence made of thorn bushes that kept out animals and threatening humans. In the center of the settlement were pens for sheep and goats. The inhabitants of a hamlet might include several related families, such as the wives and children of several brothers, but more often they were just three or four nuclear families living together. Boys and men spent most of their time out in the pastures with the herds, leaving the settlements to their womenfolk.

The Jie, a seminomadic people of present-day Uganda, lived in small collections of houses called homesteads. A Jie homestead typically housed several extended families who all belonged to one clan; it might contain 100 to 200 people. The residents lived in round beehive-shaped thatched grass huts. Each hut was the home of one of the wives and her children. Each hut was inside its own fenced yard, where the woman who owned it cooked over an open fire and did her other work. Within the yard the woman would erect another grass hut to shelter her calves and serve as a kitchen during rainstorms. The fenced enclosures were arranged in a horseshoe shape. Cattle and goats spent their nights inside the horseshoe. Although the women owned the houses, the men of the homestead's family were the real owners of the settlement. The Jie would typically build several homesteads near one another, forming a settlement. The inhabitants of the settlement

shared local resources, such as ponds. They also shared rituals and came to one another's defense.

The hunter-gatherers of the Kalahari desert did not build permanent settlements. They did, however, build temporary houses close to one another. Women occasionally built huts called *schirms* to provide shade for themselves and their children. Although they usually did not bother with this work, preferring to sleep in the bush, if they were staying in one place for a while and there was no good natural shelter, they would build several *schirms* that the group would live in for a time. The !Kung were particularly likely to build *schirms* for special occasions such as a wedding or a girl's first menstruation.

The small-statured hunter-gatherer peoples of the central African forests likewise did not build real towns or villages. They would build temporary settlements when they stopped at a particular place in a forest. A settlement would include huts inhabited by couples and their young children and huts occupied by bachelors.

THE AMERICAS

BY J. J. GEORGE

The Aztec city of Tenochtitlán in what is now Mexico, with its population of 200,000 in 1521 (when Hernán Cortés arrived), represents the maximum extent of Mesoamerican urbanism. Towns and villages had lower levels of population, complexity, function, form, and urban texture. Towns should be thought of as settlements running to hundreds of acres, with housing structures that number in the hundreds, accompanied by deep middens (or refuse heaps). Towns have heavy structures that have been rebuilt or strengthened over time in one spot. A town's dwellings are arranged in definite patterns and often in relation to ceremonial structures, such as temples, and often with some type of fortification. Towns also have a sense of place, longevity, and continuity that is lacking in villages. They are often distinguished by size and elaborate public architecture, and greater size usually means that new forms of organization develop. (More recently scholars have been simplifying their classification by using such terms as *large settlement*, *center*, or simply *big site*, terms that are effectively neutral.)

A village, broadly speaking, occupies less area than a town. It will occupy an area of several acres where the number of dwellings might run as high as 30 or 40. Structures are suitable for extended periods of time, refuse and midden deposits are in evidence, and some basic form of village planning is common. Early villages often had primitive social hierarchies ruled by chiefs and overlap with chiefdoms in the literature. Towns and villages were ubiquitous throughout the Americas by the period from 500 to 1500.

Anasazi, Hohokam, and Mogollon pit house villages in the North American Southwest before 900 may have shared a common layout—a central clear area, possibly a plaza, with a great kiva, or underground ceremonial structure, to one side, separating northern and southern clusters of residences. By 700 Anasazi towns consisted of lines of linked rooms fronted by pit houses, perhaps foreshadowing the “street” arrangement of later sites, such as Skunk Springs, Yellow Jacket, Snaketown, and even some modern pueblos. Yellow Jacket was assumed to be among the largest towns, and population estimates range from 1,000 to 4,500, partly depending upon the number of outlying villages and hamlets included in the count.

The many separate buildings of Chaco Canyon in present-day New Mexico, jammed into an inhospitable canyon, were long thought to be independent, self-sufficient agrarian pueblos. But research suggests Chaco Canyon was a coherent settlement delineated by roads, walls, mounds, and public architecture. Public architecture, in this sense, could mean plazas, great houses (structures containing up to 700 rooms), kivas, ball courts, platform mounds, canals, and roads. After the fall of Chaco Canyon around 1150, pueblo communities and cliff dwellings became common, such as the familiar Mesa Verde, Zuni, and Kayenta. Generally speaking, pueblo style was defined by massed adobe units surrounding a plaza, and cliff dwellings by stacked-stone enclosures with ritual kivas neatly molded into defensible spaces beneath cliff overhangs. After 1300 pueblos grew very large, with pueblos of 1,000 or more rooms common. The largest settlement of this time, Paquime, had an estimated population of 4,700.

Towns and villages in the Southeast and Midwest emerged within the broader cultural contexts of the Adena and Hopewell traditions of 300 B.C.E. to 400 C.E. and the later Mississippian culture of roughly the ninth to 16th centuries. The towns and villages of the Mississippian tradition shared a sedentary lifestyle, a hierarchical social organization of chiefs and warriors, and a unifying ideology involving earth-fertility themes and ancestor veneration. Mississippian towns were defined by a central mound-temple configuration and plazas, resulting in a square plan that symbolized the symbolic four-quarters worldview. Major Mississippian towns include Cahokia, Moundville, Spiro, Lake George, Winterville, Etowah, and Angel. The largest site, Cahokia, had over 100 mounds, multiple plazas, covered more than 2,965 acres, and had a population estimated between 12,000 and 30,000.

Clustered villages and towns were common during the Aztec period (14th–16th centuries), especially in the southern basin. In these settlements, houses were packed rather closely together and the communities had fairly clear boundaries. Towns and some larger villages contained buildings set aside for administrative and religious functions. Large villages,

towns, or areas of dispersed settlement often corresponded to a *calpolli*, a social or territorial unit that helped regulate land tenure and tribute payment.

Scholars subdivide Mayan settlements into regional, primary, secondary, tertiary, and quaternary centers based in part on the number of emblem glyphs that show up at a particular site and on the number of plazas. Each Mayan center had its own glyph, like a symbol or seal unique to that center, which when found at another site indicated a relationship between the two. Regional and primary centers were the first to achieve state-level organization and some scholars identify them as cities. The subsequent centers would then overlap with towns and villages. For example, Tikal, Yaxchilan, Copán, and Palenque are primary centers. Secondary centers include Aguateca, Machaquilá, Naranjo, Piedras Negras, and Quiriguá. And tertiary centers include Uaxactún, Bonompak, Jimbal, Ixla, and Miraflores. The largest centers, such as Tikal, extended over 48 square miles, and the smallest may have covered less than a half a square mile.

Mayan centers are dominated by central concentrations of special-purpose architecture including platforms, causeways, temples, ball courts, palaces, occasional fortifications, and plain or sculpted stone monuments. The centers served many functions. There are areas for public gatherings, ceremonies, ball games, and markets; and there are facilities for political and administrative activities. The largest and most elaborate residential structures were often in or near these centers.

Archaeological research in South America favors Andean settlements of larger, more complex entities akin to cities, capital cities, city-states, and empires. Nonetheless towns and villages, like the other areas, were ubiquitous. For instance, the Nazca society, centered on the central coast of Peru from 200 B.C.E. to 700 C.E., is considered by many scholars to be a group of agrarian villages and towns that together controlled a given valley. Other scholars see Nazca as a multi-valley state with its capital at a settlement called Cahuachi, a site with over 40 mounds dispersed over 371 acres whose permanent residential occupation is debated.

Moche was a state-level enterprise on the north coast of Peru that had run its course by 700. The conventional perception of Moche has been of a monolithic state with its capital at a site of the same name, but recent rethinking supports multiple regional political units, not unlike administrative towns with local tributaries, sharing cultural and aesthetic traits broadly identified as Moche.

Like Moche, Tiwanaku culture spread widely and unified a broad area with similar cultural characteristics. It occupied the richest agricultural area of the whole highland region of present-day Peru and Bolivia, adjacent to Lake Titicaca, be-

tween the sixth and 11th centuries. Largely a farming population, permanent settlements were established in valleys in small clusters of houses or in villages directly associated with farmland but also connected to the urban center.

The Wari Empire evolved adjacent to and simultaneous with Tiwanaku from the sixth to 11th centuries. It developed to the north in the Ayacucho-Huanta basin of Peru, territory occupied by a group identified as Huarpa. Huarpa life was village-based and at the time occupied the entire basin with a large number of small villages and hamlets scattered over the mountain slopes, which were sculpted with terraces to provide cultivable space and to limit erosion. The most numerous settlements were villages built with tree trunks or clay, coexisting with towns made of rough stone houses, generally round or oval in shape. The largest sites were near irrigated fields.

Finally, Cuzco, the eventual capital of the Inca Empire, was a large town or small city. Much of its pre-imperial history has been wiped out by human action—Inca and Spanish—and natural catastrophe. Settlements in the region prior to the Inca were no more than hamlets and small villages. Many were found on mid-elevation peaks or ridges, implying a concern for defense. By 1434 the Inca imperial campaigns had begun, and a primary concern was the total reorganization of Cuzco, which turned from what was probably a fairly sleepy town into the heart of a massive empire.

ASIA AND THE PACIFIC

BY MARK W. ALLEN

In many human societies the bulk of the population lives not in large urban centers, but in towns and villages. A village can be defined as a distinct community with inhabitants numbering from a few hundred to maybe a thousand and a town as having a few thousand to perhaps 5,000 people. Communities with true urbanism and populations in the tens of thousands are usually regarded as cities. Like cities, towns usually serve functions that villages do not. For example, they might serve as markets and administrative centers, with storage facilities and craft specialists. They might contain religious structures such as temples, shrines, or cemeteries. And they might be fortified, offering protection to which people living nearby might flee.

It is common to find towns surrounded by a number of neighboring villages, which officially or unofficially rely on the town as their social, economic, and political center. Geographers and anthropologists have long noted that the locations and types of settlements provide accurate information about the level of integration of particular human societies. Cities generally indicate the presence of state level

governments. States often have considerable hierarchy in types of settlements including hamlets (small, scattered communities with a hundred or fewer inhabitants), villages, towns, regional cities, and true urban centers. Towns without cities might reflect a less integrated system such as a chiefdom or small kingdom. Isolated villages scattered in a wide area probably indicate that communities are largely autonomous and self-reliant. In medieval Asia and the Pacific, a considerable variety in the patterns of towns and villages is evident.

Medieval Asia saw the continuation of states and empires in India and China from ancient times. In other areas, such as Japan, Korea, and Southeast Asia, states arose for the first time starting between 500 and 800 C.E. Thus it should be no surprise that major cities were the capitals or hubs in most of medieval Asia. Towns and villages surrounded these centers and were tied to them through interdependence. They provided agricultural surplus and sometimes labor for the cities. In turn, cities provided administration, special markets and crafts, military protection, and sometimes religious functions or facilities. In many cases it was the cities that got the most out of these relationships.

Towns varied quite a bit depending on their location and culture. In medieval India towns often contained extremely important Hindu temples or other sacred sites despite a relatively small size compared with royal or imperial cities. Such shrines often received pilgrimages from faraway places. In Southeast Asia medieval towns were centers of both Buddhist and Hindu temples, which were often surrounded by walls to delineate sacred areas. Towns there were also fortified and contained large reservoirs of water critical for agriculture. Those located on the coast and along major rivers served as important trading centers. Korean towns from the early and middle medieval period reflect the lack of integration there while three kingdoms battled for supremacy. Nearly all large communities in Korea were located on high hills that provided natural defense, and they were heavily fortified with ditches and walls. Like many Asian towns, they contained the tombs of rulers.

Chinese towns frequently were walled for defense, had large markets, and were key intersections for linking the peasants of their hinterlands into the empire. It is important to note that most Chinese peasants rarely left their own villages and local fields. Towns were usually a day's travel away and were rarely visited by most villagers. Cities were even less visited, as they might be several days of travel away. Village China essentially had its own culture established on ancient traditions based on the *hsu*, or patrilineage. Villages were far indeed, in many senses, from the literate Confucian culture to be found in the cities.

One particularly interesting medieval Asian town is that of the center of the Mongolian Empire in central Asia. Karakorum (also spelled Kharkhorum) was constructed from 1220 to 1260 by order of Genghis Khan (ca. 1162–1227). It was a planned community placed in a strategic point in the center of the empire, well positioned to take advantage of trade and communication routes. The town did not have a large permanent population, but it did contain separate districts for Chinese merchants and Muslim inhabitants. Temples representing a dozen religions were constructed. The key building of the town was the Wan, an imperial palace surrounded by a wall a little over half a mile long. Main streets ran through the town, and the town itself was surrounded by a fortification wall a little under 4 miles long. Much is known about this community from archaeological excavations as well as from the description of the European traveler Willem van Ruysbroeck (ca. 1215–ca. 1295). Thus, even the highly mobile Mongol pastoralists of Asia found it necessary to construct towns to administer their territories, conquests, and trade routes.

In contrast, villages of medieval Asia are fairly similar. These communities lacked fortifications, major temples, market centers, administrative centers, or any of the other special facilities of towns and cities. They served as the residence of peasants, and were largely structured through kinship rather than strict political control. In many ways, these communities maintained basic patterns dating back several thousand years to the beginnings of agriculture. Even in the 21st century Asian villages share much with their medieval counterparts despite the increasing presence of machines, television, and the Internet. In much of Asian history, it would be typical to find that well over 90 percent of the population lived in villages rather than towns or cities. Life in these communities was usually organized along family lineages with elders having important leadership roles.

In the Pacific the cultures of Melanesia, Micronesia, and Polynesia were spread across small islands (with a few exceptions) and supported mostly by growing root crops in small gardens in most cases (again with a few exceptions). Towns were thus very rare in the Pacific during medieval times; people lived in hamlets and villages. Even in the early 21st century such settlements are highly efficient for maximizing the resources of small islands without destroying them, because the population is spread out across both coastal and interior areas. Indeed, many Pacific Island villages specialize in particular resources such as fishing or gardening. Medieval villages here, as in nearly every other part of the world, were organized largely along kinship. To a large degree one's family lineage or lineages determined where one lived. Family elders were usually the key decision makers in villages. Special facilities and functions are limited in such communities.

There were, however, some islands in the Pacific where large communities with populations in the low thousands did develop. These communities often had special functions: they served as administrative centers for chiefdoms; as centers of defense; as locations for food storage, trade, and concentrations of crafts such as canoe-building; and sites of religious temples and monuments.

A good example of extremely large villages or small towns formed for military protection would be the *pa* (hill forts) of the New Zealand Maori. New Zealand's cool and wet climate made the typical Polynesian crops impossible or difficult to grow. Good gardening areas were very limited and highly desirable. Around 1500 the demand for this land brought about intense warfare, which led to the centralization of settlement in some particularly productive areas. Chiefs and their followers constructed *pa* in naturally defensible locations. The construction involved the use of earthwork fortifications and wooden palisades. Inside these strongholds were houses as well as stored food supplies. The largest such communities had perhaps a thousand occupants at times of greatest threat. Similar towns or villages can be found in parts of Micronesia and other Polynesian islands.

In Hawaii agriculture and religion seem to have led to the construction of the largest communities in the most favored locations. Here chiefs had considerable power, to the extent that they were sometimes considered direct descendants of gods. They owned large wedges of islands outright while their followers numbering in the tens of thousands at times owned virtually nothing. Irrigation was used to increase the production of the root crop taro, and this sometimes resulted in the concentration of people in large villages near dependable rivers or streams. Chiefs often established their sizable households in these areas. Another function of these types of communities was religious as Hawaiian chiefs competed with one another to build the biggest temple complexes using stone architecture. Still, even the largest of these communities could be regarded as simply a number of adjoining villages and hamlets rather than a centralized town. For the most part, traditional Pacific life was village life.

EUROPE

BY BRADLEY A. SKEEN

In the late Roman Empire, as landowners grew more independent, the large estates called *latifundia* became self-sufficient agriculturally, producing enough for their own needs and a surplus for local markets. Workers, who might have been enslaved during the empire, were now free, albeit they were usually dependent on the landowners. As the protective cordon of the Roman frontier collapsed and pillaging

peoples occupied the Western Roman Empire, landowners fortified their isolated villas for protection. These fortified Roman villas became the nucleus of the medieval manorial system. Workers would have lived in one or another of the villages (a term derived from *villa*, as is the Middle English *villein*, meaning "peasant") that sprang up near the fortified manor. Roman towns, on the other hand, had been purposely founded centers placed at strategic locations, either near the frontier for defensive purposes or along the transportation network, without any special relation to the villas.

This system of rural land use remained substantially intact in territories controlled by the Byzantine Empire and also endured surprisingly well in western Europe. In the fifth century the island of Britain was abandoned by the Romans, and most of the villas, palatial country houses that had been increasingly fortified, were sacked by the Anglo-Saxon invaders. Paradoxically, these ruins have features that have been preserved in their original condition, revealing a very detailed picture of rural life in Britain to archaeologists.

At the same time on the Continent the population was declining, which meant that many villas, along with large stretches of the countryside, were virtually abandoned. This was a pattern that was to be repeated in the Middle Ages. When the population dropped, towns might become smaller, but they were not abandoned. Rural estates were abandoned, however; when that happened the land returned to forest. Populations remained as concentrated as possible, since the way of life of European peasants, always on the margin of starvation, required extensive cooperation to ensure survival. In the fifth century the existence of large unpopulated tracts of land allowed the emperors to invite whole Germanic ethnic groups, such as the Visigoths and Burgundians, into the empire and assign them lands held by the local kings in exchange for a pledge of military service. These lands were divided among the ethnic groups into freehold farms following Germanic custom. This practice is the precursor, if not the direct ancestor, of the medieval feudal system. The policy failed disastrously, since the ethnic group leaders, with only the most tenuous ties to Roman civilization, soon preferred independence to the uncertain protection of the waning empire and let it dissolve into a number of independent kingdoms after 476. After his failed invasion of Spain (778), Charlemagne (r. 800–14) settled his veterans on unoccupied farmland in southern France, obliging them to render military service in the future in exchange for the land. This is often seen as the beginning of feudalism.

In the fifth and sixth centuries the population of western Europe plummeted still further in the face of repeated invasions and contagious diseases. The consequent high mortality rate and panic naturally led to famine, and hunger led

to susceptibility to other diseases. By the year 800 the total population of Europe is thought to have been no more than 30 million, when it had once been as much as 100 million during the empire. In the sixth and seventh centuries pious landowners with untenanted villas frequently gave them to monastic orders, which would reclaim the land and attract their own peasants to work the estate. Almost all the monasteries established in western Europe at this time, such as the famous Monte Cassino in Italy (529), were founded in this way. New villages and towns would grow up around the monasteries.

First the Carolingian and then the Holy Roman Empire made concerted efforts to expand to the east, even in bad times. After local ethnic groups living beyond the frontier had been defeated, new provinces (marches or marks) would be established with colonists from the interior. There, new towns and villages would be organized. Another support for new towns at this time was the increased volume of trade on the North and Baltic seas. These so-called emporia (trading posts) grew steadily in prosperity and by the later Middle Ages had mostly become imperial cities (free of the interference of local nobles) and had organized themselves into the Hanseatic League, which monopolized trade in the area. In the east the new towns had often been founded, like Lübeck, on the sites of conquered Slavic villages.

After another series of devastating raids by Vikings, Magyars, and Saracens, the general security of Europe began to improve around the year 1000 and with it the level of population and economic prosperity. By 1347 (the eve of the great pandemic of the Black Death), the total population of Europe is thought to have risen to as high as 100 million again. Social organization was now firmly based on the manor system. This consisted of a fortified position (castle), whose lord was the major landowner, in which the local populace took refuge during invasions, with an adjacent village inhabited by agricultural workers dependent on the lord. Peasants worked their own fields, which had been allotted them by their lord, in exchange for a share of the crop. They also worked on common fields and used common lands for grazing livestock. Old regions of forest were redeveloped through the reoccupation of older sites and the establishment of new manors.

In the 10th century and later landowners continued granting lands to found new monasteries, but these lands typically had long been forested by this time and were technically part of the lord's hunting preserves. There was little untenanted farmland. The great monastery of Cluny in France was founded (909) in this way. In Russia, after the devastation of the Mongol invasion and occupation in the 1230s, monasteries were founded in virgin, uninhabited forest to the northeast of the old population centers of Kiev Rus as places



Calendar page of October, showing a street lined with buildings and the village gate in the distance, Belgium, ca. 1510; men negotiate over the sale of an ox. (The Pierpont Morgan Library)

of refuge. Villages, towns, and eventually new cities, such as Moscow, grew up around them.

As new areas of countryside were redeveloped for agriculture and the population increased, new towns came into existence. These generally began as villages that happened to become market centers for trade between nearby villages, and they supported larger populations of traders and craftsmen besides peasants. Some would host regional trade fairs and so grow larger still. Towns produced additional income for their lords, especially income in the form of cash from taxes on business rather than a share of crops taken in kind. For this reason, the growth of towns was encouraged by the nobility, but at the same time the nobility wished to subject the townsmen to exploitative taxes. The townsmen's response to this problem was to form a commune, or society of mutual protection, that acted as a local government, and to try to obtain a charter granting the town fixed rights (especially in regard to economic activity). These charters were not granted by the local lord but by outside authorities, such as the king or em-

peror, who granted such rights not only to impose a control on the power of the nobility but also in return for a large cash payment from the commune.

The commune movement began in northern Italy where the urban tradition from Roman times was the strongest and the cities had the most independence, but it spread throughout Europe and down to very small communities. The Swiss government, for instance, evolved out of communal pacts made among quite small villages for the maintenance and protection of the Alpine passes. Communes would also finance the construction of city walls and establish a militia for self-protection. The threat was no longer from outside invaders but from the bandits whom the nobles failed to police or from the nobles themselves, who were often not above simply raiding unprotected towns.

An extreme, but not atypical, example of the relations between lord and town was that between Prince Alexander Nevsky (ca. 1220–63) and Novgorod. Novgorod was a wealthy merchant town that handled the transshipment of Russian furs to the Hanseatic League of cities that controlled trade on the Baltic. From 1236 to 1242 the previously independent town submitted itself to Nevsky (Prince of Vladimir) in return for his protection from Swedish and German invaders, greatly increasing his revenues. But in 1259 the commune of Novgorod grew tired of paying taxes to Nevsky and demanded a charter of freedoms and liberties from its prince. Nevsky responded by massacring hundreds of the leading merchants in the city.

From 1347 to 1350, the pandemic of plague known as the Black Death dramatically cut the population of Europe, very probably in half. The population did not begin to grow again for almost another century. Part of the reason was that the feudal governments enacted severe new laws to keep peasants where they were and earning no more than they had before the disaster—whereas a move to the free labor markets in the cities and larger towns would have brought far better prospects for most agricultural workers. In short, the balance of population between the cities and large towns and the countryside (villages) was manipulated for most of a century. The overall standard of living did increase slowly, however, simply because more resources were available, and another dramatic increase in population began in the early modern period that followed the Middle Ages with a shift toward urban centers.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

At its fullest extent the medieval Islamic world encompassed many different cultural traditions in its towns and villages. Especially in India and the regions of modern-day Pakistan

and Afghanistan, towns and villages retained much of their original cultural significance and governance. In northern India during the early era of Islamic conquest there was the clearest division between Islamized towns and villages and those that retained traditional Indian functions. Early Muslim rulers distinguished between immigrant Muslims and their descendants and Indian converts to Islam and their descendants. In general, Muslims of local extraction were discriminated against in hiring for government jobs and in social privileges. Many Indian cities had been burned, resulting in new cities or cities rebuilt along traditional Islamic lines, with marketplaces and mosques as the center of civic life. Towns and villages tended to remain as they had been before the imposition of Islamic government, even though most temples and other monuments had been destroyed. In those villages where Muslims dominated, mosques were built. In general, the farther a village was from a capital city, the more likely it was to be run as it had been before the advent of Islam.

An Indian town or village in Islamic territory tended to be run by a headman, by a council, or by both. The headman was usually a wealthy person descended from a family that had a tradition of civic leadership, although a headman could be replaced, usually at the orders of a sultan. A headman was responsible for settling local disputes, for negotiating with other villages over water rights and control of farmland, and for organizing and leading the defense of the town or village. In northern India as well as the regions of Pakistan and Afghanistan, this was very important because of the continuous threat of raids by bandits. It was common for headmen to die in battle against raiders.

Councils consisted of both old and young people, usually chosen for membership in a council by current council members. Councils cooperated with headmen when both were present in city governance. Some villages were organized around a particular craft or business. For instance, there were villages of blacksmiths, carpenters, or foresters, usually on a route to a city where their products could be shipped. These villages were run by guilds whose leaders functioned in the manner of a council, except that the leaders were usually elected by the residents of the village. In villages and towns of converts to Islam, headmen and councils continued to be the governors, with the same responsibilities as before. Villages and towns of Muslim immigrants seem to have been rare, with cities attracting most Muslim immigrants. In almost all cases villages and towns were expected to supply conscripts for public works projects, such as building and maintaining irrigation canals. During the medieval era Muslims gradually became Indianized, growing more tolerant of Hindu and Buddhist customs and more likely to organize their towns and villages in the traditional Indian manner.

To the west and in central Asia towns and villages were more likely to be organized according to the customs of Arabs. Outside of Islamic cities, people of the Near East tended to organize themselves in two ways: by kinship and by economic cooperation. Kinship was especially important among nomads. Individual families were often too weak for self-defense and too small to be economically powerful, so they associated with kinship groups whose members claimed descent from a common ancestor of four or five generations earlier. The limit of four or five generations was mostly the result of lines of descent being preserved as oral tradition and not as written tradition, with about five generations being the outer limit of oral memory. Actual descent from a common ancestor was not required for people to claim descent from a common ancestor and to claim membership of a kinship group. Numerous important kinship groups included people of different ethnic ancestry. For instance, many groups in North Africa consisted of both Berbers and Arabs. The oral history would be revised to include new members as if they actually shared a common descent, even when people knew they did not. Kinship groups provided protection from aggression by outsiders, leaders who could arbitrate disputes within the group, and spokespeople who could represent the group in dealings with government authorities. In towns and villages kinship groups often had their own quarters. Such was the case in some Arabian cities in Muhammad's own time.

Kinship groups could remain nomadic rather than settled, but economic cooperation created pressure for people to settle in one place where they could work together. Many towns and villages had existed before the era of Islam, others developed in response to agricultural needs, and still others grew out of trade. In each case, the more remote the town or village was from a city, the more likely it was that the Islamic faith would have a weak hold on the inhabitants, or no hold at all. Villages of pagans, Jews, and Christians often acknowledged the preeminence of an Islamic central government but pursued their own interests with only rare interference by outside authorities. In most cases during the medieval era, villages in remote mountain or desert areas were on their own, except for paying taxes and providing troops for the defense of the territory.

Historians sometimes write of an Islamic agricultural revolution. This developed out of the efforts of Islamic governments to bring wastelands under cultivation. In the Near East it meant repairing abandoned irrigation canals from previous eras. There and in North Africa and al-Andalus, governments also built new irrigation canals and made it a priority to maintain the canals. This helped bring new areas under cultivation, attracting settlers who became farmers. Different districts produced different agricultural products, perhaps

one producing fruits from orchards, another grain, and another meat from sheep and cattle. Where such districts met, sometimes several at a given point, people set up markets. The markets were held as often as once a week or as rarely as once a year. The markets attracted craftspeople, from women hoping to sell the textiles they made to blacksmiths hoping to repair broken pots and pans.

The agricultural revolution was sustainable enough for it to become worth their while for people to settle in such marketplaces. Farmers would set up housing near each other to aid in their cooperation in marketing their goods as well as to provide for mutual defense against bandits or other attackers. Carpenters, fullers, and others would settle in the new village because they found regular work among the farmers and visitors to the local market, called a *suq*. Such villages would almost always have a mosque, and Jews and Christians, if they were numerous enough, might build their own places of worship. Farming communities usually developed the *musha'* system. Under this system, the cultivatable local land was held in trust by the community, and perhaps once a year or sometimes more than once a year the land would be divided among the village's farmers according to how much they could cultivate.

Another way for a village or town to arise was when a particular location was suited as a stopping place along a trade route. In particular, rivers and coastlines became lined with settlements where traders could stop. A caravansary was a place set up on land routes to house and provide protection for traders and their goods, and around the caravansary a community could develop, first focused on providing services to travelers such as repairing broken equipment but sometimes developing into places where people from rural areas could come to trade their goods with travelers. In such cases, a spot could become a full-blown city with all the traditions and trappings of medieval Islamic urban areas.

Towns and large villages were often divided into districts, some of which were living quarters for people associated with one another either by a kinship group or by a craft or profession in common. Most villages had *asabiyya*, a community spirit that inspired villagers to work together for the common good. *Asabiyya* was often enough to ensure that villagers settled disputes peacefully and worked together. Such cooperation often derived from the nomadic Arabian traditions of honor that required people to be respectful to one another and to come to one another's aid in times of need.

The concept of honor often united groups of villages in cooperation. This was especially important for villages in areas remote from a central government's authority, because the villages often had only themselves to rely upon for defense. A central government's troops might be days

away from being able to come to the aid of remote villages. In mountain valleys in al-Andalus and central Asia, among oases in a dry desert, and on the irrigated plains of the Near East and North Africa, villages near each other often had geography and needs in common.

Among those villages particular kinship groups may have become dominant, and those kinship groups would ally themselves by creating a fictional mutual relationship with a heroic ancestor; out of that alliance would arise leadership for the groups of villages. Applying ancient Arabian rules of honor more often than Islamic law, leaders would make legal rulings, apply punishments, and organize public works projects, such as building roads or maintaining irrigation ditches. Often a single person, usually a man, became the acknowledged leader of the kinship group. He was accepted as leader because of his wisdom, after the fashion of Mohamad in Medina, or because he was elected by village leaders, or because of his military prowess. His leadership position was fragile; if he proved ineffective in mediating a dispute between rival villages or incompetent in military matters, he could be replaced.

Towns and village frequently did a very good job of organizing themselves and looking after the needs of their people. Still, all were potentially subject to social disasters. Towns and villages that were divided into quarters by kinship could become battlegrounds in feuds among the kinship groups. In such cases an outsider might be called upon to take over the

police force or to arbitrate. A leader could fall from respect if he failed to bring the feuding groups under control. Sometimes feuds could be so disruptive to civic life that fields went unplanted, traders stayed away, or taxes went unpaid. In such cases the central government's regional governor was expected to use the military forces at his command to quell the violence, meet out punishments, and organize relief. In areas prone to earthquakes or floods, regional governors often had to organize aid to villages. Failure in such duties could result in the governor's dismissal or even his execution. On the other hand, if he did a good job in defending against raiders or organizing communities to help each other, he could cause concern for the caliph or sultan, who would fear his popularity; death was then a common result for a governor.

See also AGRICULTURE; ARCHITECTURE; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FAMILY; FOOD AND DIET; FOREIGNERS AND BARBARIANS; FORESTS AND FORESTRY; GENDER STRUCTURES AND ROLES; GOVERNMENT ORGANIZATION; HOUSEHOLD GOODS; LAWS AND LEGAL CODES; MIGRATION AND POPULATION MOVEMENTS; MILITARY; NATURAL DISASTERS; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; PANDEMICS AND EPIDEMICS; RELIGION AND COSMOLOGY; SETTLEMENT PATTERNS; SOCIAL COLLAPSE AND ABANDONMENT; SOCIAL ORGANIZATION; TRADE AND EXCHANGE.

Asia and the Pacific

~ Willem van Ruysbroeck: Account of the Mongols (1253–55) ~

Mangu had at Caracarum [Karakorum] a great palace, situated next to the city walls, enclosed within a high wall like those which enclose monks' priories among us. Here is a great palace, where he has his drinkings twice a year: once about Easter, when he passes there, and once in summer, when he goes back (westward). And the latter is the greater (feast), for then come to his court all the nobles, even though distant two months journey; and then he makes them largess of robes and presents, and shows his great glory. There are there many buildings as long as barns, in which are stored his provisions and his treasures. In the entry of this great palace, it being unseemly to bring in there skins of milk and other drinks, master William the Parisian had made for him a great silver tree, and at its roots are four lions of silver, each with a conduit through it,

and all belching forth white milk of mares. And four conduits are led inside the tree to its tops, which are bent downward, and on each of these is also a gilded serpent, whose tail twines round the tree. And from one of these pipes flows wine, from another cara cosmos, or clarified mare's milk, from another bal, a drink made with honey, and from another rice mead, which is called terracina; and for each liquor there is a special silver bowl at the foot of the tree to receive it. Between these four conduits in the top, he made an angel holding a trumpet, and underneath the tree he made a vault in which a man can be hid. And pipes go up through the heart of the tree to the angel. In the first place he made bellows, but they did not give enough wind. Outside the palace is a cellar in which the liquors are stored, and there are servants all ready to pour them out when they

hear the angel trumpeting. And there are branches of silver on the tree, and leaves and fruit. When then drink is wanted, the head butler cries to the angel to blow his trumpet. Then he who is concealed in the vault, hearing this blows with all his might in the pipe leading to the angel, and the angel places the trumpet to his mouth, and blows the trumpet right loudly. Then the servants who are in the cellar, hearing this, pour the different liquors into the proper conduits, and the conduits lead them down into the bowls prepared for that, and then the butlers draw it and carry it to the palace to the men and women.

And the palace is like a church, with a middle nave, and two sides beyond two rows of pillars, and with three doors to the south, and beyond the middle door on the inside stands the tree, and the Chan sits in a high place to the north, so that he can be seen by all; and two rows of steps go up to him: by one he who carries his cup goes up, and by the other he comes down. The space which is in the middle between the tree and these steps by which they go up to him is empty; for here stands his cup-bearer, and also envoys bearing presents; and he himself sits up there like a divinity. On (his) right side, that is to the west, are the men, to the left the women. The palace extends from the north (southward). To the south, beside the pillars on the right side, are rows of seats raised like a platform, on which his son and brothers sit. On the left side it is arranged in like fashion, and there

sit his wives and daughters. Only one woman sits up there beside him, though not so high as he. . . .

Of the city of Caracarum you must know that, exclusive of the palace of the Chan, it is not as big as the village of Saint Denis, and the monastery of Saint Denis is ten times larger than the palace. There are two quarters in it; one of the Saracens in which are the markets, and where a great many Tartars gather on account of the court, which is always near this (city), and on account of the great number of ambassadors; the other is the quarter of the Cathayans, all of whom are artisans. Besides these quarters there are great palaces, which are for the secretaries of the court. There are there twelve idol temples of different nations, two mahummeries [mosques] in which is cried the law of Machomet, and one church of Christians in the extreme end of the city. The city is surrounded by a mud wall and has four gates. At the eastern is sold millet and other kinds of grain, which, however, is rarely brought there; at the western one, sheep and goats are sold; at the southern, oxen and carts are sold; at the northern, horses are sold.

From: Willem van Ruysbroeck, *The Journey of William of Rubruck to the Eastern Parts of the World, 1253–55, As Narrated by Himself, with Two Accounts of the Earlier Journey of John of Pian de Carpine*, trans. and ed. William Woodville Rockhill (London: Hakluyt Society, 1900).

Europe

Charles the Bald: A Renewal of the Privileges of a Monastery (874)

In the name of the Holy and Indivisible Trinity, Charles, by the grace of God, King. If we have granted the requests devoutly raised to us by our faithful servants, doubtless in so doing we have exercised a royal and ancient custom. Therefore be it known to all our faithful, and to the faithful of Holy Church, present and future, that the venerable abbot Hilduin, our most faithful servant and worthy clerk, abbot of the monastery of Sithiu [Saint Omer], situated in the district of Terouenne, built in honor of St. Peter, Prince of the Apostles, where the bodies of the holy confessors

Omer and Bertin are known to be buried, has brought to our attention that in the time of Abbot Hugh, his predecessor, we gave authority to that monastery, placing it and all things pertaining to it under our protection, care and immunity. We also placed under our protection all its cells, villas, and other possessions within the counties, territories, and jurisdiction of our kingdom. And neither we nor our successors would divide them or turn those properties to any other uses, and the monastery would give purveyance to no man. The abbot now seeks a renewal of our authority and

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(continues)

the naming of each privilege. We therefore, for the love and reverence we have for those saints, have ordered a renewal of our authority over that place, and, at the same time, confirmation of those privileges by this our charter. And we have ordered these royal letters to be written to warn our successors to permit those things we formerly granted to that monastery to remain secure, to make no division of the cells or property or other possessions of the monastery, or to permit such division to be made, or to permit the turning of those possessions to other uses. We further decree by our letters that no public official or person with judicial authority shall at any time dare to go into the churches, fields, places, or possessions of that monastery, neither those possessed in our time, nor those which holy piety shall add in the future, either for hearing cases according to judicial custom, for taking taxes, for

exercising authority, for preparing lodging, for taking food by purveyance, for the taking of pledges, for distraining free or servile men of that monastery, or for requiring other services. Let no judge presume to exact the things mentioned within the monastery itself. The abbot and his successors shall possess in peace, under our protection, the property of the monastery just as we decreed in the charter to Abbot Hugh. We grant also to that monastery that it shall have for all time a market, to be held on Fridays, and whatever profit there is from that market shall be for the shrine of Saints Omer and Bertin. Once a year the abbot shall give a feast to the brethren. And let the brethren who serve God there as His servants pray perpetually for us, the queen, our children, and the stability of our kingdom.

From Roy C. Cave and Herbert H. Coulson, *A Source Book for Medieval Economic History* (Milwaukee: Bruce Publishing Co., 1936).

FURTHER READING

- Peter Biller, *The Measure of Multitude: Population in Medieval Thought* (Oxford, U.K.: Oxford University Press, 2001).
 Richard Hodges, *Dark Age Economics: The Origins of Towns and Trade* (New York: St. Martin's Press, 1982).
 Albert Hourani, "The Countryside," in his *History of the Arab Peoples* (New York: Warner Books, 1992).
 Patrick V. Kirch, *On the Road of the Winds: An Archaeological History of the Pacific Islands before European Contact* (Berkeley: University of California Press, 2000).
 Archibald R. Lewis, *The Development of Southern French and Catalan Society, 718–1050* (Austin: University of Texas Press, 1965).
 Miriam T. Stark, ed., *Archaeology of Asia* (Oxford, U.K.: Blackwell Publishing, 2006).

► trade and exchange

INTRODUCTION

Medieval trade and exchange affected not just merchants and the governments that taxed and regulated them. Trade within a country or culture and trade with people of other lands affected almost everyone. The open, protected trade routes fostered by the early Islamic world, for example, were essential to the agricultural boom that began in the 700s. Few people in Islamic cities went without a good, varied diet, because trade brought fruits, vegetables, and meats

from al-Andalus, North Africa, and the Near East and brought them quickly. Well-regulated, protected marketplaces encouraged merchants to invest their money in such ventures as harvesting ice from mountains and glaciers for preserving the fruit that was transported on the Tigris and Euphrates and other waterways. The healthy diet that was afforded even poor people made trade of significant benefit to the Islamic world.

Still, trade was about more than bringing food to market. Underlying trade was people's desire to purchase goods not to be found locally; merchants who understood what their markets wanted could prosper. The most spectacular examples of this in the medieval world were probably the trade in silk and the trade in spices. Silk was a product that drove much international trade in Asia before the medieval era. In the early medieval period China sought to militarily dominate the trade routes of central Asia, out of a desire to ensure that the trade routes for its silk remained open. In the Near East and Europe governments tried to learn the secret of making silk; when they did, they began silk-making industries in their own lands. In this were elements of modern trade and exchange, because not all silk was equal in quality.

Silk needed to be processed to eliminate the stickiness that could cause itching of the skin. The quality of silk depended on how well it was processed and therefore how

smooth the silk was to the touch. Thus, Egyptian silk tended to be better than Syrian silk, but Indian silk was better than both. Chinese silk was much coveted. Although Chinese silk was often supposed to be the best silk, its quality within China varied greatly, and Japanese silk was much desired in China. This meant that a purchaser in one market might have several grades of silk from which to choose. Some grades were preferred for weaving rugs, others for cloth for clothing, and so on. India's silk often originated in China, and it was how the Indians processed the silk and dyed it with special colors not to be found in foreign markets that made it especially desirable in Cairo or Constantinople. Thus, during the medieval era trade began to flourish not only with basic materials but with value-added materials. For instance, the value of Iranian metal goods when sold in North Africa, Europe, or China was not restricted to the raw value of the metal; the ways in which Iranian craftspeople enriched their goods with durability and decoration added to the price.

Medieval traders were usually adventurers. In many parts of the world most people never ventured more than 20 miles from where they were born. Even a local peddler making his rounds from village to village in a backwater rural area faced hazards that others did not face and had to be able to deal with people with varying customs and needs. In some cultures traders were celebrated figures, their adventures the stuff of tall tales. In the Islamic world this was especially true, because Muhammad had been a merchant and merchants were regarded as carriers of the word of God to the world beyond that of Islam. Even in cultures (for example that of China) in which merchants were officially scorned because they did not seem to produce material goods themselves, their status during medieval times was hard to ignore. Their work not only helped feed the cities of China but also supplied consumers with goods that enhanced their quality of life; thus Chinese governments usually took pains to ensure the safety of traders on land and at sea.

Spices were goods that enhanced life. They helped preserve food and often turned nutritious but tasteless food into attractive meals. This inspired heroic efforts on the part of merchants to find, transport, and distribute spices from the farthest reaches of the world. Much has been made of the quest for gold in the Americas and Africa, but for most people in most places the spices found in those lands meant more. Thus, the spice trade inspired exploration by Chinese, Indian, Islamic, and European merchants, opening new avenues for both trade and communication. Some of the greatest explorers in the world were traders from lands with abundant spices, such as Indonesia and Southeast Asia, seeking to profit from their goods.

AFRICA

BY CHARLES W. ABBOTT

Trade and exchange are based on differences in the relative scarcity of goods and on differences in the valuation of scarce goods. There may be variations in the relative supply of goods or in the demand for them or both. Sometimes goods are exchanged using barter. More commonly exchanges are facilitated through the use of some form of money, which might be coins or paper notes, but in Africa were cowries (shells), iron bars, brass rods, spear tips, fishhooks, hoe heads, cloth, gold dust, measures of grain, or almost anything that was a durable store of value and easily exchangeable for other goods.

Imagine a situation in which pastoralists keep large animals for grazing but do not grow crops, while farmers grow and harvest crops but do not keep large animals. In such a case, trading between the two groups is likely. Members of each group have goods (particular types of food). They can both become better off (other things being equal) by exchanging part of what they possess for something else they value more highly at the margin.

Much African trade took advantage of these differences in comparative scarcities. Pastoralists had a relative abundance of animal products (meat, blood, milk products, skins, and manure), while settled farmers had a relative abundance of plant products (grains, tubers, fruits, vegetables, and grain products, such as beer). These sorts of exchanges (grain for meat or yogurt) commonly occur in local trade—pastoralists and sedentary farmers might live close to one another and see each other regularly. It was typical for them to frequent nearby areas in the same semiarid zone but specialize in different activities. Trade of this type often occurred across ethnic lines because specialization of production was often influenced by ethnicity.

The element of demand for a good or service is crucial. Some cattle-raising groups in southern Africa shunned the consumption of fish and prided themselves on their prowess in growing crops and herding cows. Such peoples did not import fish from their coastal neighbors, despite the comparative scarcity of fish of the local economy. Fish were scarce among such groups, but the people who wished to purchase fish were scarcer.

Long-distance trade refers to the transport of goods in bulk over extended distances by professional merchants to serve distant markets. Such trade seems to have been a crucial source of power and revenue for African states. Africa lacked many hearth areas where land was especially productive and valuable and where cities arose and flourished permanently, hosting durable states that obtained their revenue from a sedentary population. Instead, many African states seem to have

derived much of their revenue from their ability to tax trade flows. Instead of taxing farmer-citizens and punishing them for nonpayment, many states found it easier to direct trade flows through their territory and to charge tolls on merchants and traders who passed through.

In Africa the equatorial zone is largely covered by tropical rain forest, and as travelers move toward higher latitudes (north or south) they pass through biomes (ecological zones) that are conditioned by decreasing levels of rain and humidity. Thus the progression northward from the equator is rain forest, monsoon forest, guinea (wet) savanna, sudan (dry) savanna, the Sahel (the fringe of the desert) and then desert. Many agricultural commodities can be economically produced in only one or two of these ecological zones. Long-distance trade connected production within the appropriate biome to consumers who might be elsewhere.

Consider the kola nut. Kola nuts (genus *Cola*) grow only in certain forest areas of western Africa, in portions of what are now countries such as Côte d'Ivoire, Ghana, and Nigeria. They are edible fleshy fruits about the size of an almond, packed with caffeine and other alkaloid stimulants. Many Muslims prize them because they are mildly intoxicating yet nowhere prohibited in the Koran. Various other peoples enjoy them as well for their pleasurable stimulant effects, and in some societies they are used in rituals and in cherished traditions of hospitality. Long-distance trade transported kola to markets hundreds of miles from its growing area. By the time kola nuts reached the Maghreb (the western part of North Africa) they were a luxury good.

The raising and breeding of large animals was (and still is) heavily conditioned in Africa by the tsetse fly, which is endemic to the forest belt and much of the humid savanna. The tsetse fly transmits a disease (trypanosomiasis) that kills cattle, horses, and camels. Therefore, those animals could be raised only elsewhere, in drier regions of the continent. Cows raised outside the tsetse fly's range might be driven into the forest to be killed and eaten, but none could be raised there. The same was true of horses.

One study of the horse in western African history concluded that many societies there had ancient knowledge of the horse, even in places where it could not be bred. (In contrast, linguistic and other evidence has found that most groups in central and southern Africa did not know the horse before the coming of the Arabs or the Portuguese.) It has been estimated that the life expectancy of a horse in the humid savanna was no more than two years—too short for any horse population to sustain itself successfully and to reproduce. Yet elites in these areas desired horses intensely—they were useful in war and brought great status and prestige to their owners. In western Africa, therefore, elites in the moist savanna

who could afford it continually imported horses from regions farther to the north. The range of camels was more limited still (as they were quite vulnerable to the tsetse fly), and their owners or caretakers learned to take them only so far south of the Sahara for trade and no farther.

If some products entered long-distance trade routes because of environmentally specific production requirements, others were traded because they were minerals that were extracted only in certain areas. Gold was produced in western and southern Africa and traded over long distances. Western Africa had three major gold production areas: a large zone in what is currently southern Ghana, a smaller area in the high headwaters of the Niger River, and a small area just south of the Senegal River. From these production sites it often flowed north across the Sahara, where the demand for it was greater.

Salt production was also concentrated, but less so—in many places along the coast it could be produced by boiling seawater. Much was produced in open-cast mines developed in dry lake beds within the Sahara. Whatever the source of salt, it was different from gold in the sense that most inland communities craved predictable quantities of it and had to import it from elsewhere. Trade thus brought small amounts of salt into even the most otherwise isolated communities in Africa.

Goods especially common in long-distance trade included necessities such as salt, pricey items such as livestock and slaves, luxuries and stimulants such as kola nuts, and a variety of household items, among them, clothing, items of adornment (cloth, beads, feathers, dyes, and shea butter, which was used as a moisturizer and skin conditioner). Some items were raw materials (hides, from which a variety of goods could be manufactured), and some were finished consumer goods (elaborate cloth, often dyed and embroidered). A variety of manufactured goods were traded as well, including weapons (swords and spears) and tools (knives and hoe heads). Food products traded over a long distance tended to be mostly high-value, low-weight products such as dried fish. Bulky manufactured and artisanal products, such as containers (fired clay pots, baskets, gourds, calabashes, and eating ware), were more likely to be produced locally and traded over short distances.

Gold exists in a category of its own because of its status as an international valid unit of exchange. To produce gold was tantamount to producing money. One Malian king, Mansa Musa, became infamous for the amount of gold he spent on his journey through North Africa (ca. 1324) on the way to Mecca for the Muslim pilgrimage. Anecdotes in Islamic historical accounts report that he paid for everything with gold, spending so lavishly that the value of gold in North African markets was reduced for years after his journey.

The ubiquitous importance of slaves as trade items merits discussion. There were three trade routes from Africa to points north by 1500 (the Atlantic trade, the Indian Ocean trade, and the trans-Saharan trade). Slaves seem to have been important exports from Africa on all three trade routes. The European-dominated Atlantic route was linked to what has been called a “plantation complex” for sugar production, based in large part on slave labor. The sites of sugar production moved from the western Mediterranean to Atlantic islands (Madeira, the Canary Islands) after the year 1400 before the system eventually migrated to the Caribbean and Brazil.

In part, slaves were valuable and in high demand because the African labor market depended on slaves rather than waged workers. In addition, slaves had the major advantage of transporting themselves when driven along a trade route; in this way they were more like livestock than like inert merchandise that had to be hauled. Slaves were also least prone to escape when transported far from the area where they had been captured. Additionally, much of sub-Saharan Africa was a relatively thinly populated region. Contemporary research on the political economy of war has highlighted the tendency for thinly populated areas without much wealth to be prone to slave raiding. When an area is poor and has little to offer in trade, merciless outsiders throughout history have found a way to make a profit through plunder and enslavement of the local inhabitants.

Along with ethnic specialization in production, Africans often practiced ethnic specialization in transportation and marketing. Some groups, such as the Tuareg and Berbers, specialized in managing and supervising the trans-Saharan camel caravans. Others, such as Hausa and Dyula (Dioula), specialized in brokering the flow of goods between the forest and Sudanic ecozones. Hausa and Dyula merchants settled as foreigners where kola nuts were produced, often marrying local women. They advanced credit to producers, bought kola nuts at harvest time, and arranged their shipment north to the Sudanic zone. Islam was often an aspect of the business culture for these groups—it brought a common religion, adherence to a shared commercial code, access to scribes for the production of contracts where necessary, and the services of religious leaders for the adjudication of disputes.

Farther south along the Atlantic coast, around present-day Guinea, Kru canoe men specialized in transportation of kola nuts, salt, and fish. In what is now southern Ghana, these transporters might have been Fante. In the Niger River valley they were often Ijaw. For the most part Islam had not yet reached these groups by 1500, and they had other cultural mechanisms to aid cooperation. The unit of organization among canoe-based traders was often the house, a group of

men large enough to outfit a large war canoe that might hold 100 fighters or 50 men plus heavy cargo.

Researchers have commented on contrasts between Africa's and Europe's long-distance trade systems in the centuries approaching 1500. Europe's trade seems to have been more oriented toward bulk commodities (grain, timber, wine, raw wool, and cheese) than Africa's. Comparisons between the two regions can be made in a variety of ways, focusing on analytical constructs such as the relative prevalence of luxury goods versus staples, the prevalence of raw materials versus finished goods, the sophistication of transport methods, and the sophistication of financial institutions (including credit instruments) to finance shipments, clear payments, and insure against loss. Similar comparisons might be made with Indian Ocean or Chinese trading systems, where Europe's differences might not be so marked.

A basic comparison of European and African trading systems points to Africa's greater focus on slaves, its relative underdevelopment in ocean-borne commerce, and the limitations of trade in the interior. (Many of Europe's rivers provide easy transportation between the sea and the continental interior, while very few of Africa's do the same.) Because of Africa's peculiar characteristics, many places were inaccessible to shipping by canoe or camel, limiting transportation to human portage and raising transportation costs far above Europe's.

THE AMERICAS

BY J. J. GEORGE

A very telling event occurred the day Christopher Columbus (1451–1506), on his fourth voyage to the New World, encountered a Mayan trading party in a dugout canoe off the *Islas de la Bahía*, in the Caribbean near present-day Honduras. This was the first meeting between Europeans and Mesoamerican peoples, and it revealed the complicated intertwining already under way in Mesoamerican society. The Maya, as Columbus discovered, were carrying goods from all over Mesoamerica, including obsidian knives and swords from a highland source, cacao beans from the tropical lowlands, bronze axes and bells quite possibly from the Tarascan state of West Mexico (then a major enemy of the Aztec Empire), crucibles for smelting copper, and intricate cotton textiles. The goods in this single canoe represented all of Mesoamerica, indicating a single economic and cultural zone with a high degree of interaction. Trade and exchange activities in the Americas were varied and complex and differed in form from standard trade (a two-way exchange undertaken with a profit or needs-based motive) to tribute (a kind of tax levied upon a subject polity) to reciprocity (the mutual exchange of privileges or goods).

Trade practices in North America varied by region and often focused on elite or prestige items. For example, elite groups from different cultures traded prestige items in the Northwest. These prestige items included copper, dentalia and other marine shells, whalebone (baleen), obsidian, nephrite (a kind of jade), graphite, galena (lead ore), and certain bird feathers. Scholars have also proposed the presence of an elite merchant class that peddled regional goods among the other elites. Proximity to rivers facilitated trade into the interior, while sea routes were used for trade among coastal communities. The Southwest was believed to be linked by elaborate long-distance exchange networks. Archaeological research of shell remains at numerous sites suggest sources connecting southern California, the Gulf of California, northern Mexico, the Colorado Plateau, and the Gulf of Mexico to Hohokam and Anasazi settlements in present-day Arizona, New Mexico, and southern Colorado.

In the Southeast and Midwest evidence from Hopewell Period (ca. 200 B.C.E.–ca. 300 C.E.) sites in the Ohio and Illinois river valleys indicate extensive long-distance exchange networks focusing on raw materials ranging as far as west as Wyoming and as far east as the South Atlantic. Wide-ranging interaction continued but fluctuated throughout time. Shell and copper items in southeastern mortuary sites support continued long-distance exchange as late as the 13th to 15th centuries. Evidence at Cahokia (ca. 900–ca. 1100), near contemporary Saint Louis, suggests that items from distant sources were available primarily to elite status peoples, dis-

tributed unequally by social position, presumably to put people in positions of indebtedness.

In Mesoamerica the breakup of Teotihuacán in the mid-eighth century led to new patterns of exchange and connections less focused on major centers such as Teotihuacán and Monte Albán and incorporating coastal and peripheral areas. By the early Postclassic Period (ca. 950–ca. 1150), after the fall of many lowland Maya cities, Tula in Central Mexico, and Chichén Itzá in the Yucatán, became major centers of exchange. Their collapse in the 12th century again contributed to a reorganization of trade and exchange patterns in Mesoamerica, wherein rising city-states of small size and limited local power contributed to the expansion of commercial exchange.

Various models of exchange at Tula, Mexico, have been proposed based on studies of obsidian. Tula (ca. 950–ca. 1150), the capital of the Toltec Empire, also had primary influence on Mayan development in the Yucatán Peninsula, specifically at the site of Chichén Itzá. The first model suggests that obsidian, used in tool and weapons production, was exchanged outside Tula by local workshops and was thus a private-sector enterprise. Local craftsmen simply diverted part of their production and either carried it themselves on trading expeditions or sponsored such expeditions, or they traded it to professional merchants, comparable to later *pochteca* (Aztec traveling merchants). A second model suggests that obsidian was obtained by the state through a system of taxation on city workshops or market vendors. Subsequently, merchants would have been a kind of state-sponsored trader, acting like *pochteca*, essentially serving the state's elite class. A third model suggests that obsidian workshops were located outside the city, closer to the source of the raw material and principal trade routes. In this model, production and exchange are both under control of the state. In a fourth model, obsidian is exchanged in a kind of tribute system. In this system, Tula controlled a tribute empire wherein subject cities paid their obligation in obsidian.

Much is known about the Aztec tribute and market system from painted manuscripts detailing the empire's tribute system and eyewitness accounts of Spanish chroniclers who described the markets. The Codex Mendoza, a painted manuscript commissioned in the 1540s by the Spanish viceroy Antonio de Mendoza (ca. 1490–1552), is divided into two parts. The first is a pictorial history showing the conquests of Aztec emperors, and the second part is a record of the tribute paid by each province of the empire. Tribute items included large quantities of food staples, such as maize, beans, cacao, honey, salt, and chilies; textiles and clothing items, such as garments, raw cotton, and cochineal dye; jewelry and luxuries, such as colorful feathers, lip plugs, amber, turquoise masks, and gold



Pottery vessel, Cholula, Mexico, 1200–1521; polychrome vessels were intended for use by the elite and were traded widely. (© The Trustees of the British Museum)

bars; and miscellaneous products like copal incense, paper, and pottery bowls. Tribute is a formalized kind of tax paid to the state, indicating fealty to the empire. Tribute was one major form of exchange; similarly, the Aztec also had a major market system that facilitated multiple levels of trade.

During Aztec times (14th–16th centuries), unlike the situation with the contemporary Inca of Andean South America, markets and trade were largely independent of the state. Spanish chroniclers—including Hernán Cortés (1485–1547), the leader of the expedition that conquered the Aztec in 1521, and Bernal Díaz del Castillo (1492–?1581), one of his soldiers—marveled at the size of the main Aztec market at Tlatelolco, which served both Tlatelolco and Tenochtitlán (the Aztec capital) where tens of thousands of people (Cortés figured up to 60,000) gathered to do the business of trading hundreds of different goods, all in an orderly, organized fashion. The Basin of Mexico had what anthropologists call a complex interlocking market system with four levels of markets. Tlatelolco is the sole example of the top level. The second level comprised markets that were larger than most, such as at Texcoco, the second-largest city, and Xochimilco. The third level comprised markets in city-state centers like Otumba, Coyoacán, and Alcoman. Finally, the lowest-level markets were those of small towns and villages. The levels were distinguished by numbers of people buying and selling, the quantity and variety of goods and services offered, and by frequency—the highest-level markets met daily, the city-state markets met once a week, and the smallest markets met even less frequently.

Maya long-distance trade in the Classic Period (ca. 250–ca. 900) was dominated after 400 by the central Mexican power center of Teotihuacán, which had established colonies and alliances in Maya territory, notably at Kaminaljuyu, at contemporary Guatemala City, and Tikal, in northern Guatemala. The decline of Teotihuacán around 750 led to trade realignments and possibly contributed to the failure of some Maya cities such as Tikal. During the Postclassic Period (ca. 1000–1697) coastal trade routes increased their hold over commerce, extending routes all around the Yucatán Peninsula, again possibly contributing to the collapse of Classic Period lowland Maya settlements. While seaborne trade grew significantly, overland trade nonetheless remained important and allowed unconquered Maya groups as late as the end of the 17th century to maintain their independence.

Principal long-distance trade goods were divided among utilitarian items and items that were primarily exotic. Utilitarian items included agricultural products, bark cloth, cotton, dyes and pigments, chert (for stone tools), obsidian, pottery, salt, textiles, and tobacco. Exotic items included amber, cacao, cinnabar, copal, quetzal feathers, jaguar pelts,

stingray spines, and shark teeth. The trade system itself was in the hands of several classes of merchants, the majority of whom were members of a nonelite class of peddlers and itinerant traders who bought and sold goods in markets or in interactions with individual producers and consumers. Other people engaged in trade part-time, such as those people who manufactured and sold their own goods. But a smaller group of wealthy merchants, members of the elite class, possessed the means to organize and maintain long-distance trade, and they controlled most of the goods that passed through the Mayan area.

Many aspects of Andean civilization were organized in response to extreme topographic factors, which affected development from the earliest cultural florescence straight through to the 15th-century and 16th-century Inca. Exchange networks linked people living in complementary ecological zones; since not all products can be produced at all zones and vary depending on such factors as altitude and climate, people in one zone would trade their products with people in another zone, thus linking themselves in a complementary and vertical system of exchange. For example, altiplano peoples, or people who lived on the high plains, traded llamas and wool for lowland products including pepper, cotton, and coca.

Similarly, many exchange paradigms evolved alongside imperial cultural developments. The Wari and Tiwanaku empires developed almost simultaneously through the sixth to 11th centuries, the Chimú in the 12th through 14th centuries, and the Inca in the 15th and 16th centuries. Each empire expanded and developed both regional and long-distance exchange networks. In the case of the Inca the entire Andean region from Quito, Ecuador, to Santiago, Chile, was subsumed into one massive zone. A very hands-on authority, the Inca redistributed many staples by means of an elaborate system of storage facilities built throughout the empire. The Inca institution of *mit'a* labor, which was a kind of tax by forced labor, meant that an exchange of labor occurred wherein laborers were forced to leave home for an extended period of time to work on various state projects or to serve as members of the military. Finally, local lords, responsible for political, military, and ritual leadership, sometimes distributed products that could be procured only from great distances.

ASIA AND THE PACIFIC

BY KENNETH HALL

Local Asian and Pacific island trade in the medieval era ranged widely. Highland hunter-gatherers exchanged such forest products as timber, scented woods, bamboo, and lacquer; seminomadic herders of the pastoral steppe and desert



The Story of the Silk Princess, wooden panel painting, Dandan-oilik, Khotan oasis, Xinjiang Province, China, sixth century. Khotan was a thriving kingdom on the Silk Road; this panel tells the story of a princess who smuggled silkworms into Khotan, defying the emperor's embargo by hiding mulberry seeds and silk moth eggs in her headdress. (© The Trustees of the British Museum)

regions supplied meats, hides, and transport services; and lowland cultivators added agricultural produce. Salt from the coast, which was essential to the human diet, was a key commodity in these upland-lowland and hinterland-steppe exchanges. Another type of swap took place between settled hinterland farmers and coastal peoples: To the coastal people the farmers supplied grains, fruits, vegetables, specialty agricultural produce (cotton, hemp, and spices), manufactured goods (textiles, ceramics, and handicrafts), and raw materials (iron, gold, gems, and tin), as well as the forest and steppe products supplied by the highlanders and steppe dwellers. The coastal populations in turn sold externally to international traders. This coastal-sector trade brought products of the sea and specialized goods and imports back to the rural communities, who passed these commodities on to their highland- and steppe-dwelling trade partners.

Regional and long-distance trade was a motor for societal development throughout Asia during the medieval era, especially among those regions that had contact with the major international trade routes that connected China to India and the Middle East. Indigenous populations responded to the opportunities provided by these external contacts. They supplied local agricultural, animal husbandry, craft, and jungle products that made their way from the hinterland to the coast through more sophisticated marketing networks. Such trade influenced a society's productive and consumptive patterns. Regional and long-distance trading connections were also an important source of cross-cultural and religious exchange. Traders and travelers brought ideas and technology. In the early medieval era Buddhist pilgrims passed along the commercial routes between China and India, with Christian and Muslim missionaries following in the second millennium hoping to convert Asia's populations.

Transcontinental caravan trade routes connected eastern and western Eurasia by means of a central Asian passageway that lay just north of the rugged Himalaya mountain range separating India from China, central Asia, and southern Russia. Among the major goods carried along the route in addition to silk were jade, jewels, bronze, ceramics, glassware, carpets, cotton, tea, and spices. From the fourth to the eighth centuries central Asian Sogdians based in Suyab (in modern-day Kyrgyzstan) and Talas (in present-day Kazakhstan) were the most prominent among the multiethnic caravan traders; then, in the 11th century, the central Asian Samanids (with ties to newly Muslim Persia) based in Bukhara and Samarqand (in modern-day Uzbekistan) and Herat (in present-day Afghanistan) were preeminent. From the 11th century until the early 13th century political instability on either end of the route led to a decline in its use until Mongol tribesmen took control of the China-to-Middle East portion of the route in the 13th century. During this period, as in others when the route was not safe, travelers shifted to the alternative Indian Ocean maritime route.

Westbound merchants on the Silk Road often began their journeys in China's northern capitals and traveled along a network of urban commercial centers, between China's Gobi Desert in the north and the mountains of Tibet in the south. This portion of the route ended in northern Afghanistan, where the route split. One portion continued west to eastern Europe, another went south to India, while the main route went southwest through Persia (modern day Iran) to Constantinople.

The China-to-central Asia portion of the route depended on alliances negotiated by the representatives of China's and Persia's rulers with the central Asian Xiongnu and Yuezhi peoples (as they were known by the Chinese). These groups were well paid by Chinese and Persian governments to keep

the route open, but strategically placed government military outposts served to remind them who was in charge. However when a Persian or Chinese dynasty fell, resulting in a time of inattention and a failure to pay for the protection, these groups collected passage fees directly from the traders—or they seized their goods.

Trade along the Silk Road reached its high point under the 13th-century Mongols who had conquered all the territory from China to modern Turkey. Marco Polo (1254–1324), traveling to China from Venice and back in the late 13th century, was one of many European merchants who benefited from Mongol stewardship of the Silk Road. However, in addition to bringing wealth to Europe, the Silk Road brought the Black Death, or plague, which spread from central Asian cities to Europe in the late 1340s.

In the 15th century the route's volume permanently declined. This decline was the result of several factors: the fall of the Mongol Yuan Dynasty in China in 1368; the subsequent conversions to Islam among the post-Mongol era hordes that controlled the overland passageway; and the increased preference the subsequent Ming Dynasty had for the ocean route in the early years of its reign.

Indian Ocean-based trade was initially driven by the exchanges of Middle Eastern and southern Asian goods for those of China, but during the medieval era Southeast Asia's spices became prominent. Spices were rare items used in culinary, aromatic, and medicinal applications, with their medicinal value initially overshadowing their culinary use. Because these were all very expensive and imported in small quantities, only aristocrats could afford to buy them. They were literally worth their weight in gold to a successful merchant.

The most prized spices were pepper, ginger, cinnamon, turmeric, cardamom, cloves, nutmeg, and mace. Southeast Asia's eastern archipelago Spice Islands (now called the Moluccas) were the source of the most valuable spices: cloves, nutmeg, and mace grew exclusively there. Cloves are the dried, unopened flower bud of an evergreen tree grown on five small islands in the Moluccas; nutmeg and mace are parts of the fruit of a rare evergreen tree native to the Banda Islands. The jungles of Borneo and Sumatra were the source of benzoin and camphor barks, which were considered vital in preparations of Chinese medicines. Benzoin was also in demand for Chinese and Indian religious ritual, as were aloe and sandalwood from Southeast Asia and frankincense and myrrh from the Arabian Peninsula and east coast of Africa. India's southwest Malabar Coast was considered the source of the best pepper; northern Sumatran pepper was a less expensive alternative in the era after 1000.

These commodities made their way from their point of origin to eastern and western markets through the hands of

multiethnic traders by way of the Indian Ocean maritime routes. The Strait of Malacca that separated the Malay Peninsula from Sumatra was a key passageway from Southeast Asia to the western marketplaces of India and the Middle East. The South China Sea was equally important in the transit of spices from Java to Vietnam, China, Japan, and Korea. An alternative route from the Moluccas to China passed north through the Sulu Sea by way of the Philippines.

As the international trade developed in the first millennium, Indonesian seamen and their vessels dominated the shipping lanes; India-based and Middle Eastern—sojourning seamen and merchants were then the most common in the western Indian Ocean. By 800 Middle Eastern seamen and merchants were sailing all the way to China. Mixtures of highly skilled and experienced Chinese and Southeast Asian navigators were dominant after 1100, but they were subject to Chinese government restrictions on China-based seamen and on foreign access to China's ports of trade.

Seafaring traders bought deck and cargo space from a ship owner or captain. The crews involved in international shipping were composed of multiethnic professional seamen; in contrast, ships involved in regional and local trade regularly supplemented their professional crews with slaves purchased at regional slave markets or from pirates. The rhythm of the international sea trade depended on the seasonal monsoons, with winds blowing southwest to northeast from roughly June through August, and then reversing to blow northeast to southwest from December through March. Maritime travelers found themselves regularly lying over in a port until the next monsoon season allowed their return voyage. Because it took two to three years to make the complete east–west passage, traders would specialize in one sector of the route. For example, a merchant might trade only between the Middle East and India, India and Southeast Asia, or Indonesia and China. Ports-of-trade, similar to the caravan centers of the Silk Road, were likely to have peaks and lows in their populations as well as in their trading activities, depending not only on the seasonal travels of the merchants but also on the opening and closing of the major international markets.

Indian Ocean and Silk Road merchants would settle for months or years in a foreign port or caravan center, where they might take on wives and raise families. Itinerant traders would sell their goods to local intermediaries at their destination ports or urban centers. These intermediaries would then hold and resell them to merchants arriving later from other regional markets. For example, local intermediaries in Southeast Asia's ports exchanged Middle Eastern glassware and Indian cotton textiles supplied by South Asia-based seafarers for ceramics, silk, and spices brought by Chinese and Southeast Asian merchants.

A mix of administered and open marketplace competition was the norm in the Asian centers of trade. Local marketplaces were administered by members of the local elite in partnership with resident commercial specialists; a visiting merchant's activities and prices were predetermined by his negotiations with local authorities to ensure that the interests of the local community were protected while the merchant made a reasonable, but not abusive level of profit. Indian, Chinese, and Middle Eastern merchant-traders commonly organized themselves into merchant guilds or operated in partnership with other family members at the local and international level to represent and protect their collective interests better.

Most major commercial centers were under the direct control of central government officials or their delegated authorities, who similarly negotiated the terms of local trade access and collected the government's tax or share in cash or in kind prior to allowing visiting merchants to participate in their marketplace. The major commercial centers and ports-of-trade also competed to provide the most agreeable terms of trade; favored market centers offered the security, products (whether their own or acquired from secondary marketplaces), and provisions demanded by traders.

The 11th and 12th centuries witnessed a surge in the volume of Indian Ocean trade, thanks largely to the regional stability established over the Middle East by Muslim Abbasid caliphs (to 1258), the Seljuk Turks (1037–1219), and the Song Dynasty government's development and relocation to south China (1127–1279). Middle Eastern merchants flooded the Indian Ocean, seeking Asian goods in exchange for their own. This, paired with a stable China market, resulted in southern India and Sri Lanka becoming new international commercial hubs, filling roles as strategic intermediaries in the trade between the Middle East and Southeast Asia. In Southeast Asia, Java became prominent because of its central role in providing international access to the Spice Islands. By this time, regional centers began to function as part of one great, integrated Indian Ocean trade network. The increased volume of trade attracted a multiethnic community of trade specialists that included assorted Middle Easterners, Indians, Southeast Asians, and Chinese.

In the early 15th century, the new Ming-Dynasty emperors, who had come to power in China in 1368, sent the eunuch admiral Zheng He and his fleet of Chinese battleships to assert China's interests across the entire maritime network (1405–33). Zheng He purposefully eliminated pirates that were inhibiting trade, and he provided military assistance and promises of continued Chinese support to local political regimes that could guarantee the regular flow of international products to China's ports—for example, in Chinese support

of the new Moluccas polity that was empowered to ensure the security of the vital Strait of Malacca passageway. He also reinstated the Chinese tributary trade system, wherein Indian Ocean countries sent periodic embassies to China's courts to present diplomatic gifts of their prize marketplace commodities in return for honorific material symbols and official proclamations that confirmed their local authority. In part in response to these Ming-Dynasty initiatives, Asia's 15th century had substantial increases in trade volume, participants, and the diversity of traded commodities. This prosperity attracted the attention of Europeans, whose desire to acquire Asia's exotic commodities resulted in Europe's 16th century Age of Discovery.

EUROPE

BY TINA THURSTON

Medieval Europe saw significant changes in economic organization, which archaeologists study through analysis of artifacts, features, sites, and landscapes as interpreted through social theory and, since scant texts on markets and trade do not always reflect actual conditions, the careful use of historic documents. Several geographic axes affected markets, trade, and exchange in medieval Europe. The first is the continuum of urban to rural environments. Archaeological rescue work in European cities provides evidence for market activities in former medieval urban centers. Ecclesiastic establishments are also studied for their role in production and trade, and in recent years archaeologists have revealed less distinction between country and town; many who manufactured, marketed, and traded were also farmers. Rural production sites figured importantly in provisioning urban consumers with food animals, dairy, and cloth, and rural markets were tied into larger exchange networks.

Another important axis relates to the territorial boundaries of the former Roman Empire. While all of Europe felt the impact of imperial collapse, former provinces were differently affected than were non-Roman regions to the north and east, effectively shaping the nature of early medieval trade in each area. A final axis is the scale of study: Archaeologists identify the links in the chain of trade and exchange from workshops to marketplaces to trade routes and whole regions. Well-designed research on economic activity takes more than one scale into account.

Many 20th-century historians used only primary documents and scholarly insight to hypothesize about relationships between feudalism, urbanization, markets, and local and long-distance trade in medieval Europe. Some proposed that Roman organization persisted in the medieval period and was only dismantled when Muslim expansion cut Europe

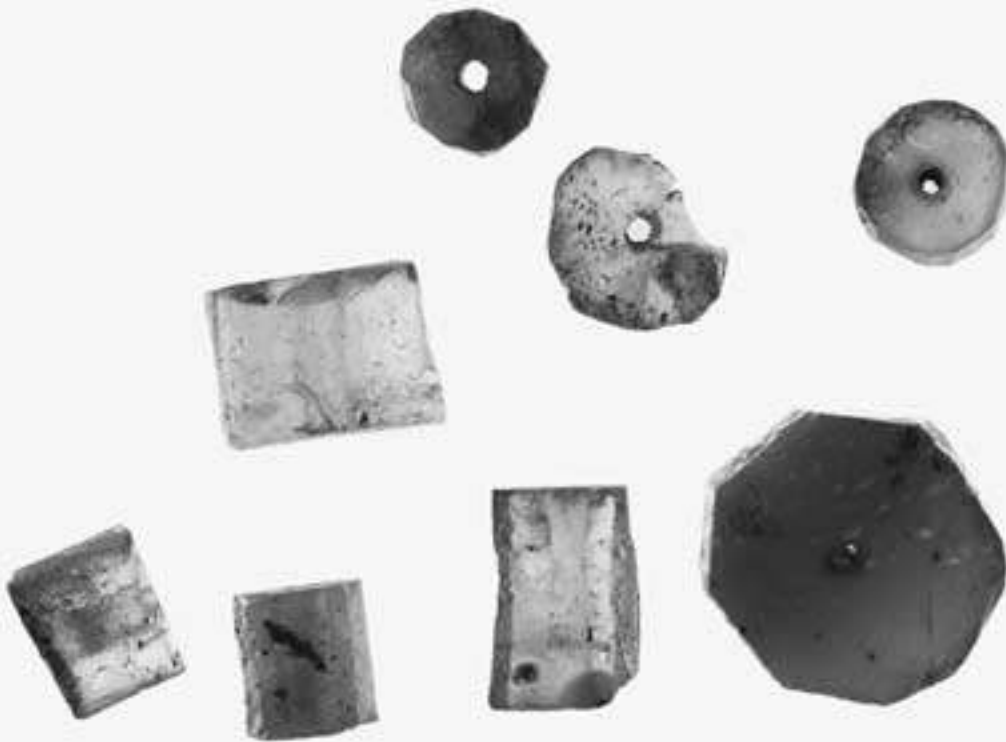
off from the Mediterranean, creating a so-called dark age, a view that became widely accepted.

By the 1970s archaeologists began to investigate the accuracy of these assertions. Generalized, predictable processes linked to political, economic, and environmental conditions were studied and compared globally, cross-culturally, and crosscutting time periods. A mandate to ignore historic records in favor of ahistorical interpretations directly from material culture was widely accepted. Such archaeologists deconstructed European historical perspectives, arguing that primary sources were biased by their authors' ideologies. Archaeological evidence alone showed that the Roman panregional market economy collapsed quickly in the fifth century and continued to decline into the seventh century as large-scale manufacturing, import, and export under the aegis of a single government and legal system disappeared.

More recent archaeologists advocate historically contextualized archaeological study that uses different kinds of data as independent threads of evidence. Analyses in this light indicate that while organized, commercial long-distance trade evaporated, local merchants and craftspeople across Europe

were in fact busy with a major reorganization of trade that was a model of ingenuity, displaying the ability of human societies to cope with changing conditions and sometimes catastrophic events.

Within former Roman regions during the fifth century archaeological investigations show that harbors fell into disrepair, and steep declines occurred in amphorae traded long distance between distant parts of the former empire. In Rome craftspeople plied their trades and conducted business from ephemeral structures in formerly elegant public spaces like the Campus Martius, while elsewhere market activities were conducted from crude stalls in abandoned forums. In Buthrotum (modern-day Butrint) the insecurity of the post-Roman world is reflected through brief spurts of fortification construction and a short surge of palace building, perhaps to preserve the status quo. Abandonment followed; palaces were left half constructed, and in derelict or unfinished structures small, vernacular houses were built whose refuse shows plenty of market activity but greatly reduced trade with distant regions. Around the onetime Roman world artifacts once traded from afar reverted to local manufacture. Simultaneously, parts of Europe closer to the Byzantine



Baltic amber beads, a precious commodity testifying to Britain's trade with the Baltic region (1400s) (© Museum of London)

sphere saw increased activity in both international trade and market activity.

Outside former imperial boundaries both elites and ordinary people continued to seek market trade, and thus more regionalized trade routes and markets evolved. The Roman era Rhine-Rhone route remained important, augmented with increased activity between the Baltic and Black seas via connecting river routes. Atlantic Europe and Britain, connected for millennia by sea-lanes, saw increased trade, and new North Sea routes connected western Europe with Scandinavia. Some Roman era trading places continued to operate for a time as local markets, but as sea and land routes shifted to reflect new political systems, many eventually were replaced by newly established ports of entry and trading posts.

Conditions had changed by the ninth century; archaeological evidence combined with newly analyzed Islamic texts shows a revival in long-distance trade due to exchange with the East, and the main product traded out of Europe, which might well have fueled European economic development, were slaves of European origin, bought and sold throughout the Byzantine world, the eastern Mediterranean, and western Asia. Between the seventh and 11th centuries commercial trading sites, or emporia, were established across northwestern Europe. The larger of these locations, often coastal ports, have been subjected to much archaeological study: Ipswich and Hamwic in Britain; Birka, Ribe, Kaupang, Uppåkra, Löddeköpinge, and Hedeby in Scandinavia; Quentovic and Dorestad on the Rhine; Staraya Ladoga in Russia; and Wolin in Poland.

The presence of weights and measures, fortifications, and boundary markers were once cited as evidence that kings or bishops closely controlled and administered trade through their unique ability to regulate, organize, and tax—their motive to support themselves and control access to high-prestige items. More recent investigations indicate that local magnates, farmers, or craftspeople producing surplus—indeed all those with goods and means—were permitted to trade at emporia with the stipulation that they pay taxes and tolls to rulers who provided safe and regulated commercial places. Research in central and eastern Europe indicate that similar markets evolved from crafts-working communities associated with local rulers at their fortified settlements, but these eventually developed into urban marketplaces.

Once, large coastal emporia were considered the sole expression of long-distance trade in post-Roman, extra-imperial Europe, but recently small inland trading sites have been discovered and investigated. In contrast to expecta-

tions, these places also show evidence of long-distance trade: coins, metalwork, and other materials not usually associated with short-distance trade in subsistence items that typically were bartered.

Early marketplaces were composed of ephemeral structures, sunken-floored stalls, and booths that are identified only by virtue of their location away from settlements or indications of their transient use. More frequently, they are identified through artifacts of manufacture: Artisans producing wares in the marketplace create unique artifact assemblages. Typical finds include weaving tools or bone and horn fragments from the manufacture of pins and combs; fragmentary crucibles, molds, and silver or bronze wasters from jewelry making; slag, iron bars, and rods, and in rare cases tongs and hammers from ironworking. Industrial-scale activity is reflected in the uniform size of fish caught in large commercial nets, and trade in fish, fowl, and other animals is clear from butchery patterns that professionals used to prepare them for market. Other market finds include coins, scales, weights, and keys to merchants' coffers. Serendipitous finds of warehouses or trading shipwrecks occasionally provide information on transport and storage. Even so-called dark earth—a humanly created soil often associated with marketplaces—can be studied.

In the High Middle Ages historical records are more numerous and detailed but were still kept by the upper classes, and many questions still are best viewed from archaeological perspectives. By the 13th and 14th centuries artifacts show that even within the lower classes, social stratification separated the poorest from the less poor, especially after the Black Death, or plague, when wages rose as the result of labor shortages. Early medieval markets were few, and their luxury materials were primarily reserved for the upper classes. In later times a vast network of small and large markets permitted ordinary people to participate in more frequent buying and selling, and this network further linked town and country as products like meat, milk, and the ingredients for ale were produced in the hinterland, processed there, and transported to urban areas.

Different archaeological questions require varying scales of analysis. To understand how needed or desired goods were made and brought to consumers, excavations at a workshop are appropriate. Studies have shown that while many artisans kept full-time workshops in markets, some sold luxury wares to ordinary people as itinerants, moving portable workshops from village to village.

If the taxation or control of trade by rulers is under study, the larger scale of the emporia or marketplace is useful. Some show long-term occupation of the same plot of land by arti-

sans in the same trade. Evaluated as a group, their unchanging boundaries and continuity, often surrounded by a nondefensive demarcation ditch, suggest that those buying and selling on these plots of land were regulated and taxed.

Comparisons of archaeology and history often reveal contradictions as medieval chroniclers rarely wrote objective descriptions of market interactions and noted only information biased toward their own concerns. Landscape-scale study explains this, tracing the paths of rural products to urban markets. Written records discussing commercially produced wool, meat, and milk indicate large populations of cattle and fewer sheep, while archaeologists record much higher numbers of sheep than cattle bones. Sheep, dying more frequently from disease, were disposed of as whole carcasses. Cows with longer life spans were butchered for food after natural death or after live transport to town markets; their bones, fragmented from butchery and cooking, are less frequently preserved. Only study of a large transect from country to town can reveal this. Thus, even in the middle to late medieval periods, when historical records of exchange, taxation, assessment, and individual holdings are more common, questions about products, the paths they found to market, and their eventual depositional contexts are still best answered through archaeological explorations.

THE ISLAMIC WORLD

BY BRADLEY A. SKEEN

The prophet Muhammad was a merchant active in the area of the Red Sea and the eastern Mediterranean. His new religion of Islam found its first home among the mercantile aristocracy of Medina and Mecca, but others of this class opposed him because they thought founding a new, exclusivist religion might be bad for business. Trade, as a profession, always held a more favored position in the Islamic world than in Europe. Trade was for many Muslims almost a necessity, since carrying small amounts of merchandise to sell along the way was a common means of financing the pilgrimage to Mecca that all Muslims had to make in their lifetime.

The Islamic conquest of an empire that stretched from Spain to the borders of China in inner Asia created an enormous economic unit that also linked together the maritime trade of the Mediterranean and the Indian Ocean (the greatest hubs of economic activity in the medieval world). The lack of political barriers in this vast realm aided the movement not only of trade but also of armies, craftsmen, scholars, and pilgrims. Government, cities, agriculture, and long-range trade all nourished each other and consequently flourished. The large cities of the Islamic world needed food and raw

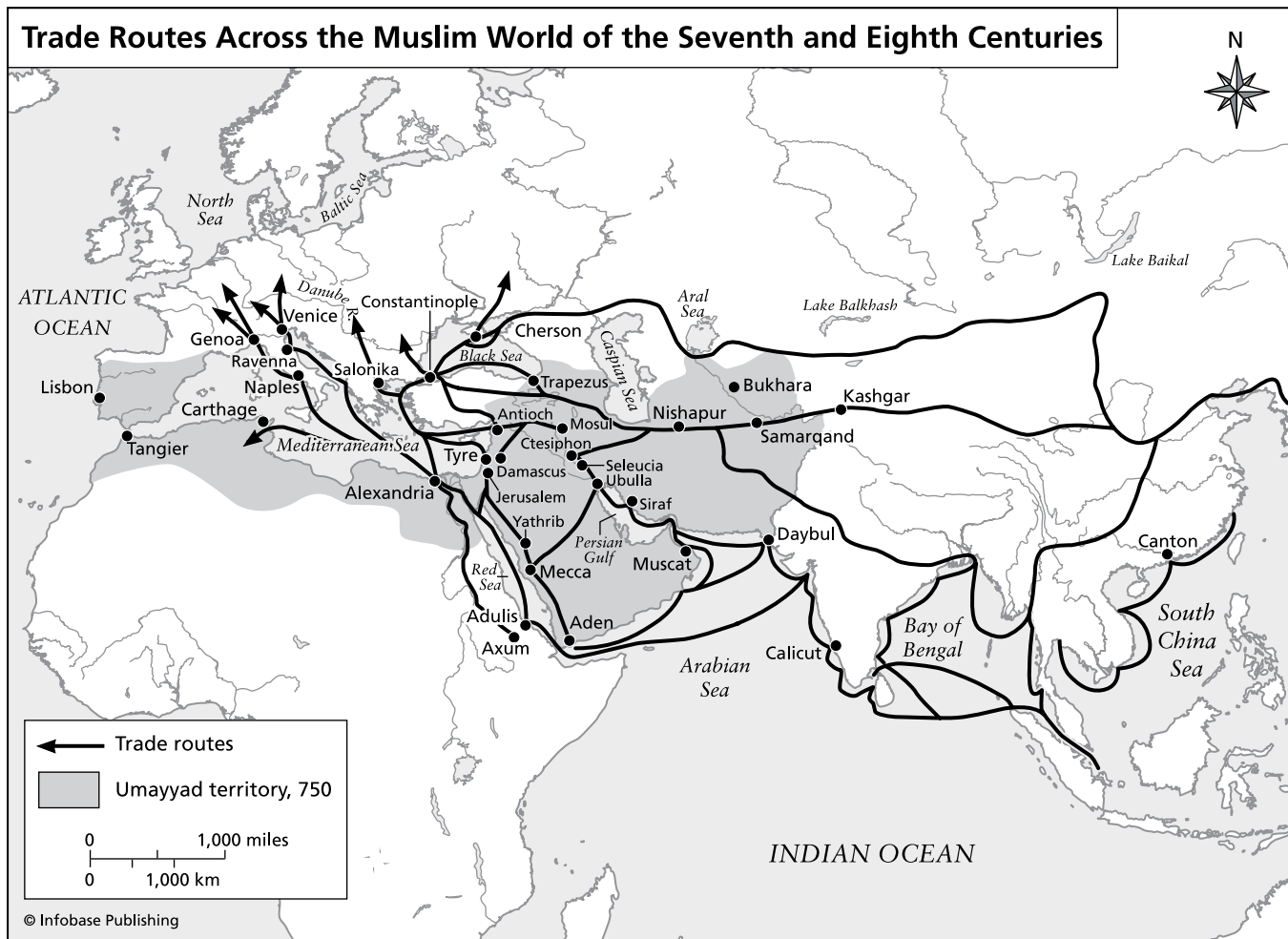
materials, while palaces, mosques, and aristocrats required luxuries for the display of wealth and power. Arab merchants were ready to supply them. Contact with Islamic traders by their counterparts in Italy also introduced new words into European languages, among them, check, broker, tariff, traffic, magazine, caravan, and bazaar.

The ease of trade in the Islamic world also meant that new ideas, techniques, and inventions could travel freely. At the most prosaic level, a rug made in China, for instance, could be traded as far as Algeria within a year, and the technique of its manufacture could be examined and copied by local craftsmen. Inventions such as the spinning wheel traveled from China to Europe via the Islamic trade routes. Thanks to trade, books could move just as swiftly across the Islamic world. The revolution in European intellectual history fostered by the reception of Greek and Arabic philosophical works by Christians in Spain depended for the most part on books that had been written or translated in Persia or Baghdad but which were readily available in Spain because of the flourishing book trade.

Although trade was taxed, Islamic government did not generally interfere with commerce and did much to support it. In 695 the caliph Abd al-Malik introduced a new Islamic coinage to replace the older Byzantine and Sassanian coins that had been circulating in the Islamic world. Because of the Koranic ban on representational art, the new coinage did not bear the traditional image of the ruler and other iconographic



Blue-and-white brush rest with Arabic inscription, Jingdezhen, Jiangxi Province, southern China, as early as 1506; such pieces with Islamic decoration would have been made specifically by and for the large Muslim population living in China and were traded and exported.
(© The Trustees of the British Museum)



Islamic civilization established an extensive trading network throughout the Middle East, northern Africa, and southern Europe in the seventh and eighth centuries.

types but was decorated with calligraphic representations of verses from the Koran. The first coinage was the gold dinar (whose name derived ironically from the Roman silver denarius), though the main currency used in trade was, as always, silver: the dirham. These coins rapidly spread throughout the world and have been discovered, for example, as far away from Islamic territory as Sweden. Hundreds of thousands of dirhams were buried in hoards during the Middle Ages, obtained in exchange for furs, amber, and slaves that traded through Kiev Rus (the modern-day Baltic States and Ukraine) to the Islamic world. Archaeologists have also found Islamic coins in China and in Great Zimbabwe in southern Africa.

The Arab conquest did not entail much long-term disruption of the local economies of the conquered peoples (except for the imposition of higher tax rates on non-Muslims) who contributed to the Islamic commercial economy. On the other hand, large commercial enterprises, such as the pearl

fishery in the Persian Gulf, were increasingly monopolized by the state, interfering with the development of a capitalist economy. Sharia law prevents Muslims from charging or paying interest (a testimony to the relative primitiveness of the economic system in which Muhammad participated), but this does not seem to have hampered the development of economic activity in the Islamic world compared with that in antiquity or in the contemporary European economy. On the other hand, Islamic courts for the first time favored lawsuits as a realistic means for merchants to find redress.

Arab merchants created new financial institutions and instruments for themselves that had not been available in earlier times. International banks were established for the first time and spread the model of the Sassanian (ancient Persian) banking system. In the Islamic world a bank could accept a deposit in Baghdad and pay out a promissory note or check (derived from the Persian word *sakk*, transmitted

to the West as an Arabic loanword) issued against the same deposit at a bank in Córdoba or in China. Arab traders also formed the first simple versions of joint-stock companies. Islamic merchants would trade with capital borrowed from investors, even from Jews and Christians, dividing the profits among the investors. In the earlier Roman Empire, by contrast, aristocrats (who controlled the bulk of the wealth generated from land) were legally proscribed from investing in trade except that conducted by their own freedmen (slaves they had manumitted).

The new Islamic trade practices were quickly copied by their European rivals, first by the Venetians. The crusading order of the Knights Templars operated a system of international banks on the Islamic model, and it was with the goal of erasing debts owed to the Templar bank that the order was destroyed by Philip IV of France beginning in 1307. The important technique of double-entry bookkeeping was also an Islamic invention that was quickly borrowed by Europeans.

In medieval times the primary source of wealth was the agricultural exploitation of land. However, the unification of the trade routes between the Far East and the Mediterranean world in Islamic hands made international trade for the Islamic middlemen far more profitable than it had been in ancient times. This trade conveyed luxury goods, such as silk and porcelain, from east to west, but since there was very little produced in the West that was wanted in China and India, the return was almost entirely in the form of precious metal coinage. The main trade route was from Ceylon (a large island off the southern tip of India) to ports on the Red Sea and Persian Gulf. This trade was facilitated by the annual cycle of monsoon winds, which allowed fleets of merchant ships to sail to Asia from the Horn of Africa across the open ocean to Ceylon and back without the need of sophisticated navigational equipment (although Arab seamen made considerable advances in navigation).

The Indian Ocean trade was monopolized in the 11th through the 13th centuries by the Karimis (an Arabic term for “merchant” but given special meaning in connection with this group), a group of about 50 merchant families organized in a network in Egypt, Yemen (at the mouth of the Red Sea), Ceylon, and India. This group engaged purely in mercantile activity and did not directly profit from, for instance, land owning or tax farming (a practice by which a private contractor will pay a government a sum approximately equal to the expected tax revenues of a province in exchange for the right to collect the actual tax). Their activities were financed as joint-stock ventures with private investors. This same group of merchants ran the largest network of international banks. The Karimis are sometimes viewed as a precursor to modern multinational corporations.

The Indian Ocean trade route was the most important in the Islamic world. In general, shipping was far more efficient and safer than land transport; thus, insofar as possible, local trade was conducted by river barges and on small coast-hugging merchant ships that plied the Persian Gulf, the Red Sea, and the Mediterranean and Indian Ocean along the African coast. Another trade network based on coastal sailing extended eastward from Ceylon and reached as far as Guangzhou in southern China, on the Pearl River estuary near modern-day Hong Kong. This was a city specially built by the Tang government to facilitate Islamic trade. Cross-Mediterranean trade from the Islamic cities of North Africa and the Levant was usually handled by European merchants, especially those from the republics of Venice and Genoa and from Barcelona in Spain.

Caravan routes crisscrossed much of the Islamic world. Regular tracks were followed, but few roads that could have supported wheeled vehicles were built between cities. Caravan traffic was almost exclusively packed on the backs of camels. Individual caravans could be made up of as many as 5,000 camels. The important Silk Road trading routes began at the Chinese western capital of Xi'an, where there was a strong Islamic presence and an impressive mosque, and ran through the inner Asian cities of Samarqand, Bukhara, and Merv and through Persia to Baghdad. Other routes ran through inner Asia to ports on the Black Sea. An extensive trade route also stretched north and south through Russia and supplied goods to the Islamic world. Caravan routes also reached from Baghdad to the Mediterranean and Red Sea across the Arabian Desert. The Western Sahara was also traversed by caravan routes dominated by the Tuareg tribesmen between the Mediterranean coast and the Niger Delta, where great Islamic cities, such as Djenné and Timbuktu, existed. Local commodities such as salt were traded via these routes, but by far the most profitable commodity on them were slaves brought up from western Africa to the Mediterranean.

See also ADORNMENT; AGRICULTURE; CITIES; CLIMATE AND GEOGRAPHY; CLOTHING AND FOOTWEAR; CRAFTS; ECONOMY; EMPIRES AND DYNASTIES; EMPLOYMENT AND LABOR; FOOD AND DIET; GOVERNMENT ORGANIZATION; HUNTING, FISHING, AND GATHERING; INVENTIONS; LAWS AND LEGAL CODES; METALLURGY; MIGRATION AND POPULATION MOVEMENTS; MINING, QUARRYING, AND SALT MAKING; MONEY AND COINAGE; PANDEMICS AND EPIDEMICS; ROADS AND BRIDGES; SEAFARING AND NAVIGATION; SHIPS AND SHIPBUILDING; SLAVES AND SLAVERY; SOCIAL ORGANIZATION; TEXTILES AND NEEDLEWORK; TOWNS AND VILLAGES; TRANSPORTATION; WEIGHTS AND MEASURES.

Asia and the Pacific

Excerpt from the Liang-shu (ca. 629)

In the west of it [India] they carry on much trade by sea to Ta-ts'in [Roman Syria] and Ar-hsi [Arsacids, or Parthia], especially in articles of Ta-ts'in, such as all kinds of precious things, coral, amber, chin-pi [gold jadestone], chu-chi [a kind of pearl], lang-kan, Yu-chin [turmeric?] and storax. Storax is made by mixing and boiling the juice of various fragrant trees; it is not a natural product. It is further said that the inhabitants of Ta-ts'in gather the storax plant, squeeze its juice out, and thus make a balsam; they then sell its dregs

to the traders of other countries; it thus goes through many hands before reaching Zhongguo [China], and, when arriving here, is not so very fragrant. Yu-chin only comes from the country of Chi-pin [a country near the Persian Gulf].

From Friedrich Hirth, *China and the Roman Orient: Researches into Their Ancient and Mediaeval Relations as Represented in Old Chinese Records* (Shanghai and Hong Kong: Kelly and Walsh, 1885).

Europe

Francesco Balducci Pegolotti: Excerpt from Pratica della Mercatura (ca. 1340)

Goods are sold at Constantinople in various ways.

The indigo called Baccaddeo is (sold in packages) of a certain weight, and the weight you must know should be the cantar. And if the buyer chooses to take it from the seller without weighing it, be it more or less than a cantar, 'tis to the profit or loss of the buyer. But they do almost always weigh it, and then payment is made according to the exact weight, be it more or less than a cantar. And the skin and wrapper are given with it but no tare is deducted; nor is garbling allowed nor do they allow the indigo to be examined except by a little hole, from which a small sample may be extracted. For such is use and wont in those parts.

[The following are sold by the cantar (of 150 Genoese lbs.).]

Wormwood; madder, and the bag goes as madder without any allowance for tare. Alum of every kind, and even if it be Roch-alum, the sack and cord go as alum.

[The following also are sold by the cantar at Constantinople and in Pera.]

Ox hides, buffalo hides, Horse hides: In purchasing these they are shown to the provers up the hill . . . and if the hides smell damp or wet, then a fit allowance is made, and this is the system in Pera and in Constantinople, and they are not put in the sun unless they are exceedingly wet indeed.

Suet in jars; iron of every kind; tin of every kind; lead of every kind. Zibibbo or raisins of every kind, and the mats go as raisins, with no allowance for tare unless they be raisins of Syria. In that case the baskets or hampers are allowed for as tare, and remain with the buyer into the bargain.

Soap of Venice, soap of Ancona, and soap of Apulia in wooden cases. They make tare of the cases, and then these go to the buyer for nothing. But the soap of Cyprus and of Rhodes is in sacks, and the sacks go as soap with no tare allowance.

Broken almonds in bags; the bag goes as almonds; only if there be more than one sack and cord it must be removed, or deducted, so that the buyer shall not have to take more than one sack and cord as almonds, but for any beyond that there shall be tare allowed; and the cord shall go to the buyer gratis.

Honey in kegs or skins; tare is allowed for the keg or skin, but it remains with the buyer gratis.

Cotton wool; and the sack goes as cotton without tare. Cotton yarn; and the sack is allowed as tare, and remains with the buyer for nothing.

Rice; and the bag goes as rice, but if it be tied the cord is allowed as tare and remains with the seller. Turkey galls of every kind; and if they are in bags you weigh bag and

all, and do not make tare of the bag. Dried figs of Majorca and Spain in hampers. Orpiment, and the bag goes as orpiment. Safflower, and you make tare of bag and cord, and after that they remain with the buyer gratis.

Henna; and the bag goes as henna, only a tare of four per cent is allowed by custom of trade. Cummin; and the bag goes as cummin, and if tied with rope the rope is allowed as tare but remains with the buyer gratis.

Pistachios; and the bag goes with them with no allowance for tare, unless there be more bags than one, and if there be, then the excess is weighed and allowed as tare, and the buyer has the one bag gratis.

Sulphur; and the bag or barrel in which it is, is allowed as tare, and goes to the buyer gratis. Senna; and the bag is tare and goes to the buyer. Pitch; and the mat is allowed for as tare, and goes to the buyer. Morda sanguie; the bag goes with it and no tare allowed. . . .

Saltmeat; cheese; flax of Alexandria and of Romania; Camlet wool; washed wool of Romania; unwashed ditto; washed or unwashed wool of Turkey; chestnuts. . . .

Round pepper; ginger; barked brazil-wood; lac; zedoary; incense; sugar, and powdered sugar of all kinds; aloes of all kinds; quicksilver; cassia fistola; sal ammoniac or lisciadro; cinnabar; cinnamon; galbanum; ladanum of Cyprus; mastic; copper; amber, big, middling, and small, not wrought; stript coral; clean and fine coral, middling and small.

[The following are sold by the pound.]

Raw silk; saffron; clove-stalks and cloves; cubebs; lign-aloes; rhubarb; mace; long pepper; galangal; broken camphor; nutmegs; spike; cardamoms; scam-mony; pounding pearls; manna; borax; gum Arabic; dragon's blood; camel's bay; turbit; silk-gauze; sweet-meats; gold wire; dressed silk; wrought amber in beads. . . .

[By the piece.]

Silk velvets; damasks; maramati; gold cloth of every kind; nachetti and nacchi of every kind; and all cloths of silk and gold except gauzes. . . .

[Then follow details of the different kinds of cloths, with the length of the pieces. And then a detail of special modes of selling certain wares, such as:]

Undressed vairs, and vair bellies and backs; Slavonian squirrels; martins and fitches; goat skins and ram skins; dates, filberts, walnuts; salted sturgeon tails; salt; oil of Venice; oil of the March; oil of Apulia, of Gaeta, etc.; wheat and barley; wine of Greece, of Turpia in Calabria, of Patti in Sicily, of Patti in Apulia, of Cutrone in Calabria, of the March, of Crete, of Romania; country wine.

From: Henry Yule and Henri Cordier, trans. and eds., *Cathay and the Way Thither, Being a Collection of Medieval Notices of China* (London: Hakluyt Society, 1916).

FURTHER READING

- Janet Abu-Lughod, *Before European Hegemony: The World System 1250–1350* (New York: Oxford University Press, 1991).
- James H. Barrett, Alison M. Locker, and Callum M. Roberts, “Dark Age Economics?’ Revisited: The English Fish Bone Evidence AD 600–1600,” *Antiquity* 78, no. 301 (September 2004): 618–636.
- Luce Boulnois, *Silk Road: Monks, Warriors, and Merchants*, trans. Helen Loveday (New York: W. W. Norton, 2006).
- Geoffrey Braswell, ed., *Maya and Teotihuacan: Reinterpreting Early Classic Interaction* (Austin: University of Texas Press, 2003).
- George E. Brooks, *Landlords and Strangers: Ecology, Society, and Trade in Western Africa, 1000–1630* (Boulder, Colo.: Westview Press, 1993).
- K. N. Chaudhuri, *Trade and Civilisation in the Indian Ocean: An Economic History from the Rise of Islam to 1750* (Cambridge, U.K.: Cambridge University Press, 1985).
- Olivia Remie Constable, *Medieval Trade in the Mediterranean World* (New York: Columbia University Press, 2001).
- Patricia Crone, *Meccan Trade and the Rise of Islam* (Princeton, N.J.: Princeton University Press, 1987).
- Andrew Dulby, *Dangerous Tastes: The Story of Spices* (Berkeley: University of California Press, 2002).
- Kenneth R. Hall, ed., *Maritime Diasporas in the Indian Ocean and East and Southeast Asia (960–1775)* (Leiden, Netherlands: E. J. Brill, 2006).
- Richard Hodges, *Towns and Trade in the Age of Charlemagne* (London: Duckworth and Co., 2000).
- John Middleton, *The World of the Swahili: An African Mercantile Civilization* (New Haven, Conn.: Yale University Press, 1992).
- Peter Mitchell, *African Connections: Archeological Perspectives on Africa and the Wider World* (Walnut Creek, Calif.: AltaMira Press, 2005).

- Anthony Reid, *Southeast Asia in the Age of Commerce*, 2 vols. (New Haven, Conn.: Yale University Press, 1990, 1995).
- W. Montgomery Watt, *The Influence of Islam on Medieval Europe* (Edinburgh: Edinburgh University Press, 1972).
- Frances Wood, *The Silk Road: Two Thousand Years in the Heart of Asia* (Berkeley: University of California Press, 2004).

► transportation

INTRODUCTION

One of the impressive aspects of medieval transportation is how much was done by people on foot. People carried goods for very long distances. This included not just nomads but also merchants, pilgrims, and farmers. In Australia and Africa nomads took all their belongings with them from place to place. In lands such as China, India, and Europe people often carried on their backs the goods they sold in villages, towns, or cities. Foresters hauled wood for burning, farmers lugged sacks of grain, and fishermen carried their catches to places where they could hope to sell them for coins or for the services of a craftsman.

In some parts of the world walking was the only reliable form of transportation. In the mountain passes of central Asia, the marshlands of southern India, and the rain forests of Africa and Southeast Asia, transportation by animals or vehicles was impractical. For instance, in western and central Africa, flying insects carried diseases that killed animals such as oxen, horses, camels, and donkeys. Donkeys were the most reliable pack animals in the region, because they seem to have been more resistant to disease, but even they had no use on paths in densely forested areas. People had to carry goods themselves, or the goods did not move.

The use of animals for transportation was often preferable to moving goods on foot, but animals had drawbacks besides not being able to go some places that people could. One was that they were expensive. They had to be fed, groomed, and sheltered. In the grasslands of the Sahel of Africa, for example, a horse had to be housed in a stable, where it was shielded from flying insects, and it needed to be watched and cared for full-time for by several people. For many people pack animals were too expensive to own or were so valuable that it was preferable to have people carry loads rather than to burden the animals with them, as was sometimes the case with donkeys in North Africa.

One of the curiosities of medieval transportation is the use and disuse of the wheel. The Maya knew of the wheel and made toys for children that rolled on wheels, but they did not take the seemingly logical step of applying what they knew about the wheel to transportation. One reason for this may have been their environment, which often included dense, wet

forest in which wheels would become entangled. But much of the medieval Mayan world that presently lies under jungle was cleared, open land. The challenge may have been one of emerging technologies: Techniques for building roads were not sufficient for creating reliable avenues for wheeled vehicles.

Perhaps more curious was the region in which the wheel seems to have had its first practical uses as aids to transportation, in the carts and chariots of the Near East. In the medieval Islamic world of the Near East and North Africa wheeled transportation fell into disuse. People walked long distances carrying goods, or they used animal transportation—camels over long distances and donkeys for both long and short distances. Cities of the Near East became ones of narrow streets; a city's space was used as much as possible for personal living in houses. Some historians think that the narrow streets developed because people either walked or rode donkeys rather than riding in carriages.

Even so, in many medieval cultures time was money, and efficient transportation was important to commerce. In China city streets apart from the main avenues were usually narrow and winding. Thus, in Chinese cities peddlers would navigate their way through streets by transporting their goods on wheelbarrows, a Chinese invention. Still, the use of carts to transport goods was essential to many urban areas, because carrying large loads in carts pulled by animals or people was the best way to provide consumer goods to urbanites. Thus, most Chinese cities had wide avenues that led from city gates to marketplaces. In Europe carts seem to have placed a heavy demand on the maintenance of roads, and many governments charged a tax for the use of their roads that varied according to the size of cart and the kind of animal pulling the cart. Some farmers found ways to carry their produce on their backs in order to avoid the taxes, but anyone carrying large loads needed wide avenues for their carts, and many a city made them pay for the roads.

AFRICA

BY CHARLES W. ABBOTT

Sub-Saharan Africa's history is unusual in many ways. It skipped the Bronze Age and went straight from stone to iron. It had few traditions of writing before Islam. Another peculiarity is the absence of the wheel. Africans made little use of the wheel. In many parts of the continent they relied heavily on human portage; that is, goods were carried by individuals on their backs, heads, or shoulders. Where camels were feasible, they were used. Horses were employed as well, but more for military purposes than for long-distance trade.

In the African setting coastal and riverine navigation were relatively unimportant in most places. (Europe and

China, in contrast, had more favorable physical geographies, with some combination of deeply incised coastlines, inviting estuaries, and plentiful rivers providing access deep into continental interiors.) The tsetse fly is endemic to humid Africa (but not to the arid or highland zones) and transmits a deadly disease, trypanosomiasis, to the horse, the cow, and the camel over large swaths of Africa. (The same disease causes sleeping sickness in humans.) In many humid parts of Africa the largest domesticated animal is the goat—a good source of protein and leather but useless for transport or motive power. The most common biome in Africa is the savanna (grassland mixed with trees), a somewhat dry climatic zone and thus unlikely to be well endowed with navigable rivers. Many places in Africa are far from the sort of stream in which one can paddle a canoe easily; much of Africa is high plateau.

The ideal mode of transportation in Africa, where feasible, was the camel. Until recently Western scholars did not fully appreciate the efficiency and flexibility of the camel. After its introduction the camel largely replaced wheeled cartage in the animal's entire range, from Morocco to Afghanistan. Two camels were more efficient than a cart pulled by two oxen. They carried roughly the same amount of cargo. They needed no cart (which was expensive, heavy, and difficult to repair outside an artisan's workshop) and no road. There was no risk of mechanical breakdown. In addition, camels were far more resistant to thirst, and they could graze on materials inadequate for oxen.

The camel was thus most efficient way of transporting goods for the long haul across the Sahara. The relevant areas of Africa served by camel caravan include the range of territory from the southern shores of the Mediterranean Sea to entrepôts (intermediary trade centers) of the Sahel, such as Senegal River trading sites, Timbuktu, Gao, and Kano. South of these Sahelian entrepôts goods were transported along the Niger River (at its northernmost bend near Timbuktu) in boats or taken farther south using donkeys or human porters. Research suggests that the southern limit of tolerance for the camel is approximately 14.5 degrees north latitude in the dry season (when the tsetse fly recedes). The ox's limit is a bit farther south: 12 degrees in the wet season and 10 degrees in the dry season. Much more tolerant yet is the donkey, which might be taken as far south as 5 degrees in the dry season.

The freight costs in camel-based trans-Saharan trade were relatively similar to European-controlled Atlantic maritime trade. (Maritime technology improved in efficiency over time, while camel-based technology seems to have been more static.) Exact freight rates for camels are difficult to compare to the Atlantic maritime trade, since some camel trade was not a long haul across the Sahara but rather to interior Saharan sites (for salt and gold) or for east-west trade past Kanem-

Bornu and Darfur toward the Nile Valley. The trans-Saharan trade was not devastated by Atlantic seaborne competition but seems to have grown in subsequent centuries. The coming of the Atlantic trade after 1450 did not eliminate the trans-Saharan trade; the two trade systems coexisted for hundreds of years, one tribute to the efficiency of the camel.

If the camel was the choice where possible for overland trade, within its range the horse was prized for war. The tsetse fly and trypanosomiasis limited the horse's range as well, though it seemed to maintain its health within the humid savanna for up to two years. (The tropical forests of the south were still a deadly zone, and horses died in the humid savanna too quickly for them to be bred there successfully.) The camel was superior for carrying goods, but the horse was superior for military purposes. The horse (with bit, saddle, and stirrups) and rider (with helmet and chain mail) extended the military power of elites who could get it. With horses, one could launch raids against one's neighbors during the dry season (after the harvest was in and the tsetse fly was less prevalent), catch slaves or extract tribute, and use the revenue to pay for more horses when animals sickened and died.

The use of porters for transportation limited the sorts of goods that could be traded long distances within the forest, except where canoe transport was possible. We know that common products traded over long distances in the forest included salt, kola nuts (a stimulant and a luxury good), gold, cloth, brass, and leather goods. Each of these was valuable enough to bear the relatively high transport costs involved in portage. Slaves were usually driven on foot; like livestock, they transported themselves.

For many scholars, the absence of the wheel is perceived as a puzzle that necessitates an explanation. Often it provokes a debate about the judgment of Africans, bringing into question their intelligence or their attitude toward change. Perhaps Africans spurned the wheel for good economic reasons. A wheeled vehicle requires roads to be effective, while camels (as well as donkeys and human porters) can follow paths with unimproved surfaces. Africans adopted many products and technologies as soon as possible: camels, horses, armor, firearms, and iron smelting. Perhaps they rejected the wheel because it made sense to do so.

In the forest Africans spent a lot of time and energy carrying things. If there are no wheeled carts, no roads for them to travel anyway, and no beasts of burden and if the topography is not suitable for canoes, almost everything that is moved must be carried by people. Modern scholars suggest that human porters usually carried between 50 and 80 pounds. Parts of Africa's zone of human portage were relatively economically isolated from the rest of the world—not by culture or values but by the cost of transportation. The lo-

gistics of portage were relentless in their simplicity. Porters expended considerable time and energy in carrying goods, and it was costly to transport goods by portage; therefore, only valuable items could be traded long distances. Such zones were open to outside cultural influences, ideas, and diseases, but trade was limited to only the most valuable goods or those that transported themselves. Africa's transportation options conditioned its access to the rest of the world. Portions of western Africa and the East African coast had had hundreds of years of contact with Europe or the Islamic world by 1500, while large areas of the humid interior were largely isolated.

THE AMERICAS

BY MICHAEL J. O'NEAL

While the wheel had been developed and used for transportation purposes on carts and carriages in other parts of the world, it did not find its way to the precontact Americas until the Europeans arrived in the 16th century. The horse, which holds a firm place in the popular imagination as a major means of transportation for the Plains Indians, for example, also arrived with the Europeans, and Native Americans did not use horses for transportation until the 17th century. While pack animals were used in some parts of the Americas, most transportation was by foot and various kinds of watercraft.

In the frozen reaches of the far north the Inuit, commonly known as Eskimos, used methods of transportation that are thousands of years old. The Inuit depended heavily on the sea for most of their resources, so transportation focused on ways of getting around in the water. The most recognizable form of Inuit transportation was the kayak, a word that comes from an earlier Inuit word, *qajait*. A small, canoelike boat made of a whalebone frame covered with animal skins, usually hides from whales, seals, or walruses, kayaks were short and tapered toward the front and back. In the center was a kind of cockpit where the rower sat and propelled himself with a single double-bladed paddle. Sometimes the rower was strapped in with hides tightly bound around his waist such that the boat was entirely waterproof and the rower could easily right himself even if the kayak rolled over in the water. Normally Inuit women never used kayaks.

The umiak was a larger, more open boat. It, too, was made of a whalebone frame. The umiak was often covered with animal hides, but sometimes the covering was bark that was stitched together with root fibers. Unlike the kayak, which was entirely rounded somewhat like a submarine, the umiak had a gunwale, or an upper edge, making it more like a sailing ship. The umiak was more suitable for use in the open seas and was often used to hunt whales, walrus, and other larger

sea mammals. The umiak was also the boat of choice when an Inuit woman had to take to the sea.

On land the Inuit often used dogsleds for transportation, particularly for hunting. Again, the sea provided resources for making these sleds. The runners typically were made of whalebone, while the rest of the sled was generally made with hides; in the more southern reaches of Inuit territory, where some wood was available, the rider stood on planks made of wood. The dogs that pulled the sled, typically six to 12, were arranged in a fan formation, with the strongest, most powerful dogs in front. These dogs were typically Alaskan malamutes; other breeds associated with Alaskan sledding, such as the Siberian husky and the Eskimo dog, did not appear until the 19th and 20th centuries. When goods had to be transported, sled dogs pulled a toboggan, or a wooden platform with a curled-up nose that rested on the snow.

When the Inuit had to walk, they often used snowshoes made of a bone or sometimes a wood frame and a web made of leather straps. Snowshoes enabled people to walk on top of the snow rather than sink into it. More northern groups preferred long, narrow snowshoes that worked well on pre-existing tracks. These tracks tended to be more permanent because the extreme northerly regions remained frozen for most of the year. Also, the region was so bitterly cold that it often did not snow. Such snowshoes functioned almost like



Ceramic model palanquin, Colima culture, Mexico, ca. 200–600
(Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 237830])

skis. In the south, where temperatures were a bit milder and it snowed more often, people preferred more rounded snowshoes that worked better on fresh snow. These kinds of snowshoes also were used by Native American people in regions that are now lower Canada and the United States. The Inuit became very adept at navigating their way through an environment that provided few natural landmarks for travelers to get their bearings.

The Native American Indian societies of North America employed transportation technologies that were essentially similar to those of the Inuit, although like people throughout the Americas, they relied day to day on foot trails and game trails through forests, over the plains, and in the ravines and canyons of mountains. The Indians of the Southwest desert, of course, had little use for water vessels, but Native American societies that lived along rivers or the ocean coasts depended heavily on watercraft for fishing and transportation. A common form of transportation was the canoe, although Native American Indians constructed canoes in their own way and with different materials from those of the Inuit. The best canoes, because they were lighter and more maneuverable, were built by the Algonquian nation of northern New England, who lived in regions that were dense with white birch trees. The bark of these trees comes off in sheets rather than small chunks. These sheets were carefully removed from the trunks of trees in large sections and then sewn together with plant fibers over a wooden framework to form the outer hull of canoes. The Iroquois, on the other hand, used elm bark, and other societies used whatever materials lay at hand, including animal hides. California Indians used light and buoyant balsa wood.

North American Indians (other than the Inuit) had a greater variety of vessels. Many used dugout canoes—that is, canoes made from a single log that was carved out to form a boat. The cultures of the Northwest in modern-day United States were especially skilled at carving dugout canoes. The Haida of the Northwest constructed large (up to 70 feet long) canoes using giant cedar logs hollowed out using both hand tools and fire. In the American Southeast archaeologists have discovered at least 400 dugout canoes. Some date from ancient times, but many date from later and demonstrate that during the medieval period the societies of the Southeast, with its extensive coastline and numerous rivers and lakes, maintained a vigorous boatbuilding tradition. Another type of boat was the bull boat, a rounded vessel made with a wicker frame and buffalo hides. Plains Indians used bull boats to transport goods across rivers; often at the helm of these boats were women.

For moving goods, Native Americans used the travois, an A-shaped litter made with two poles. The poles were har-

INUKSUIT

On the frozen tundra of the far north the landscape provides few, if any directional markers. On such a vast, white, flat, open area a traveler could easily become disoriented and lost. To navigate their way in these regions, the Inuit built *inuksuit*. These stone structures that served as way markers for the precontact Inuit are still used today. The word translates into English roughly as “something that acts or substitutes for a person.”

These stone monuments came in various sizes and shapes, but generally they tended to vaguely represent a human figure. Their most prominent feature was their “arms,” which pointed the traveler in a particular direction. Sometimes *inuksuit* were erected on the shore of a body of water to mark the place where the fishing was best; these would be set up at a distance from shore equal to the distance into the water where fish could be found. They were also used to mark dangerous places, spots where food was stored, the location of caribou herds, sacred sites, and places where significant events had occurred. Some were built to point toward the North Star, and some were positioned in such a way that a traveler could look through a peephole through which he could just see the next marker on his way.

The *inukshuk* has deep cultural significance to the Inuit. It served as more than a way marker. It became a spiritual symbol of friendship, safety, cooperation, and hope. Building them was a community effort, with close attention being paid to the balance and positioning of each stone. So deep does the significance of the *inukshuk* run that one is depicted on the flag and coat of arms of the Canadian territory of Nunavut, home to most of Canada’s Inuit population. It was also chosen as a symbol to appear on the flag of the 2010 Winter Olympics in Vancouver, British Columbia.

nessed to the chest and shoulders of a dog and dragged on the ground behind the dog. They were connected by crossbars and covered with hides that provided a platform for goods as well as for children, the elderly, or people who were injured or too sick to walk.

Before European contact Mesoamericans relied almost entirely on their feet for purposes of transportation. Some islanders in Central America, people along the ocean coasts

and throughout the Caribbean, and those on the shores of lakes used dugout canoes. For example, remains of dugout boats have been found on the Yucatán Peninsula and along the shores of Lake Texcoco near Mexico City. Some of these boats survive because they were made of logs from the chico sapote tree, the hardest wood in Central America. Otherwise, almost all transportation occurred by foot. While the Maya constructed some roads that linked larger cities, rough trails were the norm. People who wanted to travel simply set out on foot. Those who needed to transport goods loaded them into backpacks and began walking. Numerous commodities were transported in this way, including maize (corn), beans, animal skins, cotton, and firewood. Porters who carried feathers in backpacks were the most fortunate.

Later the Aztec of central Mexico constructed a more extensive system of roads. Again, they did not employ pack animals, so transportation was on foot. The roads were built to make them comfortable for foot travelers, with resting places, food, and even latrines available every 6 to 10 miles. The roads were maintained by tribute, a form of taxation, and were traveled by officials who continuously monitored their condition. Because these roads were so closely scrutinized, it was possible for women to travel alone safely. Both the Aztec and the Maya constructed causeways that linked population centers with ceremonial sites. These causeways were paved roads that made it easier for people to travel to attend religious ceremonies.

Prior to the Spanish conquest Andean civilizations—that is, the civilizations that lived along the Andes Mountains in western South America—had the most sophisticated system of transportation in the Americas, although again the wheel was not used. The forbidding rocky terrain of this region, with sharp changes in elevation, would have rendered the wheel useless anyway, so once again most transportation was on foot. In contrast to the Mesoamericans, though, the South Americans used pack animals, primarily the llama, for transporting loads.

It fell to the Inca to build the most extensive road system in all of the Americas, though such a system had been begun by the Caral-Supe civilization in ancient Peru from 3000 to 1600 B.C.E. Incan civilization began to form in about the 12th century, and by the time the Spanish arrived in the 16th century the Inca ruled over an empire that may have encompassed as much as 400,000 square miles. By the time the empire ended, the Inca had constructed a road system that included at least 10,000 miles of roads and perhaps more than twice that many. While many of these “roads” were simply paths that wound through the rocky terrain, about half were paved with stones. Fruit trees were planted along them to offer travelers refreshment, and way stations, called *tampus*,

provided resting places every couple of miles or so. Of vital importance to the Inca Empire was communication along this transportation network. Positioned at each of these way stations was a runner who had been trained from childhood to remember and repeat messages. The runners relayed messages from way station to way station, often transporting a message 150 miles a day. This relay system could carry a message from the Inca capital at Cuzco to the farthest border of the empire in about a week.

In general, water transportation would not have occurred very extensively in the highlands of South America. Some examples of reed and balsa wood boats have been found, but lowlanders in the Amazon rain forests relied more heavily on water transportation, again using dugout canoes to navigate the river and its tributaries.

ASIA AND THE PACIFIC

BY KENNETH HALL

Medieval transport in Asia and the Pacific included ocean voyages, river navigation, and human and animal overland travel. Since the Pacific islands did not have domesticated horses, donkeys, or cows at that time, river navigation or transport on foot were their only alternatives. Asians had the options of transport by local watercraft and barges on rivers and canals or human, animal, or cart transport on roadways. Most medieval-era road transport was used for small-volume carrying trade of local handicrafts (for instance, cloth) or exotic jungle products (for example, spices), the movements of government officials and priests, migrations of populations in times of natural or political crisis, and the relocation of military and their supplies in times of war. Employment, family, pilgrimage, communication, and human curiosity also contributed to travel and transportation of goods in this period.

Since there was no state-sponsored delivery system at that time, Asian societies had to use individual and animal transport networks to move goods and information. Transport and means of transport depended on the local road surface and access to inclusive market centers, warehouses to store goods, facilities to house and care for animals, and hostels. Most roads were unpaved and little more than cart paths, but there were also major transportation arteries sponsored and maintained by powerful kings in India, Southeast Asia, and East Asia. Transport might be seasonal, to avoid the harsh winters of the northern regions of Asia and the severe tropical storms at the height of the monsoon season in Asia's tropical regions. Roads were first and foremost built for their military rather than their economic importance. In times of turmoil roads were purposely left in disrepair to



Earthenware model of a cart with bullock and human figures, China, sixth century (© The Trustees of the British Museum)

protect against the raids of opponents or were reconstructed to support local military ambitions. Travel could be pleasant, with companionship at nightly stopover hostleries and in private homes that took in travelers to earn additional income. Fearing that itinerant travelers and porters who were traveling through a region might cause trouble, local communities forced merchants, artisans, and travelers in general to abide by rigid codes of conduct that were meant to preserve local stability and prevent the outbreak of violence and violation of local laws and customs.

Owing to the inadequate transportation infrastructure; the limited numbers of public roads, cart paths, and bridges; irregular road maintenance; the difficulty of travel in mountainous terrain and wetlands; and the availability of human labor versus the use of the few available large animals not needed for farming, human porters were often the transport of choice. Humans, who might be accompanied by donkeys in nontropical regions, could go where it was impossible or inefficient to use horses or ox carts, such as on steep mountain trails.

Professional transporters included merchants, artisans, or itinerant traders who carried their merchandise to the most remote areas of the hinterland on their backs and returned with locally produced goods that they would pass along their exchange networks. Transportation of larger amounts of goods depended on a mix of professional and part-time workers. There were professional wage-earning porters, who

were usually based in the major commercial centers or ports of trade. There they were employed in the loading and unloading of ship and boat cargoes and the transport of goods to and from the urban marketplaces. This was especially the case among southern China's ports of trade throughout the medieval era; in southern India from 1000 to 1300, where professional porters worked for itinerant merchant guilds that transacted long-distance trade in southern India and the Bay of Bengal region; and in the 15th-century Melaka international trade emporium.

The slaves and bondsmen of merchants and artisans also served as full-time porters. Part-time porters included farmers, who could make additional income during the slower periods of the agricultural year or who were otherwise obligated to provide portage as required by their service agreements with local elites or temples. Historians estimate that in a day a porter could carry 80 pounds about 15 miles; in contrast, a mule could carry 132 pounds and a bullock 132 to 220 pounds. To enable human porters to move a greater weight of goods, the wheelbarrow was adapted to the needs of the transportation network first in China during the Tang era (589–907) and then elsewhere in Asia.

Carts for the transport of goods were usually two-wheeled rather than four-wheeled, because the four-wheeled carts were more difficult to engineer in a way that allowed the moveable front wheels to turn within an appropriate radius on narrow roads and were hard to navigate in the tight spaces of the marketplace. Four-wheeled vehicles without moveable front wheels were common in ceremonial use, where ritual or political processions moved slowly. Horse-drawn carts were lighter than ox carts. Bullock and oxen carts were the major means of animal transport on land, since oxen could carry heavy loads. The basic ox cart was similar to those still used in Asia today, with oxen tied to a central yoke pulling the cart behind them using the strength of their front shoulders. Carts and their wheels were usually made of wood but occasionally of metals and stone. Temple and royal carts used in public celebrations or rituals were especially ornate; temple carts paraded an image of a Hindu or Buddhist divinity around a community on festival days. Military carts transported the supplies necessary to provision warriors in the battlefield: foods, weapons, and gunpowder.

Oxen were best in transportation over level land, but horses could better negotiate hilly terrain, whether pulling a cart or in a pack train. Horse transport was favored in the more commercial economies, since horses provided greater flexibility and faster transport of perishables and small-volume luxuries. However, horses required a greater investment. Horses did not breed in the Asian tropics and had to be imported at great expense from the central Asian steppes, the

Middle East, or northwestern India; horses also required special feeds rather than openly grazing, as was the case with oxen.

Cart transport was time consuming and potentially dangerous. Carts were inherently unstable, with wheels getting caught in ruts in the road, and frequently overturned or fell into ditches and waterways, crushing humans and causing them to drown. As Asian commerce became more sophisticated, rulers desiring commodities and tax revenues funded the construction of better roads and bridges, guarded cargo transport from bandits, and sponsored ferries and ferrymen who provided river passage.

China's military adopted the two-wheeled version of the wheelbarrow, nicknamed the "wooden ox," which required two men to propel and steer. At first they were a closely guarded military secret. China's generals believed that these military carts gave China's armies an advantage in moving goods and wounded soldiers by eliminating the need for slow and costly pack animals.

The Venetian traveler Marco Polo (1254–1324) described his travel to China across central Asia over marshy land covered with layers of ice, which was inaccessible to horses or carts and crossed only by dogsleds. Six dogs pulled the sleds from one to another outpost, where a fresh dog team provided transport for the traders and their hides to the next transfer station. Dog transport was unusual; most of the transport across central Asia depended on camel caravans. Asia's Bactrian camels were efficient transporters that could walk on soft sand and stone and could carry from 250 to 650 pounds of cargo, travel about 2 to 3 miles per hour, and cover about 20 to 25 miles per day.

Caravans might consist of several dozen to 1,000 camels and other pack animals (horses and mules), accompanied by as many as 5,000 men. Transport across the caravan route was risky and demanded that the caravan carry food and water reserves to ensure survival against uncertain weather conditions and other negative circumstances. If food ran out, travelers killed their baggage animals for food, but they did so only with extreme reluctance, since the death of an animal reduced their profits. The Berber scholar and chronicler Ibn Battuta (1304–ca. 1377), who traveled the caravan route after Marco Polo, claimed that several hundred horsemen and accompanying archers guarded his caravan, in contrast to Marco Polo's report, which highlighted the Mongol rule that had provided security and uniform accountability of the regional tribesmen, which encouraged Italian merchants to make the trek to China.

The Silk Road consisted of networked trading posts where travelers replenished their supplies and where their camels, horses, and other livestock rested. Caravan travelers and

their animals usually stayed and had stables and warehouse facilities in a walled enclosure just outside the inner walls of a fortified market town. There they lodged and unloaded, watered, and repacked their animals; an open space provided to them could accommodate 300 to 400 camels and mules. Local guides specialized in leading caravans from one post to another. Similarly, few merchants traveled the entire route but instead specialized in one route sector and depended on the natural passage of goods along the route or in the transit of goods through the agency of their business partnerships.

Silk Road transport costs were lower on the overland route than on the Indian Ocean maritime route. Historians draw on early 16th-century European historical records to estimate that the cost of Silk Road transport was roughly 3 percent of the sale price of silk and other valuables carried from China to the West. However, there were additional costs, such as protection fees, customs duties, and bribes that made the caravan trade more expensive than the sea route.

Southeast Asian caravans exclusively used ox carts for transport and mules rather than horses in pack trains. As in neighboring India, bandits and tigers were the greatest threat, along with wild boars, rhinoceros, and poisonous snakes. Owing to the heat, caravans moved in the cool of the morning and rested during the heat of the afternoon before resuming their travel in the late afternoon and early evening. At nightfall they formed into a protective ring of carts. Travelers slept in the carts or under palm-leaf tents at the ring's protected center. Thai records report that caravans of 60 to 100 carts could move 360 miles from the Mekong River on the modern-day Thai-Laos border in the east to the Ayut-



Palanquin rings, gilt copper alloy, Cambodia, 13th century
(Los Angeles County Museum of Art, Indian Art Special Purpose Fund,
Photograph © 2006 Museum Associates/LACMA [AC1993.125.1.1-2])

thya capital on the lower Chaophraya River in the west in five months with a full load and in three months with lesser loads. An individual could make the trip in 15 days in peacetime. Oxen could make the trip without carts in a month but had to carry food for their feed, and this limited the volume of merchandise they could transport. In contrast, travel across the Malay Peninsula, a distance of 60 miles took two to three months in the rainy season.

Sedan chairs were common in China, India, Japan, and Korea throughout the medieval era, and their use spread to other Asian regions by the end of the medieval era. The sedan chair, formed by a seat that was lifted onto the shoulders of the bearers by means of long horizontal poles, was a traditional vehicle of human transport. In East Asia it was usually made of bamboo. The chairs moved the person being carried above the worst of the dust, smell, and noise of a busy streets and unpaved roads. The elite maintained their own private sedan chairs and porters, but private operators also hired them out for public use. These were also traditionally used by rich and poor in Chinese wedding rituals, to carry the bride from her home to the place of the wedding.

Traditional Chinese sedan chairs were of two sorts: the official sedan and the private sedan. The sedan chairs of Chinese government officials carried their emblems of rank on the outside to indicate their occupant's importance. Their decoration was regulated by strict rules that dictated their elaborateness as appropriate to the various levels of the government hierarchy. The Chinese emperor had several sedan chairs, one highly ornate chair for his transport to court, another for his inspection tours around the court compound, a light sedan chair for his participation in hunts or travels outside the court compound, and a spare that was carried for his use while on boat trips to distant places. The chair furnishings would change with the seasons, to provide warmth in the winter and protection from the sun and heat in the summer. Private sedans were less elaborate and were owned by aristocrats and the urban wealthy, including merchant princes. Use of a sedan chair was a public proclamation of social privilege. Sedan chairs, surrounded by accompanying attendants, and carried by two to 16 bearers, were preceded by the beating of gongs or other musical instruments to clear their way and to draw public attention. Commoners meeting the procession were expected to show their reverence, minimally by their quiet and stepping out of the way.

Sedan chairs used in Chinese weddings were covered with brightly colored embroidered silk and gems. Their designs proclaimed good luck. In the medieval era, to ensure that the bride was not to be seen by outsiders, a double sedan had an inner chamber built within the outer chamber. When the chair reached the wedding site (often the house-

hold of the groom), the inner chamber was carried inside the house, where the bride finally revealed herself to her husband's relatives.

EUROPE

BY AMY HACKNEY BLACKWELL

Transportation in medieval Europe was slow and difficult. The road system had deteriorated after the Roman Empire ended (in 476), and it was not rebuilt. Methods of transportation were limited. Carts were no longer practical in many areas, especially for long-distance transport, and horses were rare and expensive, so most people made do with their feet to transport themselves and their goods. Oxen were much more common than horses and often were used instead of horses to pull carts or carry goods. Water transportation was in many ways more efficient than ground transportation, though even that was less than ideal.

Different types of transportation were used, depending on the length of the trip and the items being transported. Carts were most commonly used for short distances over land and mainly to transport goods, not people. For long journeys people used ships and barges, rode horses, or walked. The difficulty of transportation did not prevent people from undertaking long journeys. People regularly embarked on journeys that took months if not years. Those who made the pilgrimage from Canterbury, England, to the Holy Land might spend several years along the way; many of them did the entire trip on foot. Armies rode horses and marched vast distances to wage war. Merchants managed to transport their goods hundreds of miles for sale.

Many people habitually walked long distances. Walking for a full day to reach a destination was not considered unreasonable. If people had luggage or goods to sell, they carried it on their backs or in their arms. Parents carried small children, often affixing them to their backs with cloth slings. There are some fictitious accounts of adults carrying other adults on their backs, such as the story of Friar Tuck carrying Robin Hood across a stream, and this may be evidence that this sort of thing did actually happen.

As a practical matter, in much of Europe the condition of roads made any sort of transportation other than foot traffic impossible. Most European roads were narrow dirt tracks wide enough to permit one or two people to walk abreast or to allow people to lead pack animals in single file. There were some wider roads, but even they were usually only rough dirt. They became very muddy after rainstorms and often were obstructed with fallen branches or potholes. Human and animal feet negotiated these hazards better than wheels did.

Medieval travelers regularly encountered other dangers. Roads were owned by the lords whose land they crossed, and these landowners sometimes demanded that travelers pay tolls. If a merchant's cart toppled over or one of his mules' packs ripped open and his goods spilled out, the landowner could claim those goods as his own. Brigands and highwaymen lurked in the forests, ready to prey on unsuspecting or defenseless travelers.

Crossing rivers and streams presented difficulties. In many rural areas people normally crossed rivers at fords. These were shallow places where it was possible to wade across or step from rock to rock. Water levels varied; when they were high, fords might become impassible. Occasionally people would swim across rivers, but swimming was not a universal skill, and most medieval Europeans avoided deep water if possible. In places where there were bridges, people could continue to walk or ride as usual, though they often had to pay a toll before crossing. Ferries were common. These were boats or rafts run by men who would take passengers across a river for a fee.

When people did not walk, they rode animals. Medieval Europeans only rarely rode in other forms of land transportation, such as carts. The horse was the main riding animal, though people also rode on mules. Only the wealthy had riding horses, and even pack horses were expensive and uncommon. Both men and women rode, and women, like men, typically rode astride instead of in the sidesaddle that became popular later.

A horse could walk about 4 miles per hour and trot about twice as fast. Riders and drivers did not ordinarily make their horses move at faster gaits, such as the canter or gallop because a horse cannot maintain those speeds over a long distance. Traveling by horseback presented various inconveniences. Horses needed food and water, and if they stopped for the night, they had to be secured or housed in some way. A horse could ordinarily carry only one person at a time; if a group wanted to travel together, everyone needed a horse or the group had to move at a walking pace. Riding a horse required skill and training and reasonably good physical conditioning. Riders often met with accidents, such as falling off, which could leave them injured or dead.

Horses were bred for different traits, depending on what they were expected to do. Any wealthy person who wanted a horse for general riding and travel would buy a palfrey. Palfreys were bred to have a comfortable gait and to be fairly gentle. Some mules that were specially bred to be ladies' mounts were called palfreys or jennets. Jennets could also be horses, particularly a type of small, quiet horse originally bred in Spain. Rounceys were cheaper, more ordinary horses that could either carry riders or pull carts. Coursers were



Horseshoes, Britain, 12th century; horses were essential for transport and hauling. (© Museum of London)

strong horses with a steady gait and good endurance. They were used by soldiers who needed to travel long distances. Destriers were large war horses that were highly trained, uncommon, and so expensive that only the richest knights and nobles could afford them.

Medieval Europeans used several types of pack animals. Oxen were the most common. They were strong but slow and could be used to pull carts and carry loads, though they could not be ridden. Horses could also carry cargo or pull carts. During the later medieval period some farmers owned pack horses that they used to plow their fields (after the development of the horse collar around the 13th century) and to transport their goods to market. These horses were often bred to be heavy, strong, and slow. Occasionally, horses and oxen were hitched together to carts. Mules were another typical pack animal. Mules are stronger and more patient than horses and do not mind carrying heavy weights. Merchants often carried their goods overland in mule trains, which were lines of many mules all carrying loads on their backs. Donkeys were used to

transport small loads and in mountainous areas, where their surefootedness made them superior to horses.

Carts were essential for the transportation of goods, especially in local areas, but they were not much used for human transportation. Carts often were used to transport goods locally, within and between towns. Medieval roads were far too rough and narrow for carts with no suspension, making them uncomfortable as passenger vehicles; few people chose to ride in them. Carts came in various sizes and could have either two or four wheels. One or several horses or other animals could be made to pull them. Women, sick people, and dignitaries such as bishops sometimes rode in litters. A litter was a box or a chair suspended between two long poles. Two or four men would lift the poles and carry the litter from place to place.

Much of medieval transportation was done by water—down rivers, across lakes, and in seas. Carts were useful only for local trips; for long distances, transportation was better done on water. Most long journeys involved a combination of land and water transport. Large rivers such as the Rhine and the Danube functioned as highways. The Mediterranean, the Atlantic Ocean, the North Sea, and the Baltic Sea were all the sites of regular voyage of ships carrying people and cargo.

The people of northern Europe were known to be excellent seamen. The Vikings regularly sailed ships throughout the Baltic Sea, the North Sea, and across the North Atlantic. Viking ships were more technologically advanced than boats in other parts of medieval Europe and included both cargo ships and lighter vessels. Northern Europeans used their boats to colonize the Faroe Islands, Iceland, and Greenland before 1000 C.E. During the early medieval period many boats were rafts made of logs or frame boats covered with animal skins. They could not carry much in the way of passengers or cargo. By the 11th century, however, boats were much bigger and better crafted.

The majority of ships sailing the oceans and seas were commercial vessels dedicated to transporting goods and passengers. Round ships, with round hulls, met this need. They were primarily cargo vessels. They did not venture far into open seas, partly because of the dangers of the seas and winds and partly because of the ever-present threat of pirates. Merchant ships carried with them soldiers to fight off those pirates if they ventured near. They were quite slow because they could not sail without favorable winds. They had several decks inside. The heaviest items would be loaded into the lowest deck to keep the ship from becoming top heavy.

Armies and crusaders sometimes pressed these merchant ships into service to transport them to their destinations. Merchants looked favorably on these events as a way of making money, though sometimes crusaders turned out to

be unable to pay for their passage. Ships carrying crusaders to the Holy Land needed to be able to carry up to 600 tons of cargo, including soldiers, horses, weapons, and provisions.

Most heavy cargo was placed on barges and sailed on inland waterways. Vessels designed as barges for inland transport could be simpler and smaller. In the 12th century barges were still sometimes made of logs lashed together. Other barges were built out of planks. They had flat bottoms for smooth transport in shallow water, and they were built so as to maximize cargo space. During the explosion of cathedral building in the 12th and 13th centuries, vast numbers of stone were moved this way.

Carriers would use natural waterways, such as streams and rivers, when they could. Natural waterways presented some of the same hazards as roads on land. Ships and barges had to pay tolls to pass under bridges. If cargo fell off a barge, an unscrupulous lord could lay claim to it. Robbers sometimes attacked barges floating down rivers. When there were no natural waterways in an area, the people would dig canals to allow heavy goods to move more easily. These canals often included locks to regulate the water level. Locks allowed barges to travel uphill by alternately filling and draining ponds until the barge had reached the highest water level. When a cargo ship reached its destination, it had to be docked so that its goods could be unloaded. Some ships were too large to reach the docks; they had to be unloaded piecemeal into smaller boats that could dock. Many docks were equipped with cranes that could lift goods into or out of barges. Once a barge had been unloaded, its contents could be placed onto carts or mules and carried overland to their destination.

THE ISLAMIC WORLD

BY TIA WHEELER

The Middle East has an extensive history of long-distance travel dating back to early civilization, when ancient Egyptians and Babylonians traded with one another. Long-distance travel was strenuous and time consuming; travel between the Mediterranean coast and Samarkand could take more than a year. Environmental factors such as extreme heat in the deserts, frequently snow-blocked passes, and the lack of constant and reliable water sources all made transportation perilous. In ancient times trade mainly took place by horse and cart, but the domestication of camels provided a stronger, more economical option. Unlike most other societies that embraced and advanced their civilizations by using the wheel, large portions of the Middle East and the Islamic world abandoned the wheel for transportation, replacing it with donkeys and walking in urban settings and camels and horses for long-distance travel.

Donkeys were the preferred method for transporting goods within towns and cities because goods could be gathered on top of the animal while a small child sat astride the items and steered the donkey. Larger animals, such as oxen and camels, were less frequently used in urban settings because their bulkier stature limited movement through small passageways. Walking was frequently the method used when traveling short distances to a large city or capital for administrative duties, such as paying annual taxes.

Wagons and carts had commonly been used in the ancient Middle East, but they fell out of favor for the more economical camel in long-distance travels. Furthermore, carts were difficult to pull across sandy dunes, meaning that travelers had to follow designated paths. By the advent of Islam carts and wagons were uncommon. Muslim and European traveler accounts rarely mention travel by wheeled transport, and in the few accounts that exist the writers express surprise at seeing wheeled transportation. This notion is augmented by the lack of wheeled vehicles in medieval Islamic art; there are a few instances of pictorial representation of carts, but the physical structure is implausible, and the representations are most likely figments of the artist's imagination based on vague descriptions from historical texts. Additionally, there was only one primary word in the Arabic language to describe vehicles—*araba*. The one exception where wheeled transportation was used in the greater Islamic world was in central Asia, where nomads used wagons in transporting their households when relocating across the steppes. Carts that were used most often were pulled by horses or oxen, but the Arab traveler and scholar Ibn Battutah (1304–1368 or 1369) does mention a cart pulled by a camel.

For a long-distance journey most travelers would join a caravan because of the many advantages offered by traveling with a group, particularly safety and navigation. Thieves were common along the routes, as were both individuals and rulers exacting a “protection fee.” Because of the dangers of traveling through many tribal areas, most caravans included armed guards and local guides. The Islamic world did not have set roads for transportation, and those that had been established during the Roman era had fallen into disrepair. Without the assistance of a guide and sometimes even with a guide, it was easy for travelers to become lost in the desert landscape. An early-20th-century account by the Earl of Ronaldshay notes the difficulties of navigating the ever-changing desert landscape. He became separated from his caravan and found himself miles away from his intended caravanserai; his camels and guides, who were also lost, did not arrive until the following day.

Camels, the ships of the desert, are so called because they are able to travel long distances with minimal requirements.

It was largely an economic factor that initiated the replacement of wheeled vehicles by camels. The animals can carry a 300- to 500-pound load, and the maintenance cost for one camel is considerably less than an animal plus vehicle. In the third century the Roman emperor Diocletian's edict on prices noted that camel transport was 20 percent cheaper than wagons. On average, a camel caravan travels at 3 miles per hour and can accumulate 25 miles per day. Commonly, camels were owned by camel drivers, who leased the animals to the merchants for the duration of the travel. A great advantage of camel transportation was the ability to use them as transport for both people and goods. Riding camels astride was most common, but occasionally elite travelers were borne in litters. Goods were transported in double-sided, woven saddle bags that were placed over the camel's back.

Horses were much less frequently used for transportation, because they required greater maintenance and carried smaller loads than camels. However, horses were advantageous when transportation and travel were under time constraints, since they are much faster than camels or walking. The use of horses was limited to military campaigns, postal and communication services, and elite travelers. Transportation for royals and elite included luxuries, whether riding on more comfortable horseback or riding in a litter. The Abbasid caliph Harun ar-Rashid (r. 786–809) and his wife, Zubaydah, traveled from Baghdad to Mecca for the annual hajj, but as befitting their status they walked along a pathway of laid carpets.

Trade, pilgrimage, and scholarship were the primary reasons for long-distance travel. The spread of Islam increased the need for transportation of pilgrims and scholars. One of



Headstall, the part of the bridle or halter that encompasses a horse's head, Granada, Spain, late 15th or early 16th century (© The Trustees of the British Museum)

the five tenets of Islam is performing the hajj, or pilgrimage to the holy city of Mecca. Other cities around the Islamic world also became pilgrimage centers with shrines of saints, companions of the Prophet, and various imams, or Muslim leaders. Under Islam long-distance travel increased, as the religion encouraged the gathering of knowledge. Centers of Islamic education included Damascus, Baghdad, and Cairo. Muslims wanting to become religious scholars traveled to these cities to learn from masters or to study particular schools of thought or law. Scholars and pilgrims often traveled with trade caravans because it afforded them physical protection and an opportunity to engage in trading of their own to offset the expense of travel. Some wandering scholars, including

Ibn Battutah, Ibn Jubayr, and al-Muqaddasi, kept diaries of their travels and studies, providing accounts of transportation and travel. Unfortunately, many of these sources remain untranslated from Arabic or Persian.

See also ART; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; EDUCATION; ECONOMY; EMPIRES AND DYNASTIES; FESTIVALS; GENDER STRUCTURES AND ROLES; HUNTING, FISHING, AND GATHERING; INVENTIONS; MIGRATION AND POPULATION MOVEMENTS; MILITARY; RELIGION AND COSMOLOGY; ROADS AND BRIDGES; SACRED SITES; SEAFARING AND NAVIGATION; SHIPS AND SHIPBUILDING; TRADE AND EXCHANGE; WAR AND CONQUEST.

Asia and the Pacific

~ Description of the West by a Chinese Envoy (1220) ~

In the seventh month (August) of the year 1220, Wu-ku-sun Chung tuan, vice-president of the Board of Rites, was entrusted by the emperor (U-tu-bu of the Kin dynasty) with a mission to the northern court. An T'ing chen, secretary in the Academy, was appointed his assistant. Wu-ku-sun returned in the tenth month (October or November) of 1221, when he addressed me in the following terms:

"I have been sent a distance of ten thousand li west of the border of heaven, and not wishing all the curious things I saw in my travels to remain unrecorded, I therefore request you to write down my narrative.

"In the twelfth month (January) of 1220 I passed the northern Frontier (of the Kin empire), and proceeded in a north-western direction, where the ground rises gradually. Advancing parallel with (the northern frontier of) the Hia empire, after having travelled seven or eight thousand li, I arrived at a mountain. East of it all rivers flow to the east; west of it they run to the west, and the ground gradually descends. Farther on, after travelling four to five thousand li, the climate becomes very hot. I passed through more than a hundred cities; not one of them had a Chinese name. Inquiring about the country, I was told that many tribes were living there, namely, the Mo-li-hi, the Mo-k'o-ti, the Ho-li-kisz', the Nai-man, the Hang-li, the Gai-gu, the T'u-ma, and the Ho-lu; all are barbarian tribes.

"Farther on I travelled over several tens of thousands of li, and arrived at the city of I-li in the country of the Hui-ho. There is the residence of the king of (or of a king of) the Hui-ho. We were then in the first decade of the fourth month (beginning of May).

"The empire of Ta-shi, or the great K'i-tan, was formerly in the middle of the country of the Hui-ho (Mohammedans). Ta-shi Lin-ma belonged to the people of the Liao. T'ai tsu liked him for his intelligence and eloquence, and gave him a princess as wife. But Ta-shi secretly bore the emperor ill-will. At the time the emperor moved his arms to the west, Ta-shi was at first with him, but afterwards he took his family and fled beyond the mountains (probably Altai). Then he assembled the tribes on the frontier and emigrated to the north-west. On their wanderings they rested at places abounding in water and pastures. After several years they arrived at the Yin shan mountain, but could not penetrate owing to the rocks and the snow. They were obliged to leave their carts behind, and to carry their baggage on camels. Thus they arrived in the country of the Hui-ho (Mohammedans), took possession of the land and founded an empire. From day to day Ta-shi's power increased; he reigned some thirty years and more, and after death was canonised as Te tsung. When he died his son succeeded. The latter was canonised as Jen tsung. After his death, his younger sister, by name Kan, took charge of the regency; but as she held illicit

(continued)

(continues)

intercourse and killed her husband, she was executed. Then the second son of Jen tsung came to the throne. Owing to his appointing unworthy officers, the empire fell into decay, and was finally destroyed by the Hui-ho.

At the present day there are few of these people left, and they have adopted the customs and the dress of the Hui-ho."

From: E. Bretschneider, trans., *Mediaeval Researches from Eastern Asiatic Sources* (London: Trübner, 1888).

Europe

≈ *Excerpt from The Travels of John de Marignolli*
(1339–53) ≈

We set out from Avignon in the month of December, came to Naples in the beginning of Lent, and stopped there till Easter (which fell at the end of March), waiting for a ship of Genoa, which was coming with the Tartar envoys whom the Kaan had sent from his great city of Cambalec to the Pope, to request the latter to dispatch an embassy to his court, whereby communication might be established, and a treaty of alliance struck between him and the Christians; for he greatly loves and honours our faith. Moreover the chief princes of his whole empire more than thirty thousand in number, who are called Alans, and govern the whole Orient, are Christians either in fact or in name, calling themselves the Pope's slaves, and ready to die for the Franks. . . .

Howbeit on the first of May we arrived by sea at Constantinople, and stopped at Pera till the feast of St. John Baptist. We had no idle time of it, however, for we were engaged in a most weighty controversy with the Patriarch of the Greeks and their whole Council in the palace of St. Sophia. . . .

Thence we sailed across the Black Sea, and in eight days arrived at Caffa, where there are Christians of many sects. From that place we went on to the first Emperor of the Tartars, Usbec, and laid before him the letters which we bore, with certain pieces of cloth, a great war-horse, some strong liquor, and the Pope's presents. And after the winter was over, having been well fed, well clothed, loaded with handsome present, and supplied by the King with horses and travelling expenses, we proceeded to Armalec [the capital] of the Middle Empire. There we built a church, bought a piece of ground, dug wells, sung masses and baptized several; preaching freely and

openly, notwithstanding the fact that only the year before the Bishop and six other Minor Friars had there undergone for Christ's sake a glorious martyrdom, illustrated by brilliant miracles. . . .

Towards the end of the third year after our departure from the Papal Court, quitting Armalec we came to the Cyollos Kagon, to the Sand Hills thrown up by the wind. Before the days of the Tartars nobody believed that the earth was habitable beyond these, nor indeed was it believed that there was any country at all beyond. But the Tartars by God's permission, and with wonderful exertion, did cross them, and found themselves in what the philosophers call the torrid and impassable zone. Pass it however the Tartars did; and so did I, and that twice. . . . After having passed it we came to Cambalec, the chief seat of the Empire of the East. Of its incredible magnitude, population, and military array, we will say nothing. But the Grand Kaam, when he beheld the great horses, and the Pope's presents, with his letter, and King Robert's too, with their golden seals, and when he saw us also, rejoiced greatly, being delighted, yea exceedingly delighted with everything, and treated us with the greatest honour. And when I entered the Kaam's presence it was in full festival vestments, with a very fine cross carried before me, and candles and incense, whilst Credo in Unum Deum was chaunted, in that glorious palace where he dwells. And when the chaunt was ended I bestowed a full benediction, which he received with all humility.

From: Sir Henry Yule, *Cathay and the Way Thither: Being a Collection of Medieval Notices of China* (London: Hakluyt Society, 1913–1916).

FURTHER READING

- Ralph A. Austen, "Marginalization, Stagnation, and Growth: The Trans-Saharan Caravan Trade in the Era of European Expansion." In *The Rise of Merchant Empires: Long-Distance Trade in the Early Modern World, 1350–1750*, ed. James D. Tracy (New York: Cambridge University Press, 1990).
- Ibn Battuta, *The Travels of Ibn Battuta in the Near East, Asia and Africa, 1325–1354*, trans. and ed. Samuel Lee (Mineola, N.Y.: Dover Publications, 2004).
- Richard W. Bulliet, *The Camel and the Wheel* (Cambridge, Mass.: Harvard University Press, 1975).
- John Crandall, "The Inca and their Roads." Available online. URL: http://transportationhistory.suite101.com/article.cfm/the_inca_and_their_roads. Downloaded on November 29, 2007.
- John Block Friedman, and Kristen Mossler Figg, eds. *Trade, Travel, and Exploration in the Middle Ages* (New York: Garland, 2000).
- Robin Law, *The Horse in West African History: The Role of Horses in the Societies of Pre-Colonial West Africa* (Oxford, U.K.: Oxford University Press for the International African Institute, 1980).
- Albert C. Leighton, *Transportation and Communication in Early Medieval Europe, A.D. 500–1100* (Newton Abbott, U.K.: David and Charles, 1972).
- Eleanor Sims, "Trade and Travel: Markets and Caravanserais," in *Architecture of the Islamic World*, ed. George Michell (London: Thames and Hudson, 1978).
- David W. Tschanz, "Journeys of Faith, Roads of Civilization," *Saudi Aramco World* (Jan./Feb. 2004): 2–11. Available online. URL: http://www.saudiaramcoworld.com/issue/200401/journeys_of_faith.roads_of_civilization.htm
- Michael Woods and Mary B. Woods, *Ancient Transportation: From Camels to Canals* (Minneapolis, Minn.: Runestone Press, 2000).



► war and conquest

INTRODUCTION

The Middle Ages is often thought of as a period of military amateurism. Much of the fighting in cultures all over the world had a “heroic” quality in the sense of the heroes of the *Iliad*, such as Achilles or Hector, fighting individual duels on the battlefield in a grand contest for honor, as opposed to a clash of disciplined formations of troops. The perception is most true in the case of western Europe, the culture that, however unrepresentative it might be of other areas, does the most to inform our view of the Middle Ages. The knightly ideal of chivalry was an elaborate code for heroic warfare or, viewed differently, of military amateurism.

Knights were indeed professional soldiers, but they trained for single combat. The ritualized fighting of the tournament was as important for their prestige and reputation as actual warfare. Medieval armies and warfare were not marked by brilliant maneuvers on the battlefield or by long campaigns of attrition, which are always the preferred form of campaigning (as being less risky) for professional soldiers. The largest components of feudal armies (serving as infantry), gathered by levy, were hardly trained at all and usually served for very short periods, as little as 40 days. When a force of knights met a disciplined force of mercenaries (for example, the Welsh peasant longbowmen deployed at the battle of Agincourt), the knights did not usually fare well. Still, if a knightly army could deliver a charge of heavy cavalry, it was nearly irresistible.

In the Americas warfare often served a purpose other than mere military victory over the enemy. Among the chiefdoms of North America chiefs fought each other to gain prestige, not typically for the sake of conquest or even plunder. This very ancient style of warfare is the very antithesis of military professionalism. It can find no better expression than in the practice of counting coup. In this custom of the Plains nations, a warrior would approach an enemy warrior and simply touch him, without making any attack. If he could do this and get away unharmed, he could boast that he had utterly overcome and humiliated his foe. Even in Mesoamerica the primary reason for Aztec aggression (as successful as it often was in conquest) was for individual members of the elite military class to capture enemy soldiers as prisoners for human sacrifice and augment their own status within Aztec society. Even in the Americas, however, the Inca seem to have practiced a more methodical form of warfare based on superiority in logistics rather than the bravery of the individual fighters.

In sub-Saharan Africa most warfare was of a very “heroic” character, conducted between individual clans or villages. By the end of the Middle Ages the kingdom of Kongo in central Africa had developed a more sophisticated military system able to field larger forces and utilize them for conquest or profitable raiding. However, just as the Kongo state was organizing, it had the misfortune to become entangled with the Portuguese, first as allies but, inevitably after the Middle Ages, as enemies. Kongo simply could not match the supe-

rior military technology and doctrines of the Europeans, who used firearms and more easily held command of the sea.

The most dramatic story of medieval warfare concerns the waves of conquest both east and west by the nomadic tribes of the inner Asian steppe. The pressure was first felt in the West by the Roman Empire when Asiatic tribesmen began forcing Germanic peoples westward out of the Ukraine. Unfortunately, this came at a time when Rome was near collapse from civil wars and other internal dislocations. If the invasions had come earlier, at the empire's height, the Roman Empire's professional army would probably have been able to deal with the problem. As it was, the Romans were forced to increase the size of their forces by admitting German tribesmen and then whole tribes into the army. Eventually, the western part of the empire dissolved more than fell, as the barbarian chiefs to whom the security of its provinces had been entrusted simply declared themselves kings in their own right. Much the same thing happened in the seventh century when the relatively poorly organized Arab tribesmen invaded and overwhelmed the Byzantine and Sassanian empires at precisely the moment the two empires had exhausted each other by decades of costly and inconclusive war.

The greatest triumph of the steppe tribesmen was to come later and in the East, in the person of Genghis Khan. An unlikely military genius, he came from an illiterate society with a tradition of raiding rather than conquest. His military and political education was entirely practical, first in the struggles to secure his hereditary position among the Mongols and then to unify the steppe tribes. Owing to the relatively simple level of technology that existed during antiquity and the Middle Ages, even in a sophisticated state like China, Genghis's troops had the advantage of technological parity with their foes that nomadic tribesmen always enjoyed vis-à-vis advanced urban cultures until modern times. In fact, using the stirrup and compound bow, his troopers were more effective fighters than the soldiers of the Chinese and his other enemies. Genghis's conquest of northern China and particularly the states of inner Asia shows a profound grasp of the strategic realities of war in terms of intelligence, planning, logistics, and psychological warfare. Although there was no native tradition of Mongol siege warfare, Genghis immediately recognized its importance and organized a siege train using the best Chinese engineers and equipment. He was also blessed with a circle of subordinate commanders who were themselves brilliant generals. Genghis's quality and fortune as a general can be compared only to such figures as Alexander the Great or Napoléon. His system of warfare allowed his successors to go on conquering for a century, taking southern China, most of the Middle East, Russia, and northern India, but eventually the inherently impoverished

way of life of the steppe and the failure to modernize brought Mongol rule to an end.

AFRICA

BY KIRK H. BEETZ

In 500 North Africa was still primarily under the control of the Byzantine Empire. Outside of that region the most powerful African military was probably that of the kingdom of Axum. To the west of Axum were the Christian kingdoms of Nubia: Nobatia, Makuria, and Alwa. These nations had well-organized armies. Archaeological evidence indicates that there were polities farther west and south, but little is known of their ways of waging war. In general, more information about warfare survives from later in the medieval era than from earlier in the period. In 500 the forests were populated by hunter-gatherers and homesteads of farmers migrating from western Africa. The plains of East Africa and southern Africa were populated mostly by pastoralists, with fishing villages along the coasts. The southwestern reaches of Africa were populated mostly by the San, who were primarily hunter-gatherers. Out of many of these peoples would emerge kingdoms and empires, with well-organized military forces; some pastoral and hunter-gatherer cultures would retain already ancient forms of aggression and defense.

AXUM AND ETHIOPIA

The medieval society of Ethiopia had a strong interest in history, and its government tried to preserve documents about the kingdom's history. Medieval clerics who maintained libraries and copied decaying texts to fresh pages preserved some details of how war was waged during medieval times.

At the start of the medieval era the Horn of Africa was dominated by Axum. This kingdom had originated thousands of years before as a city-state whose main seaport was Adulis, about a six-day journey from the city of Axum. Axum had a powerful military. A navy had proven essential to maintaining seagoing trade, and Axum's navy was unrivaled on the southern seas between India and Africa. Little is known of how the Axumite navy functioned, although its ships were known well enough for poets to refer to them as large and swift. Naval ships transported Axumite soldiers to places on the Arabian Peninsula. The navy fought battles against pirates and seems to have been usually victorious. The eclipse of Axum's military by Muslims occurred in land battles.

Axum's society was the result of a mix of local African and Sabea cultures, and it controlled not only much of northeastern Africa but almost all of southern Arabia, where the Sabeans originated. The Arabian provinces of Axum were governed by a viceroy who commanded a standing army that

often supported friendly Arab princes in their wars and even interfered in wars of succession in eastern Arabia. In the era of Muhammad (ca. 570–632) Axum was able to protect Muslim refugees from Mecca.

The king of Axum maintained a standing army that was divided into regiments, each probably led by a member of the nobility. This army moved swiftly on the roads of Axum. This core of professionals would be supplemented in times of war by levies of troops from Axum's provinces and subject states. These were usually poorly equipped people armed with spears, bows, and swords. It was the responsibility of regional nobility and village chiefs to raise these troops when called upon by the king. Even though the king of Axum had protected Muslims from their enemies, the nemesis of Axum proved to be Muslims. Muslims settled on the coasts and within Axum, and beginning in the eighth century they tried repeatedly to overthrow the Axumite government. Although Axum's army had controlled much of northeastern Africa and southern Arabia for hundreds of years, it does not appear to have kept pace with military developments in the Near East. Arabian armies were better armed and wore full chain mail; they were also ably led. Axum had long been able to import supplies from abroad, but the fall of Egypt to Muslim armies cut off supplies from the Byzantine Empire, and Muslim armies cut off supplies from the south. The invaders had better access to supplies, and in conflicts that lasted into the 10th century they were able to outlast the Axumite defenders, seizing control of Axum's ports. The Axumite government had been slowly moving westward for 100 years or so and finally withdrew into the Ethiopian highlands, beginning a new era as the empire of Ethiopia.

In the highlands the Ethiopian army's quick responses to attacks and a system of fortresses defending mountain passes repelled attempts by outsiders to invade the country. Further, the army opened and protected routes to the west, giving Ethiopia access to the Nubian kingdoms of the upper Nile and to trade routes into Africa's interior. In 1270, when Yekuno Amlak (r. 1270–85) founded the Solomonid Dynasty, Ethiopian kings abandoned the practice of having a fixed capital and chose to live in a mobile tent city. The kings were essentially war leaders, and their tent cities allowed them to move themselves, their governments, and their central army to wherever there was fighting. Ethiopia's wars were not always defensive. Often they were intended to expand the kingdom or to turn troublesome neighbors into vassals who paid tribute and contributed soldiers to the Ethiopian army. Much of the professional army consisted of soldiers who had been taken as prisoners of war.

The Ethiopian standing army was divided into regiments. Each regiment was led by someone close to the em-

peror of Ethiopia, often a son or another relative. Brothers were usually not favored because they were threats to the sovereignty of the monarch. Each regiment had its own colors. Members competed for honors and participated in displays of courage with other regiments. The soldiers were often raised in the military service and taught to regard the emperor as their father. The army continued to suffer in conflicts against Muslim armies because of the inferiority of its weapons and armor until the era of Emperor Amda Tseyon (r. 1314–ca. 1344). His standing army was outfitted in chain mail and helmets and was provided with a variety of weapons. Some units focused on archery. Some had crossbows that fired darts. Others were equipped with long, narrow shields and swords for close fighting. The principal weapon was the long spear; the highly disciplined infantry units could blunt a cavalry charge by forming lines with their spears bristling forward. In Ethiopia's own cavalry the spears could unhorse rivals or be thrust over the shields of infantrymen. The cavalry seems to have been a small part of the army. For example, in 1322 the Muslim governor of Ifat murdered one of the envoys Amda Tseyon had sent to Egypt to protest persecution of Christians in Egypt; Amda Tseyon's forces reportedly had only seven horses when they invaded Ifat in reprisal.

THE NUBIAN KINGDOMS

The kingdoms of medieval Nubia fought wars against each other, against the Egyptians, and against Arab pastoralists, who continually tried to migrate into the lands of Nobatia and Makuria and drive out the local farmers. Christianity came to these kingdoms in the sixth century, and in their early years these peoples traded with the Byzantine Empire. Then Muslim armies seized Egypt and the rest of North Africa; in 651 the Muslim army invaded Nubia but was defeated in 652. Even so, the Nubian kingdoms took to paying the caliph in Baghdad annual tribute in slaves. Makuria paid 365 slaves per year. It is possible that in the late seventh century or the eighth century Makuria conquered Nobatia, although the merger may have been friendly; it is also possible that Nobatia maintained its independence but acknowledged Makuria's supremacy. From about 750 to about 1150 the Nubian kingdoms were stable, and their armies fended off raids and invasions. In 833 they actually invaded Egypt, defeated Egypt's army, and ceased paying tribute. Able to negotiate from a stronger position than before, Makuria persuaded the caliph to forgive tribute that had been unpaid and to reduce future tribute to just once every three years.

One of the duties of the army of each kingdom was to patrol the borders. Bandits and pastoralists trying to seize territory were constant problems, and troops were stationed in fortresses along the borders. Each province seems to have had



A trophy head representing a powerful defeated enemy, Benin Kingdom, Nigeria; 15th to early 16th century (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Purchased with funds provided by the Smithsonian Collections Acquisition Program, 82-5-2)

a principal lord, who maintained a castle on high ground as well as an army that kept his lands clear of invaders and that would join the national army during a crisis. The army was essential to maintaining the kingdoms' independence and the security of their subjects.

The elite force of the armies was composed of archers on horseback. Able to move swiftly and fire accurately at the same time, they were well respected by their adversaries. Nubian cavalry seems to have resembled European cavalry. The men were equipped with chain mail that was imported from the Byzantine Empire or Egypt, and they wore steel helmets and tunics over their armor with their insignia on them, much as Europeans did. Their weapons included iron swords and long spears. In the sixth and seventh centuries Nubian cavalymen rode bareback, but by 750 they had saddles, and their stirrups resembled those used in the Islamic world.

The Christians of Upper Egypt regarded the Nubian kingdoms as their protectors, and Makuria in particular sometimes intervened in Egypt when Christian communities were attacked. The period of the Fatimid rule of Egypt seems

to have been especially peaceful for the Nubian kingdoms; the Fatimids faced much hostility elsewhere in the world, and they valued the trade and diplomatic relations they developed with the kingdoms to the south. This situation changed in 1171, when the Ayyubids took over Egypt; Makuria seems to have sent troops in support of the Fatimids. They were defeated, and the Ayyubids occupied much of Makuria for several years before withdrawing. The effect on the Nubian kingdoms was dramatic. The Nubians built walls around cities that had had no walls. They invested much time and wealth in building castles after Byzantine models. Their cavalry shifted from light, swift horses to heavier, larger horses.

In 1250 the Mamluk Dynasty took over Egypt and negotiated a military treaty with Makuria in which Makuria promised to help protect Egypt's southern border. Makuria was unable to prevent bandits from raiding across the border into Egypt and in 1272 actually invaded Egypt on behalf of Christians in Upper Egypt. This action resulted in Mamluk invasions of Makuria, and the Mamluks placed a puppet on the Makurian throne before being driven out by a Christian rival. In the 14th century there was a prolonged invasion of the Nubian kingdoms from Egypt. The Nubian armies proved remarkably resilient while battling one of the world's foremost military powers. The Nubians gave up ground grudgingly, fighting a war of attrition that they seemed almost doomed to lose. Makuria fell apart in 1376 because it was no longer able to provide its troops with supplies. In 1287 Alwa was reduced to a group of small, independent principalities, ruled by military nobility. These lords fought long, defensive wars against the Muslim invaders before being overwhelmed in the 15th century.

Thereafter the Nubians either migrated to other lands or continued to fight. Their military organization resembled the traditional organizations of central Africa, with villages led by chiefs who were selected as leaders because of their military skills. Each village had a small, part-time militia that assembled to fight wars or to fend off pastoralists who tried to move into the Nubians' farmlands. The warriors no longer had the armor and shining helmets worn by the knights of the past, but they probably still used horses in battle. Their arms consisted primarily of spears and swords, and they carried light shields with light frames and probably animal skin stretched across the surface. It would have taken skill to use the shields because they would have been effective only against glancing blows and would not have endured direct blows from swords or hammers.

THE EMPIRES OF THE WEST

During the medieval era numerous small kingdoms formed, survived, and then collapsed to be replaced by new kingdoms

in western Africa. They often were created by someone who was believed to have magical powers. Their kings were not necessarily regarded as gods themselves, but in general they were regarded as having special connections to God or to the world of spirits. The armies of these kingdoms tended to be run by members of nobility, who usually fought as armored knights on horseback. Horses were difficult to maintain in forested lands, but during the medieval era people learned to house horses in stalls to keep out flies that carried disease; the horses often were cared for and protected by several people. Even so, the rulers of the kingdoms regularly had to import horses from North Africa to replace the horses that died from disease.

Northeast of Lake Chad the kingdom of Kanem was formed in the ninth century. In about 1068 a Muslim overthrew the last king of the Zaghawa Dynasty and founded the Sayfawa Dynasty. Although the monarchs were officially Muslim, the commoners of Kanem resisted Islam, and this resistance led to occasional rebellions. The principal mission of Kanem's army was to protect the trade routes that ran through the kingdom. By 1259 Kanem had an army of 40,000 horsemen, led by 3,000 knights. In times of war infantry consisted of conscripted (drafted) peasants. The infantry was armed with bows and spears. The armored knights wore chain mail made in North Africa or in Kanem itself; the armor covered them from neck to ankles. They were armed with spears, swords, and war hammers. In large battles the knights bore the brunt of the fighting. For patrolling the trade routes, lightly armored cavalry could chase down bandits and harass intruding pastoralists.

The most powerful monarch of Kanem was probably Dunama Dibalami (r. 1210–48). He organized his government around the kingdom's military. Government posts had been filled on the basis of loyalty to the *mai* ("king"), but Dunama Dibalami gave government posts to military nobility and made the posts hereditary. Further, he destroyed the *mune*, a supernatural object that linked Kanem to its non-Islamic past. The results were disorder among the peasants, who were angered at the loss of the *mune*, and frequent rebellions by hereditary governors of provinces. The rebellions created enough turmoil for Arabs successfully to invade Kanem from the north and drive the kingdom's government out of its capital, Njimi. To the south and west of Kanem the refugees founded the kingdom of Bornu. Most of the 15th century was spent in civil strife, but by about 1472 a new capital, Ngazargamu, had been established. It was a fortified city, and much of Bornu seems to have been dotted by fortified settlements. It had a military government consisting of knights, and its focus was on conquest. Ali Gaji (r. 1497–1515) reconquered Njimi.

Farther to the west was the Ghana Empire, which arose around 700 and fell in 1078 to Almoravid invaders. In 1140 the Almoravids were driven out by an army from the kingdom of Kaniaga. A rebellion drove out the Kaniagan troops in 1230, but the new government of Ghana allied itself with Mali and by 1240 had become just another part of the Mali Empire. Ghana's economy depended on trade with North Africa, and much of its military was devoted to protecting that trade. Its soldiers were not well equipped; most of them were peasants hastily conscripted when a war began. Even so, in the 11th century Ghana was reported by Muslim geographers to be able to muster over 200,000 troops, mostly peasant conscripts, led by war chiefs. The number may be an exaggeration, but part of Ghana's military success may have been its army's ability to overwhelm many enemies with the size of its army in an open range. The infantry fought in columns, bristling with spears. Kaniaga's army may have focused on a small core of armored cavalry, with the bulk of the army consisting of archers on horseback and spear-carrying infantry.

The Mali Empire became legendary in the medieval world, famous for its wealth, its system of government, and its military power. Throughout its existence it depended on its military for survival; the military not only protected the many trans-Saharan trade routes through Mali but also had to fight rebellious provinces and invasions by raiders. The growth of Mali into an empire began with an exceptionally gifted military commander, Sundiata Keita (ca. 1217–55), one of the sons of the king of Mandinka. He was a very sickly child who began walking at age seven, with the aid of metal canes that were said to bow under his weight. When Kaniaga conquered many of the tributary kingdoms of the Ghana Empire, the king of Kaniaga had all of Sundiata's family put to the sword except Sundiata and Sundiata's mother. One account of the events says that Sundiata was spared because he was so sickly that he seemed to pose no danger; another says that he and his mother had already been forced into exile by a jealous brother.

Sundiata was a charismatic leader even when he was a teenager, and he attracted followers. He also turned out to have a gift for organizing people. He combined armies from the kingdom of Mema, the city-states of the Mandinkans, and the remnants of Ghana's nobility, and he set the pattern for future armies of the Mali Empire. His cavalry consisted of armored warriors, mostly from the aristocracy, and of infantry armed primarily with spears and bows with poison-tipped arrows. The battle of Kirina (ca. 1235) took place in a region with several rivers, so it is likely that both sides used war canoes. The Kaniagan forces were outmaneuvered; Sundiata was able to put the bulk of his cavalry against Kaniagan infantry. Throughout the years of the Mali Empire at its zenith,

its army would maneuver its heavy cavalry into positions that allowed it to charge the massed infantry of its enemies. Not much is known of how Sundiata laid siege to cities held by his enemies, but he seems to have preferred to try to breach the walls of cities rather than to wait out his enemies. It took several months of persistent attacks to breach the walls of Kaniaga's capital city.

After Sundiata's time the Mali Empire continually fought rebels and invaders. Even raiders from the southern forests were persistent, attacking annually and being defeated annually by Mali's highly disciplined heavy cavalry. Mali's cavalry of the 13th and 14th centuries had the most advanced armor in western Africa. Like the knights of Kanem, Mali's cavalry wore chain mail from neck to ankle. They wielded long spears and heavy shields during charges but could fight from horseback or on foot with their swords. They rode large, heavy horses that had padded armor. These horses were themselves weapons, their size and weight bearing down on enemy infantry. During the 13th and 14th centuries Mali may have had 30,000 professional heavy cavalymen. Mali also had horse archers, but Mali's generals seemed to prefer to use infantry as archers.

Enemies from southern kingdoms often tried to lure the heavy cavalry into dense forest or swamps, where mounted troops could be picked off by archers who hid behind trees. However, Mali rarely sent horsemen into forests, preferring to penetrate the forests with war canoes and infantry or to stay out of them altogether. Mali had a core army of infantry that served as garrisons in cities and fortresses and protected the emperor. Although the emperor and his family were technically Muslims, the emperor continued to practice traditional African magic and to tolerate other traditional customs, including having women in positions of authority. In times of war the mother of the emperor or one of the emperor's wives could be an intimidating military leader, often entrusted with defending important cities and territory. For most military campaigns, Mali relied on its extensive roads to move its troops quickly. Often, even when moving very rapidly, the main body of the army arrived too late to aid a frontier outpost or a city near the empire's borders. This weakness was worsened by a reliance on summoning infantry from peasants, who usually were equipped only with whatever they could grab.

During a period in which Mali suffered a food shortage in its large cities, fended off several attacks from small polities, and lost Timbuktu to Tuareg invaders, a small kingdom with a well-organized military was able to take advantage. The Songhai Empire began as a small kingdom in the northwest of modern-day Nigeria. The kingdom had been a perpetual problem for the Ghana Empire and then the Mali

Empire. In 1465 the Songhai conquered Mema. In 1468 they drove the Tuareg out of Timbuktu. The Songhai were joined by troops from rebellious provinces and tributary kingdoms. Their foremost leader was Sonni Ali (r. ca. 1464–92). At his command was an exceptionally well-disciplined army of professional soldiers, veterans of many battles. These full-time soldiers were notable for their hardiness and courage. A Songhai infantryman would stand his ground even if surrounded by the enemy, moving only if ordered by a superior officer to change his position. Cavalry charges that would have scattered other troops often failed against the Songhai infantry. However, the behavior of Songhai's troops after the taking of Timbuktu was very undisciplined, and Malian civilians were slaughtered, the women raped, and their homes looted.

The siege of Jenne-jeno proved to be different. The city of Jenne-jeno was surrounded by swamps in the rainy season and had numerous waterways that enemies had to cross to reach the city itself. In fact, it had successfully resisted all attempts by the Mali Empire to conquer it. Sonni Ali decided against a direct assault on the city, choosing instead to surround it and prevent outside supplies from reaching the city. During the dry season Songhai's army surrounded the city. During the rainy season the army had to withdraw because swamps expanded. Sonni Ali's navy consisted of hundreds of war canoes, and they were used to patrol waterways in an effort to prevent the smuggling of supplies into Jenne-jeno. In open battle Sonni Ali was able to deploy his diverse military units very effectively. His cavalry was fast and could quickly turn enemy flanks. His infantry used spears and swords. For aerial attacks he had not only archers with bows and arrows but also troops who could fire poisoned darts and who were skilled sharpshooters. The terror inflicted by the darts had much to do with defeating the Tuareg because a prick of the skin could mean death.

The leaders of Jenne-jeno were canny, letting their walls and swamps keep the enemy out while not sending their troops out for open battle. After seven years of the siege both sides were ready to give up, but the leaders of Jenne-jeno surrendered first. What then passed was a display of the discipline that would become the hallmark of Songhai's armies. The people of Jenne-jeno were unmolested. The troops of the Songhai remained in formation and under the supervision of their officers. This tactic allowed Sonni Ali to display generosity and magnanimity toward his conquered enemies, something that may have encouraged other potential foes to submit voluntarily to Songhai, saving many lives.

CENTRAL AFRICA

There were kingdoms in the area of the Congo River, but little is known of them. In late medieval times there were king-

doms between western Africa and the southern city-states of East Africa. Little is known about these kingdoms except that their kings could guarantee safe passage to merchants, suggesting some type of military power. The hunter-gatherers of the rain forest were under constant pressure from farmers migrating southward. As the north of Africa became drier and as the dry lands spread southward, people who depended on reliable sources of water for their crops also moved south. How often there was conflict is uncertain. The hunter-gatherers had bows and blowguns. The poisons of the arrows and darts could exact frightful tolls. In some cases, the hunter-gatherers assimilated into the small armies of their northern neighbors; in other cases, the hunter-gatherers retreated. When they chose to fight, they would unite warriors from several different groups, probably related by kinship, but they did not field large armies.

Indeed, for most of the medieval era an army of 3,000 men and women would have been enough to dominate a kingdom. Military leaders were usually people believed to have supernatural powers. Blacksmiths, in particular, became military leaders and even kings. Blacksmiths were traditionally thought to have a supernatural connection to deceased ancestors and to gods, and their work involved secret rituals passed on from father to son. Further, in much of central Africa they were traveling workers. They took their tools with them from village to village on narrow paths through the rain forest. They were subject to robbery while traveling and therefore formed groups of bodyguards. Keeping the paths open for travel even when the blacksmiths were not there required even more guards. These guards became armies, capable of fighting small wars. Blacksmiths with armies could take control of villages. Many chiefs began as blacksmiths with private armies, and some of these chiefs became kings, ruling over many villages.

Wars were seldom long, usually lasting no more than three days. Most conflicts could be settled in a day. Battles were fought according to rules well understood among the different cultures that populated the region. Usually an open area was selected. The object was to force the opposing side to retreat. The warriors would form lines facing each other; they were armed with spears or short swords and carried tall, light shields. Each side would try to outmaneuver the other in order to turn the enemy's flanks. In the process, the warriors would clash, and blood would be shed, but the affair was conducted so as to minimize bloodshed. Once one side had nearly encircled the other, fighting could become fierce, but there was always an opening in the ranks near the forest edge through which the encircled forces could retreat. The battle began in late afternoon so that after an hour or two of fighting, the losing side could retreat under cover of darkness. In

general, it was shameful for the victors to loot the enemy's villages, but seizing a moderate amount of livestock, without leaving the enemy destitute, was considered honorable. On rare occasions, when an enemy was especially scorned, the victor would seize the loser's territory, allowing a kingdom to expand a little.

THE EASTERN CITY-STATES

Even though the trading cities of the eastern seaboard of Africa and on northern Madagascar were famous, not much is known about their militaries. Almost all had a navy, usually small and used for protecting sea traffic from pirates. Kilwa may have had a notably large and well-equipped navy that helped it control much of the eastern coast of southern Africa. Kilwa and other cities were surrounded by walls, but the walls do not seem to have been very effective. When Portuguese crews began destroying the cities in the late 15th century, they were able to sail into Kilwa's port like merchants; they then came out during the night, murdering much of the population and carrying many people away for slavery in Europe.

Only Mogadishu managed to fight off the Portuguese, but the details of the feat are unclear. Mogadishu had a fortress on high ground near the city, to which many of the city's people fled; others fled inland. Assaults on the fortress by the Portuguese and Africans allied with the Portuguese failed; the loss of life for the invaders was enough for them to have to retreat from the region. It is unlikely but not impossible that the defenders of Mogadishu had firearms, which could have been imported from the Mediterranean; these defenders more likely had bows, spears, and swords, and wore armor similar to that worn by Ethiopian soldiers.

SOUTHERN AFRICA

To the west of the city-states was Great Zimbabwe, an empire that dominated several kingdoms. The empire had many well-kept roads that seem to have been organized according to an overall plan. Several roads led out of the city of Great Zimbabwe. These roads led to towns. From each town roads connected to villages. The empire relied on the roads for swift movement of its troops, who were likely to have been entirely infantry. Small fortresses along the roads could have housed garrisons whose duty was to keep the roads clear of bandits. Spreading west from Great Zimbabwe were small vassal kingdoms that shared the Zimbabwean culture and that probably required occasional suppression by the army of Great Zimbabwe. Also of concern were the herders of the southern plains. They may have been required to pay tribute for driving their herds of cattle on territory controlled by Great Zimbabwe and other kingdoms. A small but disciplined regular army that used the roads to patrol the borders of the kingdoms could

have defeated any but a similarly well-disciplined force from the pastoralists.

The herders were mostly the Khoi. To the west of the grasslands on which the Khoi migrated were drylands occupied primarily by the San. Both peoples had similar weapons: bows and spears. These were used mostly for hunting but could double as military weapons. The Khoi may have had the stronger position in wars between the two groups because they could gather warriors in a group more quickly than could the San. Usually Khoi and San war parties were small, consisting of several men, often related kinsmen. Battles could have consisted more of shouting and posturing than physical combat.

The San, in what is modern-day Angola, sometimes became warriors in the armies of central African kingdoms. Sometimes they fought against the southward expansion of kingdoms. They were valued for their skills with the bow and were tough fighters with spears and short-bladed swords or knives.

THE AMERICAS

BY J. J. GEORGE

Many aspects of war in the Americas during the Middle Ages show great developmental continuity with earlier periods, especially in the areas where hunter-gatherer, nomadic, or chiefly cultures persisted. Areas such as the Arctic, the Great Plains, the Caribbean, southern Central America, and South America outside the Andes generally experienced small-scale but nonetheless intense warfare and raiding. These conflicts were in large part due to smaller scales of political coordination. Between the 10th and 16th centuries, however, the situation changed dramatically, especially in Mexico and the Andes, with the rise of overarching political-economic-military entities, such as the Toltec, Aztec, and Inca empires, all of which were highly organized and able to mobilize war and conquest as deft and persuasive tools. Four major events in this period broadly shaped the ebb and flow of the cultural landscape. War is certainly implicated among them, shaping and being shaped by the intricate and often devastating turning of events.

The first event was the fall of the central Mexican empire centered at Teotihuacán around 750, dissolving numerous practical ties and alliances stretching across Mexico into the Mayan territory of Guatemala and Honduras. The ensuing void gave rise to a number of city-states, struggling against one another for greater power and control. The second event was the collapse of the Classic Period lowland Mayan civilizations in southeast Mexico and neighboring Central America around 925. Scholars have yet to agree on

the exact reason for the collapse but agree that any number of factors contributed to their decline; climate change, warfare, and agricultural sustainability are a few of the reasons typically offered. The third major event was the rise of the Aztec Empire in the 14th to 16th centuries. The Aztec, who looked backward to Teotihuacán and the Toltec Empire (10th–12th centuries) for validation, evolved from a warrior tribe to an empire of warriors. Sustaining their tribute empire mandated more or less continuous warfare. The fourth major event was the consolidation of the Inca Empire from 1434 to 1532 along the spine of Andean South America. Centered at the highland city of Cuzco, the Inca eventually conquered all of the territory from roughly Quito, Ecuador, to Santiago, Chile, spanning approximately 3,000 miles and including perhaps 10 million subjects. War and conquest were crucial components in all of these events. Mixed with their social, economic, and political nuances, they amount to highly complex historical processes.

NORTH AMERICAN WARFARE

Warfare was common throughout North America during the period 500–1500, just as it was in many other parts of the world. Some of the best early information regarding indigenous warfare comes from the late 16th century in the form of paintings, sketches, and written accounts by European explorers detailing not only native war practices but general ethnographic information as well. Complementing this information, archaeology has provided data allowing for deeper historical context such that practices witnessed in the 16th century can convincingly be traced further back in time. Native North Americans lacked writing and written texts, unlike their neighbors to the south in the Mayan and Aztec cultures, who developed their own form of pictorial writing. Nevertheless, the picture of North American warfare is becoming clearer as research continues.

Among the Mississippian Period cultures of the Southeast and the greater Midwest, Spanish and French explorers from the 1530s to the end of the 16th century offered pictorial evidence and witness accounts indicating that war and war rituals were both important and common. Chiefly warfare had spread throughout the midcontinent by the end of the first millennium. Intense chiefly rivalries were a main reason for going to war and were a way for a chief to extend influence, not necessarily for the conquest of land but as a way to extend his financial and political base and to defend it against aggressive actions by rival chiefs. According to European sources, preparations prior to military campaigns included war feasts and declarations of war. War chiefs consulted with priests over the likelihood of success; one engraving by Theodor de Bry (1528–98), after an original 1564 painting by

Jacques Le Moyne (ca. 1533–88), shows a chief consulting a shaman about plans for his battle against a neighboring enemy. Behind the chief stand warriors holding clubs, spears, and bows and arrows, evidently awaiting word on whether the battle will ensue.

Another engraving by de Bry is particularly illuminating because it shows a chief named Holata Outina marching to war against an enemy neighbor. What is particularly informative about the image is that it shows Outina at the center of organized troops, who are lined up about 10 deep on each side of him, forming around him a large, open, rectangular space from which he commands and in which he is protected. The troops are dressed minimally in loincloths and carry spears, clubs, and bows and arrows. Many of them are covered in body painting. Another complementary image, also an engraving by de Bry, after an original watercolor by an Englishman named John White (d. ca. 1593), depicts what these advancing troops might have faced once they engaged their target. It shows a small village of huts surrounded by a wooden palisade—a row of sharpened logs planted vertically in the ground forming a defensive barricade around the village. In the middle of the village a number of men appear to engage in some sort of ceremony around a fire, possibly in preparation for war. These images indicate that warfare was often on a smaller scale than was common among other cultures, such as the Aztec and the Inca, in which scores of thousands of troops could be gathered for any particular deployment.

Across North America tribal and chiefly cultures existed in a variety of cultural and settlement patterns, including nomadic, hunter-gatherer, semisedentary, seasonal, and landed agricultural communities, each of which reflects a different relationship to warfare and the kind of warfare that each could wage. Raiding was probably the most common type of aggression and involved small numbers of minimally armed warriors essentially crashing and dashing, perhaps to avenge an insult or a death or perhaps to pillage the food supply or to steal an enemy's women.

Evidence from the Southwest, among the Anasazi, Hohokam, and Mogollon cultures, is consistent with considerable conflict. At the household level archaeologists have found trophy skulls and pottery depicting weapons, body armor, and arrows embedded in human figures. At the community level skull burials, decapitated burials, skeletal evidence of violence, defensive walls on compounds, and site destruction all suggest the proliferation of conflict. In addition, evidence at the spatial scale of the polity and inter-polity, including signal towers, hilltop sites and small sites located for defensive reasons, and uninhabited buffer zones similarly suggest an abiding preoccupation with conflict. The reasons for the

conflicts that did occur and the form the conflicts took vary. Furthermore, scholars suggest that conflict in the Southwest was perhaps not endemic but rather happened at some times in some places but not everywhere all of the time.

MEXICAN WARFARE

The decline of the central Mexican empire at Teotihuacán around 750 had far-reaching consequences for all of Mesoamerica. At its height, between 450 and 650, its resident population was at least 125,000, though some estimates reach as high as 200,000. Its political and economic ties stretched to the Mayan territory, where depictions of warriors in Teotihuacán-style garb are known from carved stelae, indicating a clear military influence. Scholars differ on the exact nature of Teotihuacán's military and how much war was promoted within the society, but to maintain extensive trade contacts and to influence Mayan society, at least the impression of power was necessary. Defensive-minded architectural construction within the city itself indicates a preoccupation with or concern over conflict. The exact reason for its decline is still a matter of some conjecture. Nevertheless, it appears that the resulting power vacuum led to the emergence of various regional centers, including Xochicalco, Cacaxtla, and Teoteneango, all of which were situated on hilltops and were fortified, again suggesting conditions of conflict. Following the fall of Teotihuacán, the Toltec Empire rose and maintained political-military dominance in central Mexico.

Following the fall of the Toltec and a period of reorganization that involved power struggles between competing city-states, eventually the Aztec rose to power. The word *Aztec* derives from *Aztlan* ("place of the herons"), which is the quasi-mythical land from which the ethnic Mexica migrated to the basin of Mexico sometime around 1250. "Aztec" is thus a modern label assigned to the Mexica. The basin of Mexico, or what is today the vast, sprawling metropolis of Mexico City, was then home to numerous independent city-states settled by earlier immigrant groups. By 1325 the Aztec had settled on a swampy island in Lake Texcoco and there began building what would eventually become Tenochtitlán, the capital of the Aztec Empire. After 1325 the Aztec allied themselves with the more powerful states of Azcapotzalco and Texcoco as a tribute-paying entity and aided them in wars. Simultaneously, the Aztec themselves were becoming a powerful entity.

Finally, beginning in 1428 the Aztec made a push for greater power and established a military-economic alliance with Texcoco and Tlacopán, commonly referred to as the Triple Alliance, in which they agreed not to wage war on one another and to cooperate in wars of conquest against other towns or city-states. The goal of the Triple Alliance was to



Wooden slit drum decorated with scenes from a battle between two cities, Mixtec culture, Mexico, ca. 14th century (© The Trustees of the British Museum)

conquer other city-states in order to force them to pay tribute. A secondary goal of war was to capture enemy soldiers for sacrifice, which was a fundamental element of the Aztec worldview. The Triple Alliance first set about consolidating control throughout the basin of Mexico, conquering city-states to the south at Coyoacán, Xochimilco, and Cuitláhuac. Next they looked to expand outside of the basin of Mexico and turned to Cuauhnáhuac and Huaxtepec, in the modern state of Morelos; they won a major victory over Chalco after Montezuma I (r. 1440–69) assumed the Aztec throne in 1440. This pattern of expansion continued until the arrival of the Spanish in 1521.

However, the Triple Alliance did not advance without setbacks and difficulties. Outright rebellion in subject polities was common, necessitating a strong military response by the Aztec. More devastating, however, was when the Tarascan state to the west of the Aztec Empire, which had remained independent of Aztec hegemony (dominance), delivered one of the Aztec's most crushing defeats. In 1479–80, following a series of ongoing border disputes and incursions, the Aztec leader Axayacatl (r. 1469–81) led an army of 32,000 soldiers into ethnic Tarascan territory. After initial success, taking a major fortress, the Aztec marched deep into Tarascan territory, to within 50 miles of the Tarascan city of Tzintzuntzan, where they were decimated by a combined Tarascan-Mat-

latzinca force of 50,000. The Aztec retreated, trailed by the Tarascan, and lost all gained territory west of the town of Taximaroa. Conflict between the two states remained fairly constant up until the Spanish arrival, at which time Aztec desperation was so acute that emissaries were sent to request Tarascan support against the Spanish.

The Aztec did not maintain a standing army, but all young men were trained in military skills at military schools called *calmecac*. Social prestige and advancement were possible for both commoners and nobles through military exploits. Social status depended, in part, on the number of captives taken in battle. With each additional captive, a man gained new privileges. The most successful warriors were called eagle warriors and jaguar warriors, and they enjoyed special privileges, such as being allowed to dine at the royal palace, drink pulque (a fermented alcoholic beverage), and keep concubines. They were the leaders and commanders in battle. The taking of captives for ritual sacrifice reflected Aztec creation myths and religious beliefs, which mandated sacrifices to feed the sun to ensure that the world would keep moving. These so-called “flowery wars” were thus entirely different than any typical modern conception of war. Similarly, the wars were ritualized and followed a strict protocol. The ruler with expansionistic desires sent emissaries with gifts to request the surrender of the targeted town or city-state. Accepting the

conditions often meant that the *tlatoani*, or local ruler, would remain in power so long as the mandated tribute was paid. Rejecting the offer meant that war, and possibly destruction, was imminent.

The battles themselves must have been quite spectacular to witness. The war leaders, typically members of the eagle and jaguar societies, adorned themselves in elaborate costumes befitting their rank, often with feather tunics, headdresses, armbands, and other decorative clothing. For example, an image from Fray Bernardino de Sahagún's (ca. 1499–1590) Florentine Codex, one of the most important primary sources for Aztec scholarship, depicts warriors heading into battle dressed in jaguar skin, carrying shields and standards, and bearing the favored Aztec weapon, the *maquahuitl*, a long, flat wooden handle fitted with rows of obsidian blades. Finally, victory on the battlefield came when enough enemy soldiers had been captured or killed to subdue and demoralize the opponent. Sometimes defeat meant the partial destruction of a city. Thereafter tribute quantities were set, and so long as they were met, the victors usually avoided meddling in the internal affairs of the subject polity.

MAYAN WARFARE

Warfare among the Maya was common, a reality that ran contrary to some early scholarship that held the Maya to be an idealized, peaceful society. Furthermore, it appears that warfare only increased as time passed, such that by the Late Classic and Terminal Classic periods, or roughly between 600 and 925, warfare as an institution was an integral and pervasive element in Mayan society. Much is known about Mayan warfare for two essential reasons: Mayan representations of war on carved stone stelae, murals, painted codices, and painted vessels are prolific, and scholars are now able to decode with great accuracy Mayan glyphic texts, which illuminate names, dates, and events. Inscriptions detailing the capture of a rival king, indicating victory in battle, are found at many Classic Period cities, including Tikal, Palenque, Yaxchilán, Dos Pilas, Quiriguá, Copán, Bonampak, Seibal, and Piedras Negras. Hence, the monuments the Maya used to commemorate warfare were diverse, and now they are intelligible.

Depictions of warfare emphasize garments and weaponry, reveal stages of ritual preparation, such as the presentation of captives, and show that victory was not easily achieved but happened through aggressive hand-to-hand combat, after which captives were stripped of their battle gear and taken back to the city of the victors. The events depicted in Mayan art frequently represent rituals performed at home, such as the display of captives to the public, thereby emphasizing presentation and public validation. Unlike the Aztec and the Inca, the Maya never coalesced into a single empire. Mayan

warfare occurred between city-states of varying hegemonic authority, and the public presentation and display of victims worked to reinforce a sense of public pride as well as to validate the authority of the rulers. The public monuments, then, serve to validate localized power and often detail the exploits of individual rulers in the context of the glory of the city.

The city of Yaxchilán, to take one example, seemed particularly focused on detailing the stages of warfare. Yaxchilán is situated in the central area of Mayan territory along the Usumacinta River, astride what is today the border area of Chiapas, Mexico, and Guatemala. Two Yaxchilán rulers in particular figure prominently in the depictions on carved stone lintels on structures they themselves commissioned. They are known as Shield Jaguar, who died in 742, and his son, Bird Jaguar, who succeeded his father to the throne 10 years later. Shield Jaguar constructed a building, referred to as Structure 44, that details his victories in battle and the humiliation of his foes. In another building, referred to as Structure 23, a series of carved lintels depict bloodletting, vision quest, and the capture of an enemy ruler, all of which reinforced the ritual nature of Mayan warfare.

Similarly, Bird Jaguar, following his ascension to the throne and after victory in battle, commissioned his own structures and then chose to depict a series of events that were essentially the same as those his father chose, thereby commemorating both his father's and his family's glory. One particular lintel, referred to as Lintel 41, represents Bird Jaguar donning ritual attire in preparation for battle, presented with arms, wearing cotton armor and a round pectoral with a jaguar inscribed within it, possibly a reference to his father as well as a symbol of power. Representations similar to these were common throughout the Mayan area.

Another interesting aspect of Mayan war, especially during the Classic Period, is that powerful rulers considered the position of the planet Venus to be of crucial importance as a guide to victory. It appears that the planet was invoked for assistance in war by a special skeletal mask worn by royal figures on carved stelae. On one such stela from the Classic Period site of Dos Pilas the text proclaims the Dos Pilas lord victorious against the rival city of Seibal. The text associates the day this event occurred, 3 December 775, with a particular glyph, and this glyph, a shell-star, shows up again and again on days attributed to Venus and is thus read to be a providential day for war, usually when Venus makes its first appearance as the evening star, when Venus passes behind the sun.

Many questions about Mayan warfare remain. Whether the goal of war was to benefit materially or territorially is still debated, but there is evidence that at least some cities had territorial aspirations. Records show that Ruler 3 of Dos Pilas, for example, who ruled from 727 to 41, conquered numerous

neighboring sites during his reign, kept their rulers hostage, and controlled a kind of superstate greater in extent than any other Classic Mayan city-state. Though the Maya did not promote material acquisition in their representations of warfare, material gain may still have been an important consequence of or reason for going to battle. Nevertheless, Mayan depictions cast warfare in terms of rituals that upheld the cycle of kingship.

SOUTH AMERICAN WARFARE

The best information on warfare in South America comes from the 16th century and reflects the period of the Spanish conquest, when the Spanish confronted Incan armies and thus witnessed Incan war practice firsthand. Similarly, Spanish chroniclers interviewed and recorded details about Incan life that might have been otherwise forgotten. As useful as the chronicles have proven to be, they must be read with a discerning eye because of their biases. Warfare during the Inca Empire was tied to the empire's extraordinary expansion. Militarism was not the only method by which the Inca expanded, but it certainly was pivotal. Diplomacy, reward, and enculturation were also essential ingredients of their conquest strategy. Nevertheless, to meet their military goals, the Inca created a network of internal garrisons, frontier forts, and a logistical system of roads, support facilities, and depots. Their imperial success is due as much to logistics and organization as it is to training, tactics, or technology.

Before their imperial expansion the Inca, whose civilization was centered at the highland city of Cuzco, were not the most populous, the most powerful, or the wealthiest people of the central Andes. Other groups, such as the Qolla and the Lupuqa of the Lake Titicaca basin, and the vastly larger and more complex coastal Chimú polity, surpassed the Inca in most ways. Early conflict and militarism were probably more in the nature of pillaging and raiding for booty as well as glory, the success of which dissuaded attacks and raised the Incan profile. Policy shifts emphasizing annexation over looting are usually ascribed to the Incan rulers Viracocha Inca (r. ca. 1410–38) and Pachacuti (r. 1438–71), and early imperial successes probably owed much to alliances, conscription (military draft), and selective confrontation backed by overwhelming force. Despite the Incas' reliance on overwhelming force, it is probably also true that the inability of *señoríos*, or polities ruled by a native lord, to coordinate resistance facilitated their own annexation. The Incan victory over the Chancas, whose telling usually includes a mythical event in which stones transform into warriors in aid of the Inca, is generally regarded as the springboard for the explosive territorial expansion that followed.

Communities were first offered the opportunity of peaceful annexation. Incan messengers arrived with charitable terms of surrender. If the terms were accepted, subject elites received gifts and could expect to retain their status, and the community would be allowed to keep many of its resources. In return, the new subjects pledged loyalty to the Sapa Inca, or chief Inca, agreed to supply labor service, and paid homage to the sun. In this manner, following combinations of diplomacy or forced coercion, the Inca rapidly expanded. As their systems of support and control matured, including the construction of garrisons or forts, forced resettlement, and the development of provincial centers, the Inca's ability to maintain control and stability greatly improved. Nevertheless, rebellion on differing scales was endemic throughout the empire.

Incan military organization was not complex even by standards of ancient empires. The lack of a standing army, the reliance on conscripted peasants as soldiers, and the difficulties in communication because of great distances and because of the linguistic groups in the empire resulted in a simple military structure. The king was the commander in chief and occasionally a field general. A hierarchy of officers followed below him with the highest officers usually being royal kin. The king's military role shifted as the empire moved through its expansion phase. For example, many Spanish chroniclers



Ceramic vessel in the form of a trophy head, Huastec culture, Mexico, ca. 900–1200 (Courtesy, National Museum of the American Indian, Smithsonian Institution [catalog number 243351])

wrote that Pachacuti delegated authority to his brothers before finally ceding military command to his son, Tupac Yupanqui (r. 1471–93). Beneath them two or four commanders led a campaign or an army, with their units composed of soldiers from particular ethnic groups. Incan oral history and Spanish accounts state that the Inca could raise armies in excess of 100,000 at a time, although these estimates should be viewed with some skepticism as both sides were prone to exaggeration for effect.

Battles themselves relied on preplanning and the use of overwhelming force. The Inca scouted the battlefield before engagement and created clay models of the terrain. Once the entire army was in place, they advanced on the point of attack with overwhelming force and numbers. Most battles were described as melees on open terrain or assaults on fortified strongholds. Two favorite tactics were feigned withdrawals coupled with pincer attacks and flanking maneuvers, both of which indicate that the Inca used the element of surprise to their advantage. Typically, a barrage of arrows, sling stones, and javelins preceded hand-to-hand combat by warriors wielding maces, clubs, and spears.

The overall effect of the Incan imperial war machine was a vast reorientation of Andean civilization toward Cuzco, the seat of the royal throne. While many preexisting social and political structures were left alone, the Inca made use of vast resettlements of persons to aid in economic and political goals and to prevent uprisings. When the Spanish arrived in 1532, the empire was in a state of informal disintegration, in which a dynastic war of succession was being waged between Huáscar (d. 1532) and Atahualpa (ca. 1502–33). Atahualpa emerged victorious, though he was soon captured by the Spanish and held for ransom. The ransom was paid, but Atahualpa was garroted (strangled) anyway. Finally, Spanish hegemony rapidly ensued, thereby initiating the colonial period of Andean history.

ASIA AND THE PACIFIC

BY MARK W. ALLEN

Warfare and conquest played key roles in Asia and the Pacific during the medieval period. However, the nature of violent conflict varied drastically across this huge expanse of two continents (Asia and Australia) and thousands of islands scattered across the South Seas. In the western deserts of Australia hunter-gatherers continued to fight with simple stone and wooden weapons that appeared tens of thousands of years ago. At the other end of the spectrum the Chinese and others were experimenting with the use of gunpowder and even artillery to bring down city walls during the last centuries of the medieval period. Between these extremes Polynesian

chiefs on high volcanic islands in the remote Pacific Ocean led armies of thousands of warriors in attacks on rivals in order to build their own personal power and to conquer the land and labor of other leaders.

The more complex forms of Asian warfare, though of a much larger scale, were not necessarily more deadly than the battles, raids, and skirmishes of traditional societies in Australia or the Pacific islands. Anthropologists have documented that warfare in hunter-gatherer groups or simple farming village societies often resulted in some of the highest casualty rates, particularly among noncombatants. Clearly, though, the warfare of Asian states or empires during the medieval period is far more familiar to us today than that of simpler societies. Medieval Asian warfare involved large standing armies, specialized units, standard-issue weapons, uniforms, distinct hierarchies from lowly foot soldiers to exalted generals, and weapons of mass destruction (relatively speaking) in the form of siege engines and eventually gunpowder and even artillery.

One issue related to warfare is the role of leaders and the elite in deciding when to go to war and with whom, the goals of conflict, and how the victors should treat the vanquished. Other important issues include the role of technological changes in war, for there were many during the medieval period, and how societies employed warfare as a political strategy as they dealt with rival groups in their own society as well as peoples with very different cultures. Warfare was frequently a means to various political ends and could spur on or inhibit other cultural achievements, such as technology, religion, architecture, art, or social organization. Warfare and conquest are central to understanding how Asia and the Pacific progressed from ancient to modern times.

For much of Asia during the medieval period there are written texts, such as bureaucratic records and official imperial histories. Such is especially true of India and China. In contrast, writing did not develop in Southeast Asia, Korea, or Japan until fairly late in the medieval period. It was not present in the Pacific islands at all until European contact. Archaeological evidence is highly abundant for some areas but much less so for others. Such information is often imprecise in terms of pinning down the date of a particular event, but it often gives insight and detail that history cannot match.

WARFARE AND CONQUEST IN ASIAN STATES AND EMPIRES

In Asia during medieval times warfare continued the course developed earlier in the ancient world: Wars were usually waged by states and empires against their neighbors both near and far. They were fought by armies of thousands of soldiers using standardized iron and later steel weapons

and armor. These were standing armies organized hierarchically, with powerful generals and other ranks of officers at the top. Specialist units, such as bowmen, cavalry, or engineers, were usual. Naval combat also further developed during this time as ships were sometimes used to transport large forces or to serve as floating fortresses packed with archers and war machines, such as ballistae (large crossbows used for hurling missiles) or catapults. A frequent goal of warfare was the destruction of fortified rival cities or towns to remove competition and to seize resources, such as mineral wealth, trade routes, or productive land. The primary benefactors of this type of war were usually the rulers and other elites who often relied on militaristic themes and symbols as well as plunder and tribute secured through war to support their privileged status.

In India a bewildering number of medieval Hindu states and empires rose and fell through military conquest. The first of these appeared around 500 B.C.E. Hindu armies were particularly effective in the use of war elephants that could crush through nearly any defensive line. The sight of a line of them moving forward was often enough to cause understandable panic in enemy armies. Elephants were often equipped with fighting platforms for archers and other soldiers. Indian armies also used fortifications for defense and war machines, such as catapults and ballistae, to knock down strong points. One of the best-known medieval Hindu empires is that of Vijayanagara (ca. 1350–ca. 1650), which began in central India and spread south to cover the entire southern half of the peninsula. Written texts and archaeological sites reveal that the empire grew rapidly, spurred on by military conquest and by its role as a Hindu counter to Muslim kingdoms to the north. Eventually, several Muslim armies came together to attack the empire in 1566. After a major battle at Talikota, the city of Vijayanagara was sacked and destroyed by Islamic armies despite seven lines of fortification. The ruins of the capital's walls can still be seen today, as the city was never reoccupied as an urban center.

China has one of the oldest traditions of military conquest and professional armies in the world, going back at least 3,000 years. Dozens of states and empires managed to conquer or subdue their neighbors by threat, only to see their own dynasty weaken or fall apart. At the beginning of the medieval period China was trying to recover from fairly dire straits, particularly in the north as waves of tribal warriors from the north and northwest attacked the outer parts of the empire and sometimes even deep into its interior. By the time of the Sui Dynasty (581–619) and the Tang Dynasty (619–907), however, China had managed to reunify its territory and reestablish firm control of the borders, often through rebuilding or improving ancient fortifications, like the Great

Wall (really a number of massive fortifications more or less employed as a defensive system rather than a single protective wall). Nevertheless, Chinese armies also were on the offensive, sometimes against rivals within China and sometimes against other cultural areas, such as Korea or Japan.

One military transformation put in place by the early medieval period was to draft peasant farmers into military units (called *fubing*) organized by their local villages to serve at time of need. The later Song Dynasty (960–1279) added further innovations, including the first Chinese standing navy, and experimented with gunpowder as a weapon. By late medieval times, however, Chinese armies were largely outmatched by the speed and ferocity of mounted warriors from the steppes of central Asia, and even the Great Wall and other defenses could not keep them at bay. China itself came to be ruled by outsiders during the Yuan Dynasty (ca. 1271–1368).

Unfortunately, quite a bit less is known about Korea during this period, owing to a lack of indigenous written histories (there are accounts in Chinese documents, but these, of course, are from the Chinese point of view) and less archaeological investigation. While China has a long history of states and empires, complex societies were much more recent developments in the Korean peninsula. Three kingdoms eventually arose there about 300, referred to as Koguryo, Paekche, and Silla. This development seems to have happened during a period when China was self-absorbed with internal conflicts, as before China had essentially not allowed a rival state to exist so near its borders. Archaeology demonstrates that all three Korean kingdoms arose through conquering neighbors and amalgamating their territory and human labor by force. They continued to compete with one another during the first few centuries of the medieval period, as shown by the presence of fortified cities and other fortresses, many of which were destroyed by battles. Eventually, with the assistance of Tang Dynasty China, the Silla Kingdom came out on top and by 688 had successfully united the Korean peninsula through conquest.

To the east of Korea the islands of Japan present a similar history. In fact, the histories of Korea and Japan were closely connected during the early medieval period, and Japanese forces actively participated as allies in some of the Korean kingdom battles. Also, as in the Korean case, China had a heavy hand in at first preventing or discouraging the development of state-level society and in later shaping how the earliest states took shape. Imperial power in Japan was limited compared with that of China, and by the 12th century a series of civil wars had broken out to limit the power of the emperor even more. Clan warlords called shoguns seized power and led their military forces against each other. Different clans rose and fell, largely through military success and failure. The

various shoguns could, however, unite their armies to face outside invasion, as they did against the Mongols in the 13th century. Key figures in these wars up until the 18th century were a class of professional warriors known as samurai. They perhaps epitomized the militarized nature of elite medieval Asian society. The way of the samurai was doomed when contact with Europeans began at the end of the medieval period, but widespread adoption of firearms was resisted for centuries as a more ancient form of warfare continued to be fought in Japan while the outside world moved much more quickly toward industrialized warfare—that is, to war of the gun and the canon.

Finally, the wars and conquests of mainland and island Southeast Asia provide other examples of these same processes. This region is a very different environment from central Asia, one of dense tropical forests, lowlands, rivers with large floodplains and deltas, and numerous islands (some of which, such as Sumatra, Borneo, and Java, were very large). States and empires were also slower to develop here than in India or China, and these two Asian powers both had strong influences on developments in this area. Cities with large stone monuments, such as temples, had appeared in Vietnam, Cambodia, and Thailand by 600, and states really began to take off a century or two later. Early medieval warfare is indicated in art showing soldiers and by the presence of city walls, but information about medieval Southeast Asia is still fairly limited because of the scarcity of historic texts and the relatively low level of archaeological research. (This area has been a difficult place in which to conduct research given the environment and modern conflicts, such as the Vietnam War). Fortunately, more information exists about the rise of the Angkor kingdoms in modern Cambodia, which clearly rose by conquest under the first ruler, Jayavarman I, around 800. Over the next few centuries there were continued civil wars, struggles against rival states, and occasional battles with outsiders. War elephants, navies, and fortifications were important in these conflicts, but the use of the horse was not—probably because of the tropical forest environment. No single state ever built a long-lasting empire in this part of Asia during the medieval period.

A NEW MEANS OF WAGING WAR IN ASIA: THE CONQUESTS OF THE STEPPE HORSEMEN

It might come as a bit of surprise that the most devastating armies of all in medieval Asia were formed of nomadic pastoralists from central Asia and not from the ancient walled cities of China or India. This situation came about because of an altogether new type of warfare in Asia from 500 to 1500—one with dramatic effects. Sweeping out of the steppes of central Asia, a succession of relatively nomadic horse-mounted war-

riors struck fear into their more settled neighbors to the west, south, and east. These steppe warriors included the Turks (sixth–eighth centuries), the Uighurs (eighth–ninth centuries), the Khitans (10th–12th centuries), and, finally and most devastatingly, the Mongols (1206–1368).

Of course, cavalry had been used for centuries in the ancient world but never so effectively as with these central Asian horsemen. Mounted warriors took advantage of speed, deadly accurate composite bows that could be fired while maneuvering, and the stirrup. It is unclear when and where the stirrup first appeared and whether it was independently invented more than once; nevertheless, it was employed to great effect by the Mongols and their successors. Stirrups allowed a horseman to stand up in the saddle and deliver powerful blows to the enemy and also allowed a more stable platform for horse archers. With tens or even hundreds of thousands of such skilled horsemen, Genghis Khan (ca. 1162–1227) and his successors created the Mongol Empire, the largest contiguous land empire ever formed (and the second largest ever, after the British Empire), in a very short period of time. The impact of this empire and its successors was such that neighbors as far away as Europe and the Middle East lived in constant fear of invasion for centuries. In some instances, fearful populations neglected to build cities or large monuments since attractive targets would surely invite an onslaught of Mongol horsemen. Despite the Great Wall and other massive fortifications, much of China eventually came to be ruled for a time (the Yuan Dynasty) by the Mongols, starting with Kublai Khan (1215–94), the grandson of Genghis Khan. The Mongols readily adopted other military technologies and approaches, such as naval and siege warfare. They even attempted unsuccessfully (thanks largely to several large storms at sea, which sank hundreds of ships) to conquer the islands of Japan and Java in Indonesia with huge invasion fleets.

NEW TECHNOLOGY OF WARFARE: GUNPOWDER AND ITS EFFECTS

The progression of Asian military technology and capability further accelerated toward the end of the medieval period. Gunpowder was first developed in China around 1000 and was gradually employed in weapons, such as bombs and simple artillery to bring down fortifications. This technology spread to Europe and the Middle East, where further modifications were applied. By the end of the medieval period canons, other types of artillery, and firearms were rapidly spreading through Asia and Europe. This development would lead to a wholesale change in warfare, as city walls were no longer a major deterrent to attack and as warfare moved from a profession that required years of training to use a bow, ride a warhorse, or wield a sword to one that involved standing

in formation and pulling a trigger. The transition to firearms and artillery was without question a major factor in the transition from the medieval period to the Renaissance and the Enlightenment.

WAR AND CONQUEST IN THE PACIFIC ISLANDS AND AUSTRALIA

Moving from the Asian continent to island Southeast Asia and the vast area of the Pacific Ocean, warfare and conquest did not involve standing armies, iron weapons, experimentation with gunpowder, or the struggles of fortified cities or empires. Instead, the older weapons of stone and wood continued to be used in conflicts among small-scale farming societies in some areas and chiefdoms in others. It is likely, however, that the effects of warfare on the lives of individuals and on their societies were just as significant as they were on those of Asian societies.

On the largely arid continent of Australia people continued to live by hunting, fishing, and gathering wild plant foods until colonization by the British in the 19th century. In traditional times such simple tools as throwing sticks and stone tools were combined with intimate knowledge of plant and animal resources. No positions of formal leader were recognized, and groups were very small. Nevertheless, Aborigines nearly always carried large wooden shields and clubs for use as weapons in case of attack. Conflict was not common, but the threat of it likely was. Thus, while huge armies battled for control of Asia during the medieval period, in Australia a form of conflict likely tens of thousands of years old continued to be played out.

The Pacific islands are often grouped into three geographic areas: Melanesia, Micronesia, and Polynesia. Melanesia contains many fairly large islands not too far east of island Southeast Asia. Here for thousands of years small-scale societies based on gardening root crops, like taro and the sweet potato, have packed these often rugged tropical islands. Anthropologists frequently cite the continuation (even into the late 20th century) of "Stone Age" warfare in the highlands of the large island of New Guinea—one of the last places on earth to be explored by the outside world. In these valleys anthropologists witnessed firsthand battles between hundreds of combatants lined up against each other with clubs, spears, and bows and arrows. Large planned battles had few casualties, but the highlanders of New Guinea also engaged in surprise raiding, which might kill a number of people caught unarmed outside of their villages. This warfare was not to support the lives of elites as in Asia; instead, it has been interpreted as competition between groups for land or as an outgrowth of religious concerns, such as appeasing the ghosts of dead ancestors. This obviously ancient form of warfare, how-

ever, should not be regarded as a game or as gamelike; it has been noted that up to one out of four men died violently in some areas of New Guinea, a much higher rate of casualties than in Europe during World War I or World War II.

Micronesia is characterized by hundreds of small islands, many of them small coral atolls built up on the rims of extinct volcanoes. Here warfare was employed as a means of expanding chiefdoms by conquest. Specialized warriors fought each other, sometimes wearing full body armor made of woven fibers and armed with wooden swords lined with sharks' teeth. Attacks were frequently made across large distances as one island attacked another. Some islands have archaeological evidence of fortified villages protected by natural defenses, ditches, stone walls, and wooden palisades.

Polynesia encompasses the most remote and wide-scattered of the Pacific islands. These islands were settled by people with a common culture during a flurry of exploration and colonization with large sailing canoes from around 300 to 1000. Anthropologists interested in warfare frequently discuss the Maori of New Zealand—the Polynesians who settled this large set of islands in the far South Pacific. About 100 years after New Zealand's colonization (estimated by archaeologists around 1000–1300) Maori warfare evolved into a classic example of small chiefdom warfare involving the dominance of strong, fortified villages. Despite deadly, specialized hand-to-hand weapons, fortifications were very effective so long as people were vigilant against their enemies. Wars were fought to acquire or to retain suitable gardening land, to avenge insults, and to gain prestige and status. While warfare was not constant, the never-ending threat of warfare came to be a central part of Maori culture, and nearly all males were prepared to fight from an early age. Maori warfare was a form of stalemate as it was essentially impossible for a chief or another leader to build a kingdom through conquest given the strength of enemy fortifications and the lack of siege or missile weapons that could overcome such defenses.

A second important Polynesian example would be warfare in Hawaii, the remote Pacific islands that likely came closest to the level of states. Here powerful chiefs and their specialist war leaders led armies of thousands in attempts to defeat the forces of rival chiefs on the same island or even across islands. Warriors employed shark-teeth swords and daggers, clubs, slings to hurl deadly stones, and other types of specialized weapons. Woven fiber armor was used here and in some other Pacific island cultures. Victorious chiefs would take the lands of their rivals and appropriate the labor of their former subjects. It is speculated by some that given enough time, an ambitious chief would have eventually built a state comprising all of the Hawaiian Islands through such conquest. However, the coming of Europeans starting in

1769 brought wholesale change, disease, and powerful new players from America, England, France, and Russia. Eventually (1810), supported with guns and sailing ships, the chief Kamehameha I (r. 1795–1819) did indeed unite the islands through conquest into an independent kingdom.

CONCLUSION

Warfare and conquest during the medieval period in Asia and the Pacific involved a tremendous amount of geographic and cultural variability. Warriors were armed with Stone Age weapons in some areas and nearly modern weapons in others. Some wars involved empires of millions of people; others involved only a few families. Aims of war varied from revenge, the desire to seize land and other resources, and the selfish aims of powerful rulers to expand their riches, reputation, and renown. Sometimes war and conquest spurred on the quick development of new military technologies, yet in other cases weaponry remained unchanged for thousands of years. This variability is an excellent example of how cultural, historical, economic, political, and geographic factors affect human societies.

Despite this variability, medieval warfare and conquest in Asia and the Pacific also reveal several common patterns and themes. Everywhere, warfare was deadly and was not a game. Casualties could be small in number for a Pacific island society yet could actually encompass a huge proportion of the population. Likewise, leaders, ranging from chiefs in charge of 1,000 or so people to emperors with hundreds of thousands of soldiers in standing armies, used warfare as a tool to build and to consolidate their political power. In most cases, the rise and fall of leaders were tied closely to their military successes and failures. Warfare also encouraged the development of technology, economic production, and logistical organization. It led to major innovations in agriculture, architecture, metallurgy, engineering, and even the arts and literature. Successful war leaders made sure that their exploits were recorded by monuments of stone, by written inscriptions and texts, or by preservation in oral histories and song. Wars and warriors spread ideas, resources, religions, and genes throughout this region of the world, though the Pacific was clearly far more isolated than Asia.

EUROPE

BY TOM STREISSGUTH

The migration of Germanic tribes through western Europe brought about the collapse of Roman government in the fifth century. Without centralized authority or an organized network of defense, European society fragmented into hundreds of small domains. Land and resources were the object of raid-

ing on the part of local counts and the volunteer militias they organized among the peasantry. Conflict among nobles over land and privileges and their constant efforts to remain independent of titular kings and dukes provided the impetus to war. Defensive strongholds were raised on the foundations of Roman walls and towers. In parts of western Britain hill forts dating to the Iron Age were reoccupied in the fifth century. Construction in stone was rare in the early Middle Ages, and many fortifications were little more than tall earth mounds, surmounted by palisades of wood or rubble. A trench or moat dug around the perimeter served as further protection. As siege engines became more effective, fortifications grew stronger.

By the High Middle Ages western Europe had thousands of such strongholds and fortifications. The defense of a realm was accomplished by setting up a network of fortifications and towers that could not turn back an invasion but could slow any invading force. The defensive network of Alfred of Wessex (r. 871–99) in western England countered the Viking invasions of the ninth century. Levying soldiers for service in the field and for defense of the towns, the king set up 33 fortified strongholds, where the locals were detailed to keep watch and defend the city walls. None of these strongholds lay more than 20 miles from the next, which allowed relief forces and supplies to travel from one place to the next without encamping in the open countryside at night. Similar networks of linked fortifications were set up by Fulk of Anjou and Henry the Fowler of Saxony.

THE THREAT FROM OUTSIDE

By the sixth century only the eastern half of the Roman Empire, with its capital at Constantinople, survived as a remnant of imperial Rome. To defend their long borders against raids and invasion, the Byzantine emperors organized mobile cavalry units and a powerful navy, which controlled the eastern Mediterranean. A professional infantry force of archers and spearmen garrisoned the frontier posts, while the horsemen employed spears, lances, and the bow. The stirrup, introduced from China via the Avars of central Asia, allowed the Byzantine cavalry to fight more effectively, with riders using the device to balance and support themselves while charging with heavy lances.

The Byzantine army defeated the Germanic Ostrogoths in Italy through superior training and coordination of their units—a doctrine foreign to the northern tribes, who fought as individuals rather than in mutually supporting and complementary formations. The empire also relied on a long-range supply network and an intelligence service that probed the strengths and weaknesses of the enemy and by appealing for the loyalty of Roman citizens living under foreign rule.

The goal of reconstructing the empire in Italy ultimately failed, however. The long-range campaigns in Italy and Africa overextended the Byzantine frontiers and resources and left the empire vulnerable to attack in the Middle East and Asia Minor.

Foreign raiders swarmed into coastal towns and farming manors in western Europe, looting and burning and wreaking havoc among the civilian population. Seaborne raiders moved swiftly and struck without warning, preventing local militias from organizing effective resistance. In some places these outsiders established permanent settlements, displacing the landowners and peasantry. The Magyars, nomadic horse-mounted warriors from the steppes of Russia, raided throughout central Europe and the Danube River valley before finally settling on the Hungarian plain in the 10th century. The Arabs raided cities along Mediterranean coasts in Greece, southern Italy, Sicily, and the Iberian Peninsula, where an invasion of Moors from North Africa established a Muslim caliphate in the eighth century.

The most feared of these outsiders, the Scandinavian Vikings, attacked the coasts of England, the river valleys of northern France and Germany, and the plains of northern Russia. The Vikings originated in Scandinavia, where they raised livestock and tilled marginal land through short growing seasons. Their meager livelihoods spurred the Vikings to centuries of exploration in the North Atlantic, settlement of lands as distant as the coasts of North America, and terrifying raids on the European continent. Expert navigators, they used swift longboats that could be run directly onto a beach or sailed upstream for surprise attacks on towns, manors, and monasteries. Wielding broadswords and axes, they spread terror throughout Europe for two centuries before reaching a truce with the king of France, who recognized their claim to the duchy of Normandy. In the 10th century the Vikings began converting to Christianity, establishing farming colonies in the North Atlantic, and ceasing their hostilities on the continent of Europe.

The raids of Vikings and Magyars spurred the construction of new fortifications and the creation of a permanent class of professional soldiers, the knights. These mounted warriors fought on behalf of their feudal overlords; they were traditionally obligated to serve their lords for 40 days each year and during any siege or invasion. Their status rose as power coalesced in the courts of hereditary kings and dukes; their services were in high demand as warfare among feudal lords grew more common in the High Middle Ages. Training and equipping a mounted knight was expensive. For this reason, knights were endowed with fiefs (productive property) so that they could afford to maintain horses, weaponry, and armor; hire a retinue; and keep themselves ready for duty whenever



Bone figure of a knight, Britain, mid-14th century (© Museum of London)

called upon. With their role in military operations increasingly important, the knights gained new status and privileges, including the right to pass on their titles and property to their heirs. Their role as soldiers included the protection of domains from raiding and pillage, attacking rival strongholds, and enforcing feudal obligations and laws.

CASTLES AND SIEGE WARFARE

As medieval building technology improved, stone-walled castles replaced the isolated strongholds of earth and wood that had protected villages and manors in the early Middle Ages. Towers holding a small retinue of knights and archers served mainly as lookouts; larger structures were self-contained cities that sheltered goods, food, livestock, and local civilians when the region was under siege. These strongholds kept a lookout on frontiers and defended the countryside from the pillaging of enemy forces.

MEDIEVAL WARFARE IN MODERN FILM

The most common way that modern people receive an impression of warfare in the Middle Ages is by seeing it recreated in films. The Hollywood image of medieval battle is a charge of two bodies of heavily armored knights into each other. Almost invariably, onscreen we see the front wave of knights from the opposing armies reign in their horses and approach their enemies at a walk. The knights are then shown leaning precipitously out of their saddles to fence with each other on horseback. In propagating this caricature of medieval battle, Hollywood has done a grave disservice to the realities of medieval warfare. This stock scene is even used as the climax of both of the major versions of *Henry V* (one by Laurence Olivier in 1944 and the other by Kenneth Branagh in 1989), despite the fact that the main action of the battle at Agincourt consisted of the French knights repeatedly and almost suicidally charging an entrenched position of Welsh archers.

In reality, a typical medieval army consisted mostly of infantry, and the role of the heavy cavalry (knights) was to break the formation of the enemy infantry and scatter and destroy them. But whether made against infantry or other cavalry, the charge of cavalry depended on what is technically known as its weight, the sheer kinetic energy of the mass of horsemen and armored riders hitting into the line of the opponent, breaking through and riding over the enemy at full gallop. Often the enemy would break and run rather than be charged, but even if they stood, the success of the charging knights depended on hitting and riding through the enemy line; it would have been madness to charge and then to reign in the horses at the last moment.

Undoubtedly, this kind of action would be harder to film than the stock Hollywood scene, but it has been done successfully. Paradoxically, the best depiction of medieval battle is in the fantasy films of the *Lord of the Rings* trilogy (by Peter Jackson, 2001–2003). In those films several cavalry charges are successfully shown riding over enemy bodies of both cavalry and infantry. In the scene of the siege of Minas Tirith, those films also show by far the most realistic depiction of medieval siege warfare ever filmed, with the accurate depiction of trebuchets and the terrible damage their missiles could do to fortifications and formations of enemy soldiers as well as their use by both attackers and defenders in a siege.

Castles were defensive structures designed mainly to withstand enemy sieges. They contained a central keep or tower, which rose above the topmost level of the walls and which served as a treasury and central storage area. To withstand a long siege, castle defenders stored grain and salted meat, kept herds of livestock, and dug deep water wells. The walls were penetrated by one or several gates, which themselves served as barracks and important points of defense. Doors were protected by a heavy iron grille known as a portcullis, which could be lowered to resist enemy troops and battering rams.

Medieval architects devised several ingenious methods for the defense of castles. The high walls protected archers and infantry stationed on walkways. Passages over the tunnel leading into the castle were sometimes given murder holes, through which scalding liquids and arrows could be deployed against attacking foot soldiers. Moats protected the castle against battering rams and siege towers and also prevented underground tunneling. The design of these fortifications grew more complex in the later medieval period. In the 13th century the largest forts were designed in a series of rings. An outer ring prevented the use of battering rams and siege towers with a line of sloping walls, which made it difficult to use scaling ladders or artillery. Towers built at the corners afforded a wide view of the countryside and a better field of fire for defending archers and spearmen. Archers sniped at the enemy from atop the walls or from narrow slits known as loopholes.

Castle sieges were carried out over long periods of time, often months, during which the besieging army occupied the surrounding countryside and attempted to starve out the defenders or lure them outside the walls for a decisive battle. Sieges were sometimes negotiated, with the attackers agreeing to withdraw by a certain date if their own reinforcements did not arrive. In this way a besieging army could ensure they did not have to fight through a winter season, in which castle defenders had a great advantage owing to their stores of food and water. During a siege assault, archers sent a rain of deadly arrows into the yards of the castle, while foot soldiers scaled the walls with ladders. Battering rams and catapults were deployed against the walls and gates. Small roofed structures sheltered the rams and their crews from enemy fire. With adequate time and resources, attackers could also raise siege towers, tall wooden structures built on a set of wheels. The siege tower was covered by planks of wood or fire-resistant hides, allowing attackers protection while the tower was brought against a wall. A drawbridge placed at the top of the tower gave attackers a route into the castle.

Before the assault sappers were sent underneath the walls to undermine them. The tunnels were reinforced with heavy

timbers; the attackers then burned out the timbers in order to collapse the tunnels and the walls overhead. Siege engines were used to create a breach in the walls, or bring down a castle tower. The trebuchet, the most fearsome artillery weapon of the Middle Ages, consisted of a long arm built on a central pivot and weighted with stone or boulders held aloft at the forward end. Heavy stones were placed inside a sling at the far end, and the weapon was positioned several hundreds yards from the defending walls. When the forward weights were released, the arm swung on its pivot and hurled its stone several hundred yards at high velocity against its target. There was little defense against the trebuchet, as its great range allowed it to be positioned well outside archery range. The trebuchet could bring down a wall in short order or fling carcasses into a town or castle as a way to spread disease.

Besieging armies were at a disadvantage as time wore on, as they had to live off unproductive surrounding land. A supply train followed the besieging force, moving by road or river, but there was no method for long-distance supply of weapons, food, and other items necessary for a long siege. Peasants would abandon sieges during the fall harvest or the spring planting season, when getting a crop into the ground often meant the difference between survival and famine. This forced armies to move and fight during the summer and early fall and avoid any activity during the barren winters, when there were no crops or livestock for food or forage for animals. As the land around a castle was denuded of its crops, the besieging army was subject to famine as well as contagious diseases, which could move rapidly through the ranks of an army living at close quarters. Cholera, dysentery, plague, and other sicknesses often proved much more destructive to besieging armies than fighting.

KNIGHTS AND COMMONERS

The conquest of Spain by the Moors, who fought as massed, lightly armed cavalry, prompted the Franks to develop a professional army of heavy infantry and mobile cavalry. At the battle of Poitiers in 732, the Frankish king Charles Martel defeated the Moors with massed foot soldiers, many of them dismounted from their horses and fighting with heavy shields, spears, and battle axes. This victory stemmed the tide of the Moorish conquest and played a key role in the establishment of the feudal system. Having successfully defended its borders, the Carolingian kings who ruled the Franks seized productive estates from the church and distributed them to their loyal nobles, who were then obligated to provide troops and military service in time of war.

The feudal system gradually spread throughout Europe and to the British Isles. Armies in the early Middle Ages comprised a select levy of men who were recruited for offensive

operations outside the local region and who served alongside the personal retinues of local lords. A general levy of the civilian population was called up for defensive fighting, as when a country was invaded, a town was besieged, or raiders were loose. The disciplined legions of ancient Rome were taken as a model by the Carolingian rulers Pepin (r. 751–68) and his son Charlemagne (r. 768–814), who reigned over the Frankish kingdom in the eighth century. All free men within the Carolingian realm were required to take an oath of loyalty and hold themselves ready for military service. In this way the kings gained effective control over the private retinues of local counts and lords, forcing ordinary soldiers to divide their loyalties and the nobles to pay homage to the throne. When campaign season arrived, the armies were raised through a levy of landowners, with those holding large estates required to furnish their own horses and armor. With these levies Charlemagne brought huge armies to the field and subdued the powerful Lombard kingdom of northern Italy as well as the realm of Saxony, in what is now northeastern Germany.

BATTLE FORMATIONS

The mounted knight and his retinue of servants were central to the popular view of warfare in the Middle Ages. In reality, cavalry by itself was never effective in large-scale battles; the chivalrous notion of single combat between armored knights is more a literary device than historical truth. The battle of



The Burghead Bull, Burghead, Morayshire, Scotland, seventh century; one of six carved slabs found together, this is speculated to be part of a Pictish warrior cult of strength and aggression. (© The Trustees of the British Museum)



During his rule the emperor Charlemagne conquered the powerful Lombard kingdom of northern Italy and the realm of Saxony, in what is now northeastern Germany; along with other parts of western and central Europe.

Hastings, fought in 1066 between the forces of William the Conqueror (r. 1066–87) of Normandy and King Harold II (r. 1066) of England, was more typical of medieval battle tactics. After a mass of English foot soldiers used their wall of shields to turn back several waves of Norman horsemen, William ordered his archers to send their deadly missiles over the front ranks and into the rear of the English army. Defenseless against the onslaught from the air, the English infantry fell by the hundreds where they stood, after which Harold's army succumbed to a determined cavalry charge.

To bring different forces to bear, medieval generals divided their armies into companies of archers, foot soldiers, and cavalry. The infantry were armed with swords, axes, clubs, or spears, using light armor if their army could afford it, as well as iron helmets and small shields of metal or hides. They fought in a large mass, attempting to hold their formation together as long as possible in order to provide mutual support and create a strong defensive position. Once the group lost its formation, it became much easier for enemy cavalry units to attack and rout them. Archers and crossbowmen were used

to fight at long distance, for the attrition of massed enemy units and to send flaming arrows against wooden structures, enemy camps, and siege engines.

Cavalry were placed on the flanks and to the rear, formed up in several ranks to charge against vulnerable points in the enemy line, hoping to panic enemy soldiers and force them to break rank. In a large battle, however, mounted knights usually dismounted for close-quarters combat. Steady discipline was required to control horses in the noise of battle, to avoid disorganized retreats, and to prevent a headlong charge against apparently disorganized or retreating opponents who were in reality laying a trap. A disciplined line of infantry could withstand a charge and easily disperse a cavalry unit with a wall of pikes or halberds (weapons designed specifically to grasp the armor of a horseman and bring him to the ground). This tactic triumphed at the battle of the Lechfeld in 955, when Otto the Great's disciplined foot soldiers defeated the fearsome mounted archers of the Magyars.

THE CRUSADES AND THE MONGOLS

Able knights and military men of medieval Europe enjoyed high prestige. Their deeds were celebrated in songs and poetry that praised bloodshed and mayhem. Fighting was entertainment as well, in the form of jousting (single combat) and the tournament, a form of military rehearsal that pitted teams of knights against each other in combat and maneuvering over a wide stretch of countryside. But as Europe's aristocrats vied for power and resources, the bloody engagements among their retainers cost lives and treasure. Warfare brought considerable damage to productive land and resources, and in an effort to lessen these effects the church forbade warfare on certain days of the week and in holy seasons (the church also attempted to outlaw the crossbow, finding it to be an unfair and unchivalrous weapon). These efforts to redirect martial energies culminated with the call for crusade against the Muslims by Pope Urban II in the late 10th century. The knights of Europe gathered on ships or marched overland to the Middle East in search of glory, land, and riches as well as the blessing of the church.

With the Crusades, European warfare techniques thus arrived in the Middle East, with mixed results. The mounted and armored knight was poorly adapted to the climate of the region and ineffective against the swift and lightly armored cavalry employed by the Arab armies. The siege weapons brought from Europe proved their worth against Muslim strongholds. In Europe the knight gradually went out of style, overpowered by artillery, archers, and the rise of standing armies, which included large masses of foot soldiers that held a great advantage in set battles. A serious

blow to the role of the mounted warrior in Europe was the invasion of the Mongols from their homeland in the steppes of northeastern Asia in the 13th century. The Mongols deployed in vast *tumens* of 10,000 mounted archers, who were strictly disciplined, highly skilled in the use of the bow, and carefully coordinated on the battlefield through the use of flags and audible signals.

The Mongols swept through Russia in 1241, defeated an army of Polish knights sent against them, and then turned south through passes in the Carpathian Mountains to the plains of Hungary. The mounted and heavily armored knights of medieval Europe were no match for the more mobile Mongol army, which crushed the Hungarian forces at the battle of Mohacs. At the point of an invasion of western Europe, however, the death of Ogedei, the Mongol khan (ruler), forced the Mongols to withdraw for a traditional council and nomination of the khan's successor.

NAVAL WARFARE

Naval warfare was carried out much as it had been in ancient times, in rowed galleys that carried infantry and archers aboard for close-quarters fighting. Warships maneuvered to ram with a reinforced bow or grapple, board, and fight at close quarters. Ships were built with tall superstructures at the stern and in the bow, which sheltered spearmen and archers. These ships proved effective against the much smaller and lower longboats that had carried the Vikings on their raids. Cannons were added to the decks of the ships at the end of the medieval period. A gun deck immediately below the main deck was built as an artillery platform, with which military ships were able to deliver devastating broadsides.

The Byzantine Empire deployed the most powerful navy of medieval Europe. The Byzantine *dromon* was an oared galley equipped with slings that hurled an incendiary liquid known as Greek fire at opponents. In the 10th century the Byzantine fleet was successful in contesting Arab control of Crete and Sicily by transporting horses across the seas for land operations. Horse transport also played a key role in the conquest of England by the Normans in 1066. During the Hundred Years' War the need of the English to transport their armies by sea and to protect harbors captured in France and the Low Countries provided a spur to England's growing naval power. A key battle took place in 1340 at the Flemish port of Sluys between English and French ships. Archers, crossbowmen, and pikemen hurled their missiles from the decks and towers; with no ground available for retreat, combatants aboard the ships fought desperate hand-to-hand battles with swords, spears, and axes. At Sluys the French lost as many as 20,000 men, both of their command-

ers, and most of their ships, while the English gained the port of Sluys and a maritime advantage they would exploit for the next century.

THE HUNDRED YEARS' WAR

A destructive scorched-earth campaign that lasted for generations, the Hundred Years' War proved to be a turning point in strategy and tactics of the medieval world. With few set battles, the war progressed in many years as a simple pillaging expedition by the English, who created a new set of effective battle tactics honed in earlier campaigns against the Welsh and Scots. Foot soldiers were drawn up in defensive formations, while cavalry soldiers dismounted and formed up in solid lines of foot soldiers wielding swords and pikes. Longbowmen were dispersed in large blocks, their long range and rapid rate of fire allowing a devastating attack at key points in the enemy line.

The first major battle of the war took place at Crécy, just north of Paris, on August 26, 1346. The English forces numbered 12,000 spearmen, longbowmen, and cavalry, facing a much larger French army. The victory of the English at Crécy helped to end the dominance of mounted knights in medieval Europe. As the war continued, however, the French began to successfully counter the English tactics under the leadership of Bernard du Guesclin, the constable of France under Charles V (r. 1364–80). Du Guesclin avoided open battle with the English and instead employed hit-and-run attacks, ambushes, night raids, and sieges of fortified places by artillery. The new strategy drove the English virtually out of France by 1380, confining them to a few strongholds along the Atlantic coast in the southwest.

Henry V (r. 1413–22) of England returned to France in 1415, capturing the key port of Harfleur, setting up a network of fortified coastal ports, and defeating a large army of French knights and infantry at the battle of Agincourt. The English army employed powerful artillery against French cities and fortifications and returned to their tactic of pillaging the countryside. At Agincourt the English longbowmen used their bows of stout, yet flexible yew wood. Fired in mass at a long distance, their arrows could easily penetrate shields and plate armor, kill a horse, and wreak havoc among massed cavalry and infantry units.

Between battles the English employed the tactics known as the *chevauchée* (meaning “horse charge”) in which units of mounted soldiers roamed across the countryside, destroying crops and livestock, burning homes, and killing civilians. The *chevauchée* was an attempt to demoralize the enemy and render the land completely unproductive, thus depriving the French king of tax revenue needed for the upkeep of his military forces. The *chevauchée* was an in-

fantry tactic and had no role for mounted knights, either as attackers or defenders.

NEW MODES OF WARFARE

The French, disorganized and poorly led, found their kingdom threatened with permanent English control when the French king Charles VI (r. 1380–1422) disinherited his own son in favor of Henry's. On the death of both Henry and Charles in 1422, the young English heir Henry VI (r. 1422–53) claimed all of France north of the Loire, except for the royal city of Orléans. A siege of the city in 1428 through 1429, however, was broken by French defenders, inspired by a young and inexperienced peasant girl, Joan of Arc, who claimed a divine mission to restore the French dauphin (heir) to the throne.

After this success the French took the offensive, and Joan witnessed the crowning of the dauphin as Charles VII (r. 1422–61) in the cathedral of Rheims. When Joan was captured and executed as a witch in 1431, the English found they had created a martyr and stirred up a wave of nationalism that swelled the ranks of the French army. Over the next two decades the English were gradually driven out of northern France. A truce in 1444 allowed the French to regroup and reorganize their armies. The effort helped the French king and his advisers centralize their authority and reduce the power of the local dukes and counts.

The French army was reorganized, with each unit given a clearly defined role and a set of uniform battle tactics. The men were paid regularly, and their rations were increased. The French also invested in up-to-date weaponry and integrated their artillery force into the operations of the army. The cannons were put on carriages for better mobility and were improved with trunnions, which were used to balance the guns and allow them more accurate fire. Iron cannon balls were introduced, more reliable and effective than the stones previously used; careful experimentation also improved the effectiveness of gunpowder.

The new tactics and improved condition of the army and artillery allowed the French to quickly go on the offensive. They invaded Normandy and soon had besieged and defeated English strongholds, most of them in a matter of a few days. In set battles their cannon were able to overcome the English longbows. At the battle of Formigny in April 1450 a cannonade by the French provoked a charge in which the English infantry was cut down by the French spearmen and crossbowmen. This was the first major battle in which artillery played a decisive role.

The use of gunpowder, invented in China, transformed military science at the close of the Middle Ages. The first iron bombards were deployed in the 14th century against gates,

towers, and wooden structures and in battle primarily to startle and intimidate the enemy horses and foot soldiers. They were used in combination with trebuchets and other siege engines to destroy walls and fortified cities, and the French used them to recapture Harfleur and other key English-occupied cities late in the Hundred Years' War. Cannon also played a key role in the recapture of Spain by Castile in the late 15th century.

As the barrel length of cannon increased, artillery gained range and accuracy, and the use of iron projectiles proved far more destructive than the stone shot used by the traditional siege engines. Artillery emerged as a central weapon in siege warfare in the Italian campaigns of the 1490s. A small hand-held cannon known as the *harquebus* was introduced at the close of the medieval era, but a poor rate of fire and accuracy made this early rifle still less effective than archers and crossbowmen.

The companies of "freebooters" and mercenaries who roamed France during the Hundred Years' War still depended largely on swift cavalry to make sudden strikes and evade organized pursuit. These companies arrived in Italy late in the 15th century to serve the lords and towns of the Italian peninsula as mercenaries. Freebooters held prisoners for ransom and blackmailed cities not wishing to go to the expense and trouble of levying an army and fighting. Although they were much despised by military strategists and political thinkers such as Niccolò Machiavelli, who saw them as a destructive influence on Italy's political life, mercenaries played an important transitional role between the medieval and the modern age, as the armies of levied soldiers and knights of the Middle Ages developed into the national "standing" armies that came into use during the Thirty Years' War of the early 17th century.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

Much of the medieval Islamic world was defined by war and conquest. The consequences of wars against the Sassanian Empire, the Byzantine Empire, the kingdoms of India, the nomads of Asia, the knights of Spain and France, and the crusaders are written large in history, because they reshaped the culture of the world profoundly. A general trend of Islamic war in medieval times was conservatism, a tendency to cling to outmoded tactics or weapons even when faced with new dangers. Another trend was the tendency of Muslims to turn their military skills against one another. This sometimes led to disaster, because wars among Muslims distracted them from imminent outside dangers that more than once could have swept away their armies.

THE ARABIAN BEGINNINGS

During Muhammad's life (ca. 570–632), Muslim battles were small; they loom large for their consequences. There were three battles of importance for understanding how Muslims waged war in the 600s: the battle of Badr in March 624, the battle of Uhud in March 625, and the battle of the Trench in March 627. In the first of these one can see the full influence of Arabian-style warfare of the era. Leaders in Mecca had conspired to murder Muhammad. Medina had welcomed him as a wise man who could arbitrate disputes among the clans of the city. He used his power base in Medina to retaliate against those who had wronged him.

Badr was a place with many water wells, and it was a customary stop for caravans. Muhammad had most of the wells poisoned so that a Meccan caravan that stopped at Badr had little drinking water. This was a common tactic in the medieval world. In a nasty fight Muhammad's champions triumphed. Then the main battle commenced. The Meccans had 100 horses to Muhammad's two, and these horses seem to have nearly won the battle for the Meccans, but Muhammad's fighters stubbornly held their ground, killing many of the enemy with arrows as well as swords. The result was a victory for Muhammad's troops over superior forces. The victors attributed their triumph to God's intervention. The booty they won was worth over 50,000 dinars.

On the other hand, the battle of Uhud was nearly a catastrophe for the Muslims. In general, Arabs regarded fighting from behind fortifications to be cowardly; they preferred to fight on open ground. At Uhud, Muhammad's forces were again outnumbered, and this time he had no horses, not even for himself. The Meccans had more than 200 horsemen who were cut down. Muhammad was wounded. He and some of the survivors fled to the top of a rocky outcrop where the enemy's horses had trouble getting footing, and there he held out until the Meccans called it a day.

Muhammad adapted. For the battle of the Trench, he had a defensive trench dug around Medina. He had a few thousand poorly equipped troops at his command, whereas the Meccans arrived with thousands of allies from nomadic tribes. Siege warfare was almost unknown to the Arabs in the 600s. In the battle of the Trench the Meccans had the Medinans cut off from fresh supplies. In a patient, long siege the Medinans had to lose, but the Meccans were not interested in spending a long time away from home in uncomfortable conditions while fighting an enemy that would not do the honorable thing and come out to do battle on open ground. They lost interest in the siege and went home.

After Muhammad's death came the Ridda Wars, or the Wars of Apostasy. Some tribes that had pledged their support

to Muhammad refused to transfer that support to Muhammad's successors. Further, Muslims themselves disagreed over who should become their new leaders. This led to several battles in which many of Muhammad's original followers were killed. One of their battles was the battle of the Camel in 656. One side was led by Aishah (614–78), the youngest of Muhammad's wives and the most beloved. She rode on the back of a camel as the battle swirled around her. Her side lost, and she retired to her home to write about her husband. It was unusual for Arab women to participate in battles, and Muslim scholars would cite the battle of the Camel as an example of why women should not have positions of leadership. Traditionally, women were motivators in military camps. Before battle they would play their tambourines and taunt men by challenging their courage and manhood, in an effort to excite the men and motivate them to fight valiantly. After a battle the women would sometimes mutilate the enemy dead, taking ears and noses as trophies, as well as caring for and comforting their side's wounded.

When the word *jihad* was used, it usually referred to a phrase from the Koran: *jihad fi sabil Allah*, roughly meaning "striving in the path of God." Each person was responsible for his or her own jihad, a lifetime of striving to live a moral life. Early Islamic soldiers had to pay for their own equipment, meaning most had little except their weapons, and they all dressed differently from one another. This did not lessen their cohesion as fighting units; after all, Alexander the Great had conquered a huge empire with troops who also outfitted themselves individually. One helpful element from Islam was a unifying sense of a higher purpose. This meant that even if they did not fully understand why, and even if they were motivated by the prospect of looting enemy settlements, they were also always serving God, and they were always responsible for working with their fellow Muslims to advance the word of God.

The noun *jihad* has had different meanings for different people. Early in the history of Islam, it acquired a new implication: that Muslims were to advance the word of God throughout the world, because Islam was a universal religion. It never lost the implication that individual people led their own jihads by striving to be good, but it also became greater jihad and lesser jihad. Greater jihad was the preaching of the word to people who did not know of God's word as revealed to Muhammad. Imams and missionaries journeyed to India and eventually along the southern coast of Asia to as far as Indonesia; they were very successful at winning converts. Lesser jihad was the advancing of Islam through military conquest. This last idea fell into disuse in the 800s but was revived in the 1000s, when bandits raiding the Byzantine Empire and pillaging India used it as an excuse for their incursions. When



The siege of a Turanian stronghold by the forces of Kai Khusraw, from a Shahnama (Book of Kings) by Firdawsi, opaque watercolor, ink, and gold on paper; 15th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1928-11)

the Crusades began in the 1190s, Muslim clerics in the Near East recalled lesser jihad as a way to rally Muslim governments to fight the European invaders.

OPENING A WIDER WORLD

The motivations for the rush of armies out of Arabia in the early medieval era were mixed and somewhat clouded. Although the notion that the expansion was an example of lesser jihad has been common in histories, it may not have seemed that way at all to the early Muslims. During the 40 years before the era of Muhammad's ministry, the Sassanian Empire had overwhelmed two Arabian kingdoms in the north of the Arabian Peninsula and had seized Yemen, apparently in an effort to monopolize both land and water trade routes to and through the Near East. These actions disrupted traditional

Arabian trade routes. Matters became further aggravated when Muslims encountered problems with authorities of the Byzantine Empire while making pilgrimages to Jerusalem.

Initial attacks against the Sassanian Empire involved troops mostly from towns and cities in Arabia. The Muslim army depended on its infantry for most of its success. Camels were used for transporting supplies; camels had the ability to carry heavy loads for hundreds of miles relatively quickly. Horses were rarely ridden between battles; their owners would ride camels or walk rather than risk tiring their horses.

The tactics of Muslim generals were familiar to the Sassanians. Both sides had infantries composed mostly of archers. Among the Sassanians were soldiers devoted to protecting archers with shields that blocked enemy arrows and with swords and spears meant to blunt charges into their ranks. Most of the Muslim infantry was made up of archers who could drop their bows and arrows and fight with swords, knives, and javelins. The Sassanians had professional soldiers who were well trained and experienced. The Muslim soldiers were volunteers, although many had experience as mercenaries. During battle the Muslims maneuvered to get their archers massed on high ground, protecting them with other infantry and using their cavalry to harass Sassanian moves against the archers. Given the Sassanians' impressive professionalism, their well-trained troops, and their experienced officers, they would appear to have been able to quash the army of Islam. Yet the Sassanian generals had recently lost several battles to the Byzantine Empire and may have been less than competent. Further, both the troops and the Sassanian Empire's economy were tired and recovering from a long war against the Byzantine Empire. The Islamic army proved to have a decisive advantage: the extraordinary discipline of its troops. Its soldiers went where they were told to go with relentless determination, and they stood their ground unflinchingly. They wore down the Sassanian troops and eventually broke the morale of the Sassanian soldiers, who either abandoned the fight altogether or fled into eastern Iran, where provinces of the Sassanian Empire held out for several more decades until it was clear the Muslims were not going away. The Muslim conquests put a permanent end to the Sassanian Empire.

The Byzantine army presented different problems for the Muslims. For one thing, under the charismatic leadership of an emperor who was a gifted military strategist, it had defeated the Sassanians and recovered most of the territory that had been lost to the Sassanians a few generations earlier. Byzantine cavalry rode big, heavy steeds that were not intended to be as adroit as were the horses of the Muslims. The Muslim infantry was no match against a charge of the heavily armored Byzantine knights. The old Arabian

practice of lining up in parallel lines before battle was easy for the Byzantines to exploit.

The principal reason for eventual Muslim success may have been superior leadership. Muslim generals adapted to the unfamiliar ways of warfare of the Byzantines, while the Byzantine political leaders seem to have believed the Muslim invasion to be only a large raid for booty, much like countless other raids from Arabia. Another factor in the Muslim army's favor was the attitude of the local populations in Palestine and Syria; for centuries empires had come and gone, and some Near Eastern populations changed their religion according to whoever happened to be ruling them. Moreover, Islam did not seem much different from Christianity and Judaism; the ideas and general worldview of Islam was comfortably familiar. Thus many local peoples did not help the Byzantines and sometimes even welcomed the Muslim conquerors.

Umar the Great (Umar ibn al-Khattab, r. 634–44) may have been the most brilliant strategist of his era in the Near East. Under his directions, a Muslim army invaded Egypt, cutting off important supplies of grain to the Byzantine army. This was an accomplishment of far-reaching importance. Because the permanent loss of Egypt's harvests limited the Byzantine army in how far its military operations could range, it helped restrict the Byzantine army to Anatolia and Europe.

THE Umayyads and the New Reality of Warfare

The Umayyad Dynasty lasted only from 661 to 750, but during that time it managed to organize the Islamic world into a cohesive whole. At first, Arabs dominated the officers of the army; traditional kinship groups tried to keep the positions of military power in the hands of pure-blooded Arabs of distinguished ancestry. Muslims were about 5 percent of the population of the Near East and North Africa. To prevent their being assimilated into local populations, Umar the Great had garrison towns built from which Muslims would rule and where Muslim strongholds could be established. The Umayyads created towns solely for soldiers and their families, but they made the soldiers full-time paid professionals, rather than part-time soldiers, and they built an army out of people from ethnic groups other than Arabs. Turks, sub-Saharan Africans, and others were beholden to the caliph, who cared for them, and not to the traditions of Arabian clans.

In the 740s a rebellion in the eastern part of the Islamic world proved to be the undoing of the Umayyads. This rebellion brought with it a style of fighting that was unfamiliar to the Umayyad army. From the region of modern-day Afghanistan and central Asia came cavalry troops that depended on fast attacks that moved too quickly for enemy troops to respond. The invaders rode in open formation, using their

horses to break apart ranks of enemy infantry. This sort of tactic would be repeated by the Seljuk Turks and the Mongols in later years. When the Abbasid Dynasty (750–1258) supplanted the Umayyad Dynasty, the reconstitution of the army with non-Arab troops and officers became permanent, and the new officers of the Abbasids chose to emphasize the cavalry over the infantry. Under the Umayyads, warhorses were outfitted with felt armor. During the centuries of the Abbasid Dynasty, arms and armaments improved, although as the Islamic world broke into sultanates, the extent and quality of Islamic armies varied from place to place.

FIGHTING THE CRUSADERS FROM EUROPE

By the late 1000s the various claimants of power in the Islamic world were very antagonistic toward one another, and their interminable wars had weakened them, much as the frequent wars between the Byzantine Empire and the Sassanian Empire had weakened them. Normans invaded Sicily, which had been in Muslim hands for about 200 years, and by 1090 had taken control of the entire island. It was a harbinger of what was to come.

While speaking in Clermont, France, in 1095, Pope Urban II (ca. 1035–99) called upon western European nobility to aid the Byzantine Empire, which was struggling against the Seljuk Turks. When a western European military force, united under German and French leaders, crossed through the Byzantine Empire and into the Islamic world, they appeared to the Muslims as though they were just plunderers who would be gone once they had some booty to take home. The crusaders' speaking of a religious mission probably was familiar to the sultans of the Islamic world. Some Muslim leaders had also justified their raids on the world outside Islam as promoting their own religion. It took months, perhaps even a few years, before the political and military leaders of the Islamic world realized that the crusaders intended to remain in the Near East indefinitely.

The armies that faced the crusaders were ill prepared for the challenge. Each Muslim army received little or no help from other Muslim armies because of their suspicion of one another. Further, the Seljuk Turks were perceived as a far greater threat than were knights from Europe, and some sultanates welcomed the crusaders as allies against the Seljuks. Muslim generals continued to use outdated tactics. They were not prepared for the tactics of the crusaders. The crusaders rode warhorses that were heavier than the warhorses of the Muslims. Their troops were well armored. A knight was a formidable war machine, clad in chain mail from the top of his head to his feet, with plate metal for helmets and shields.

In early battles Muslim cavalry allowed mounted European knights close to them. The Muslims carried light

shields and gleaming curved swords made of Indian steel. These blades had cut apart many enemies in India and central Asia, and the swords impressed the enemy, who noted how the blades could cut into chain mail. Even so, tactics that had worked for Islamic armies in the past were failures against the Europeans, who crushed opposing horses under their own, who spitted horsemen on spears, and whose long swords could cut men in half.

The crusaders also brought with them advanced siege techniques. Since the 600s the Islamic world had used mostly catapults and testudos, devices with armored roofs under which soldiers could rush at an enemy's wall. At the battle of Antioch (1098), the Crusaders faced the challenge of a walled city manned with determined defenders. The walls were perhaps 60 feet high and wide enough at their tops for horsemen riding three abreast in each direction to pass one another comfortably. In every direction, defenders could rain *naft* (Greek fire, an incendiary concoction that burst into flames) on their enemies. The crusaders cut off access to the city and built a fortification nearby where they could resist attacks from the city. It seems that the Muslims regarded Antioch as impregnable, but the crusaders built trenches ever closer to the walls, allowing their troops to draw nearer and nearer without being exposed to arrows. The crusaders also built tall wooden towers on which archers and other soldiers perched. Meanwhile, a relief army had been sent to drive the crusaders away from Antioch. By the time it arrived it was one day too late; the crusaders had surmounted the walls, opened the gates, and entered the city.

THE MAMLUK TRADITION

The word *mamluk* translates roughly as "one who is owned." There were other words for different kinds of slave during the medieval era, but *mamluk* was used to designate military slaves and eventually included soldiers who had once been slaves but had been freed. The *mamluks* were begun during the reign of the Abbasid Caliph al-Mamun (r. 813–33) by al-Mutasim (r. 833–42), who used them to help him become caliph. They were bought when they were around the ages of 10 to 12, old enough to have survived childhood diseases but young enough to be molded into fiercely loyal fighting men. They were purchased exclusively in *dar al-harb*, meaning "the abode of war." Islamic nations belonged to *dar al-Islam*, meaning "the abode of submission." These were legal concepts, not military ones, with *dar al-Islam* being where Islamic law prevailed and *dar al-harb* being where Islamic law did not prevail. Islamic law restricted the buying of free people as slaves, so the boys who were to become *mamluks* were purchased in lands outside of the Islamic world from people who were not Muslims. Most came from central Asian no-

madic tribes and from sub-Saharan Africa, although Indians and Europeans could be part of the mix. Boys from central Asia were especially valued because they could be counted on to know how to ride horses and how to use bows and spears. This made training them easier, because *mamluks* were expected to be cavalrymen.

SALADIN

Saladin (ca. 1137–93) was in the right place at the right time with the right experience and skills united with a fine mind. He had been a student of theology but became a military officer. He proved adept at political intrigue and by about 1170 he had managed to become master of Egypt. There, he improved the training of the Egyptian army. In 1174 he proclaimed himself sultan of Egypt, starting the Ayyubid Dynasty (1174–1260). At first, his military adventures were against other Muslim states, slowly absorbing Near Eastern states into his new empire. He did not wage war against the crusaders' Kingdom of Jerusalem, instead using the Kingdom of Jerusalem as a buffer between him and the northern Turks, who seem to have been his principal target. He developed tactics that took advantage of the speed of Near Eastern horses. Mamluk troops were adept at using bows while riding horseback, but Saladin used his cavalry in close-quarters fighting.

When Saladin faced armies from the Kingdom of Jerusalem, he often avoided pitched battles. His strategy was to hit quickly and then retreat quickly. Even when this happened, Muslim casualties were often high, because the enemy knights had lifetimes of training in close combat. In the battle of Montgisard in November 1177 about 90 percent of his forces were killed.

For many years thereafter the crusader states and Saladin's empire fought sporadically. He executed almost all prisoners of war. At the battle of Hattin in July 1187, Saladin's troops defeated a sizable army and opened the way to Jerusalem, which he took in October 1187. These events prompted the Third Crusade, among whose leaders was Richard the Lion-Hearted of England (r. 1189–99). Richard I and Saladin reflected different temperaments and different skills. Richard I was a master battlefield tactician. In the battle of Arsuf in September 1191, Richard was able to place the weight of his knights on enemy troops on open ground, and Saladin's forces were soundly defeated. On the other hand, Saladin was master of long-term strategy and often seemed to be thinking months ahead of his opponents. In the case of the Third Crusade, he scorched the earth between the Europeans and Jerusalem. Wells were poisoned, crops ruined, and livestock killed and thrown in the wells or led away. Richard I may have had a golden opportunity; had he immediately marched to Jerusalem, he might have defeated its defenders. Instead he

worried about the lack of clean drinking water, and the moment passed. Eventually he and Saladin made a treaty that left Jerusalem in Muslim control but required that Christians be allowed to make pilgrimages to Jerusalem unmolested. Saladin had much impressed the crusaders, who returned to Europe with stories of Saladin's gallantry in battle.

RETRENCHMENT

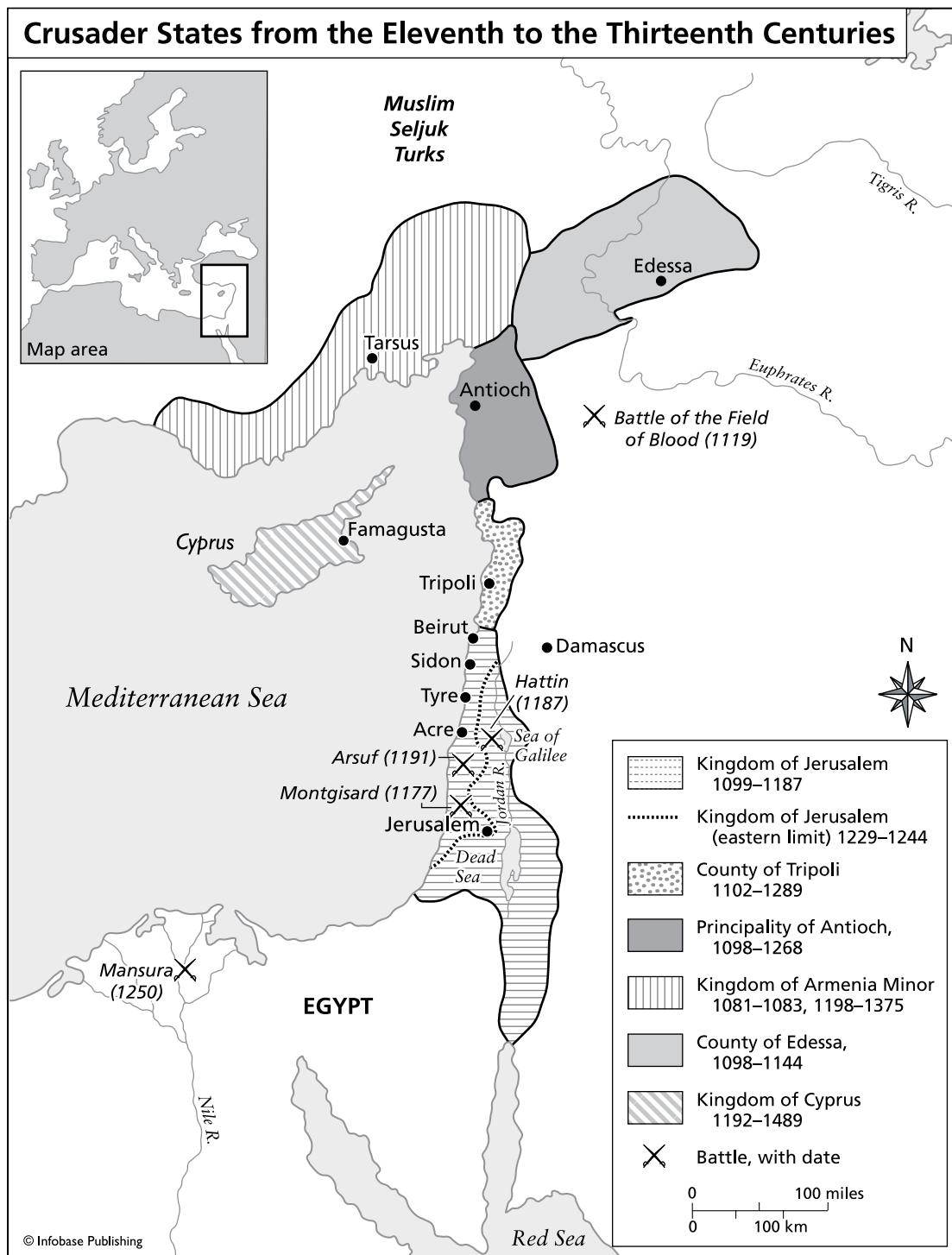
When the Mongols invaded the Near East in the 1240s, Islamic governments were still divided and often warring against one another. The major powers were the Seljuk Turks, who controlled much of the north, including Anatolia, having inflicted severe defeats on the Byzantine Empire, and the Mamluk Dynasty (1250–1517) that began with a coup in Egypt. The Mongols were a terrifying force that had slaughtered entire populations of cities. By the time they confronted the Seljuks, they had ended the central Asian civilization that had existed along the Silk Road. The Seljuks recruited Europeans into their army and adopted the tactics of Europeans. The core of the Mongols' army was a cavalry consisting of master horsemen who could shoot arrows accurately at a full gallop. Their swift ponies would sweep into opposing armies on the open plains that the Mongol generals preferred for their battles. Along with their frightening cavalry, the Mongols had siege engines and knew how to bring down a fortification's walls.

In the Seljuks the Mongols met a true test of their might. Seljuk generals knew their territory, and they were experienced in commanding swift cavalry such as that of the Mongols. The Seljuks relied on the discipline of their troops, facing the Mongols with infantry bristling with spears behind shields and trying to bring their heavy cavalry to bear on the Mongols' lightly armored horse archers. It seems that the Mongols were no match for the formations of heavily armored lancers in direct confrontations, but the mobility of Mongol forces allowed them to outflank their enemy, and at Köse Dag in 1243, outnumbered and outgeneraled, the Seljuks were defeated. The Mongols were able to sweep through the Near East almost all the way to Egypt.

The Great Khan died, and the leader of the Mongol army in the Near East left for the Far East to vote on a successor for the leader of the Mongols. He took with him a large force, perhaps to protect himself. The only military force capable of stopping the Mongols' advance into North Africa was that of the Mamluks. In the Mamluks, the Mongols faced a sophisticated foe whose core troops were great horsemen who were a match for the Mongol horsemen. Mamluk cavalrymen were trained from boyhood to use bows, spears, and swords on horseback; each was trained to be a single-handed army. They were utterly dedicated to their leaders; unlike other forces of

often well-trained men, they would not break into flight even when seemingly overwhelmed by opposition cavalry. A Mam-luk also could dismount and fight as infantry. As individuals,

each was trained in battlefield tactics and could act as an officer when none were to be found; together, they could organize themselves into improvised fighting units even in the midst



Between the 11th and 14th centuries, Christian Europe took up nine military expeditions against the Muslims in Greater Syria and Egypt and established Crusader States that were defended by armies of pilgrim settlers, military-religious knights, and European kings and nobles. Most of the mainland territory was abandoned by Christians by 1291.

of battle. The confrontations between the two sides were bitterly contested, and the Mamluk army was hard-pressed to halt the Mongol advance into Egypt. But the army's persistent resistance mired down the enemy, and the Mamluks eventually defeated the Mongols in 1260 at the battle of Ain Jalut in Palestine. This opened a new era in history not only by ending the Mongol threat to North Africa but also by pushing the Mongols north and out of Syria, leaving the Mamluks to become the foremost power in the Near East.

In al-Andalus, the forces of Islam were not faring as well. A prolonged period of persecuting Christians had sent refugees into the northern Christian kingdoms where their presence had inspired an ideology of *Reconquista*, the term for the campaign of Christians to take back the Iberian Peninsula from the Muslims. The armies of al-Andalus looked very much like those of the Christians. Muslims and Christians had fought on the same side in some wars and had learned the same battle tactics. Both sides had elite horsemen who wore full chain mail armor and wielded lances, swords, axes, and maces, and both sides had infantry that was often drawn from the peasantry and equipped with helmets and spears. For the most part, the governments of al-Andalus failed to cooperate to meet the threat of a determined and usually unified enemy, allowing the Christians to conquer the small states of al-Andalus one by one, until the only major opposition to the Christian forces came from Granada.

Access to Granada was mostly by sea or through mountain passes. The government of Granada built fortifications

at the passes to block invaders. Tactics usually focused on small raiding forces that would try to sneak through the mountains and attack enemy outposts and destroy enemy villages and crops. When Christian forces finally broke into open ground in Granada, they faced determined defenders of towns and cities who made the laying of sieges difficult. The Christians tried to lure the Granadan army out into open country, where Christian forces outnumbered the Granadans. When Granadan officers led their cavalry and infantry into direct confrontations with the enemy, they lost, and casualties were usually high. The resolution of the war was as much a matter of enemy patience as military skill, with the city of Granada eventually being cut off from help. The troops of Granada either became part of the army of the new rulers, retired to civilian life, or fled to North Africa or Anatolia.

See also ARCHITECTURE; ART; BORDERS AND FRONTIERS; BUILDING TECHNIQUES AND MATERIALS; CITIES; CLIMATE AND GEOGRAPHY; EMPIRES AND DYNASTIES; EXPLORATION; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; HEALTH AND DISEASE; MILITARY; NOMADIC AND PASTORAL SOCIETIES; OCCUPATIONS; RELIGION AND COSMOLOGY; RESISTANCE AND DISSENT; SEAFARING AND NAVIGATION; SHIPS AND SHIPBUILDING; SOCIAL ORGANIZATION; SPORTS AND RECREATION; STORAGE AND PRESERVATION; TRADE AND EXCHANGE; TRANSPORTATION; WEAPONRY AND ARMOR.

Europe

~ Abbo Cernuus: "Wars of Count Odo with the Northmen in the Reign of Charles the Fat" (ca. 890s) ~

The Northmen came to Paris with 700 sailing ships, not counting those of smaller size which are commonly called barques. At one stretch the Seine was lined with the vessels for more than two leagues, so that one might ask in astonishment in what cavern the river had been swallowed up, since it was not to be seen. The second day after the fleet of the Northmen arrived under the walls of the city, Siegfried, who was then king only in name but who was in command of the expedition, came to the dwelling of the illustrious bishop. He bowed his head and said: "Gauzelin, have compassion on yourself and on your flock. We beseech you to listen to us, in order that you may escape death. Allow us only the freedom of the city. We will do no

harm and we will see to it that whatever belongs either to you or to Odo shall be strictly respected." Count Odo, who later became king, was then the defender of the city. The bishop replied to Siegfried, "Paris has been entrusted to us by the Emperor Charles, who, after God, king and lord of the powerful, rules over almost all the world. He has put it in our care, not at all that the kingdom may be ruined by our misconduct, but that he may keep it and be assured of its peace. If, like us, you had been given the duty of defending these walls, and if you should have done that which you ask us to do, what treatment do you think you would deserve?" Siegfried replied. "I should deserve that my head be cut off and thrown to the dogs. Nevertheless,

if you do not listen to my demand, on the morrow our war machines will destroy you with poisoned arrows. You will be the prey of famine and of pestilence and these evils will renew themselves perpetually every year." So saying, he departed and gathered together his comrades.

In the morning the Northmen, boarding their ships, approached the tower and attacked it. They shook it with their engines and stormed it with arrows. The city resounded with clamor, the people were aroused, the bridges trembled. All came together to defend the tower. There Odo, his brother Robert, and the Count Ragenar distinguished themselves for bravery; likewise the courageous Abbot Ebolus, the nephew of the bishop. A keen arrow wounded the prelate, while at his side the young warrior Frederick was struck by a sword. Frederick died, but the old man, thanks to God, survived. There perished many Franks; after receiving wounds they were lavish of life. At last the enemy withdrew, carrying off their dead. The evening came. The tower had been sorely tried, but its foundations were still solid, as were also the narrow bays which surmounted them. The people spent the night repairing it with boards. By the next day, on the old citadel had been erected a new tower of wood, a half higher than the former one. At sunrise the Danes caught their first

glimpse of it. Once more the latter engaged with the Christians in violent combat. On every side arrows sped and blood flowed. With the arrows mingled the stones hurled by slings and war-machines; the air was filled with them. The tower which had been built during the night groaned under the strokes of the darts, the city shook with the struggle, the people ran hither and thither, the bells jangled. The warriors rushed together to defend the tottering tower and to repel the fierce assault. Among these warriors two, a count and an abbot, surpassed all the rest in courage. The former was the redoubtable Odo who never experienced defeat and who continually revived the spirits of the worn-out defenders. He ran along the ramparts and hurled back the enemy. On those who were secreting themselves so as to undermine the tower he poured oil, wax, and pitch, which, being mixed and heated, burned the Danes and tore off their scalps. Some of them died; others threw themselves into the river to escape the awful substance.

From: Frederic Austin Ogg, ed., *A Source Book of Mediaeval History: Documents Illustrative of European Life and Institutions from the German Invasions to the Renaissance* (New York: American Book Company, 1907).

The Islamic World

~ William of Tyre: "The Fall of Edessa," excerpt from *History of Deeds Done beyond the Sea* (ca. 1150) ~

In that same year, [1144] during the time which elapsed between the death of King Baldwin's father and Baldwin's elevation to the throne, one Zengi, a vicious man, was the most powerful of the Eastern Turks. His city, formerly called Nineveh, but now known as Mosul, is the metropolis of the region which was earlier called Assur. Zengi, its lord and governor, at this time laid siege to the city of Edessa, more commonly called Rohas, the greatest and most splendid city of the Medes. Zengi did this, relying on the numbers and strength of his men and also on the very dangerous strife which had arisen

between Prince Raymond of Antioch and Count Joscelyn of Edessa. The city of Edessa lies beyond the Euphrates, one day's journey from the river. The aforesaid Count of Edessa, contrary to the custom of his predecessors, had ceased to live in the city and made his constant and perpetual abode in a place called Turbessel. He did this both because of the richness of the spot and because of his own laziness. Here, far from the tumult of the enemy and free to pursue his pleasures, the count failed to take proper care of his noble city. The population of Edessa was made up of Chaldeans and Armenians,

(continued)

(continues)

unwarlike men, scarcely familiar with the use of arms and accustomed only to the acts of trade. The city was only rarely visited by Latins and very few of them lived there. The safekeeping of the city was entrusted solely to mercenaries and these were not paid according to the type of service they performed or the length of time for which they were engaged indeed, they often had to wait a year or more for the payment of their stated wages. Both Baldwin and the elder Joscelyn, when they held the county, made their home permanently and customarily in Edessa and took care to have the city supplied with food, arms, and other necessary items from nearby places. They had thus been able both to maintain themselves in safety and also to overawe the neighboring towns with their strength.

There was, as we have said before, bad feeling between Count Joscelyn and the Prince of Antioch a feeling that was not hidden, but rather had become an open hatred. For this reason, each of them took little or no care if the other were attacked or suffered misfortune. Rather they rejoiced at the other's catastrophes and were made glad by the other's mishaps.

The aforesaid great prince, Zengi, took the opportunity offered by this situation. He gathered innumerable cavalry forces throughout all of the East; he even called up the people of the cities neighboring Edessa and brought them with him to lay siege to the day. He blockaded all of the entrances to the city, so that the besieged citizens could not get out and so that those who wished to help them could not get in. The resulting shortage of food and provisions caused great suffering for the besieged. The city, however, was surrounded by a formidable wall. In the upper town there were high towers and down below there was the lower town where the citizens could take refuge, even if the city itself were taken. All these defenses could be of use against the enemy only if there were men willing to fight for their freedom, men who would resist the foe valiantly. The defenses would be useless, however, if there were none among the besieged who were willing to serve as defenders. . . . Zengi found the town bereft of defenders and was much encouraged. He encircled the town with his forces, assigned the officers of his legions to appropriate stations, and dug in. The catapults and siege engines weakened the fortifications; the continual

shooting of arrows tormented the citizens incessantly; and the besieged were given no respite. It was announced, meanwhile, and the news was also spread by rumor, that the city of Edessa, a city faithful to God, was suffering the agonies of a siege at the hands of the enemy of the faith and the foe of the Christian name. At this news the hearts of the faithful, far and wide, were touched and zealous men began to take up arms to harass the wicked. The Count, when he heard of it, was stricken with anguish. Energetically he assembled his forces. . . . Messengers bearing news of this sinister event came even to the kingdom of Jerusalem, bearing witness to the siege of Edessa and to the misfortunes suffered by its citizens. . . .

The Prince of Antioch, however, rejoiced in Edessa's adversity and paid small attention to his duties for the common welfare. He was little concerned that personal hatred ought not cause public harm and made excuses, while he put off giving the aid which had been requested.

Zengi, meanwhile, pressed continual assaults on the city. He ran the gamut of attacks and left nothing untried which could harass the citizens and aid him in gaining control of the city. He sent sappers through trenches and underground tunnels to undermine the walls. As they dug passages beneath the walls, they buttressed these with posts, which were afterward set on fire. A great part of the wall was thus broken down. This breach in the wall, more than 100 cubits wide, gave the enemy an entrance into the city. The enemy now had the approach they had desired. Their forces rushed together into the city. They slew with their swords the citizens whom they encountered, sparing neither age, condition, nor sex. . . . The city, therefore, was captured and delivered to the swords of the enemy.

Thus while the Prince of Antioch, overcome by foolish hatred, delayed rendering the help he owed to his brothers and while the count awaited help from abroad, the ancient city of Edessa, devoted to Christianity since the time of the Apostles and delivered from the superstitions of the infidels through the words and preaching of the Apostle Thaddeus, passed into an undeserved servitude.

From William of Tyre, *Historia rerum in partibus transmarinis gestarum*, trans. James Brundage, *The Crusades: A Documentary History*, (Milwaukee, Wis.: Marquette University Press, 1962).

FURTHER READING

- Bernard S. Bachrach, *Armies and Politics in the Early Medieval West* (Brookfield, Vt.: Variorum, 1993).
- Thomas J. Barfield, *The Perilous Frontier: Nomadic Empires and China* (Cambridge, Mass.: Blackwell, 1989).
- Jim Bradbury, *The Medieval Archer* (New York: Boydell Press, 1996).
- Lester Brooks, "The Songhay Ascendancy," in his *Great Civilizations of Ancient Africa* (New York: Four Winds Press, 1971).
- Philippe Contamine, *War in the Middle Ages*, trans. Michael Jones (New York: Blackwell, 1984).
- Ross Hassig, *Aztec Warfare: Imperial Expansion and Political Control* (Norman: University of Oklahoma Press, 1995).
- Ross Hassig, *War and Society in Ancient Mesoamerica* (Berkeley: University of California Press, 1992).
- John Keegan, *A History of Warfare* (New York: Alfred A. Knopf, 1993).
- Patrick V. Kirch, *On the Road of the Winds: An Archaeological History of the Pacific Islands before European Contact* (Berkeley: University of California Press, 2000).
- Steven A. LeBlanc, *Prehistoric Warfare in the American Southwest* (Salt Lake City: University of Utah Press, 1999).
- James E. Lindsay, "Warfare and Politics." In his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005): 57–85.
- Harold G. Marcus, "Beginnings, to 1270" and "The Golden Age of the Solomonic Dynasty, to 1500" in his *History of Ethiopia* (Berkeley: University of California Press, 1994).
- David Nicolle, *Historical Atlas of the Islamic World* (New York: Checkmark Books, 2003).
- Roland Oliver and Anthony Atmore, *Medieval Africa, 1250–1800* (New York: Cambridge University Press, 2001).
- Geoffrey Parker, *The Cambridge Illustrated History of Warfare* (New York: Cambridge University Press, 2005).
- John Reader, "Part 4: African Civilizations," in his *Biography of the Continent Africa* (New York: Vintage Books, 1997).
- Linda Schele and Mary Ellen Miller, *The Blood of Kings: Dynasty and Ritual in Maya Art* (Fort Worth, Tex.: Kimbell Art Museum, 1986).
- Barbara Tuchman, *A Distant Mirror: The Calamitous Fourteenth Century* (New York: Ballantine Books, 1987).

► weaponry and armor

INTRODUCTION

At the beginning of the Middle Ages battle was still contested by men at close quarters using edged weapons, hacking at each other with swords, spears, and axes. By the end of the period the battlefield was coming to be dominated by gunpowder artillery and small arms. While we often think of medieval warfare as being an aristocratic pastime, by the end of the Middle Ages popular armies fighting for political and social change had made their appearance, abandoning traditional weapons and tactics in favor of innovations such as the Swiss pike square, the Hussite wagon fortress, and the Korean ironclad gunboats.

In the medieval period cavalry became the dominant arm on the battlefield. While most armies remained predominantly bodies of infantry, the strength of cavalry compared with infantry greatly increased. The stirrup was invented in inner Asia and was borrowed throughout Eurasia. It allowed cavalymen to remain on a horse for longer periods of time (for days at a time in some cases, as during the long forced marches undertaken by Genghis Kahn) and also to stay in the saddle with much greater security when they were actually clashing with opponents. A cavalryman standing in the stirrups could strike his opponent with much greater force than could an ancient horseman who had to grip the sides of his horse with his thighs and rely on his balance rather than his strength to stay on the horse.

Although most battles were decided with swords or lances, this was conditioned by the inertia of tradition and the relatively low level of professionalism of most medieval armies. The fact is that infantry or cavalry armed with longbows or compound bows could simply stand a hundred yards off from an enemy formation and slaughter them at will. The most decisive victories in medieval warfare—the English successes at Crécy, Poitiers, and Agincourt, and the Mongol conquest of most of Eurasia—were all brought about by archers whose very way of life made them experts in the use of the bow. But the idea of creating long-term service units to train regularly with specialized weapons was foreign to most military institutions in the Middle Ages. In Europe, for instance, the greater bulk of the infantry in any army owed a feudal obligation of 40 days' service a year, so any but the most minimal training was out of the question.

The best swords in the Middle Ages were produced by the craft traditions of Japan and northern India. Indian swords were generally known in Europe as Damascus blades, from the terminus of the caravan routes that brought them westward. The quality of these kinds of swords compared with most medieval weapons is suggested by a legendary story often told about a dinner party held during negotiations between the rival rulers fighting each other in the Third Crusade. Richard the Lionhearted, the king of England, demonstrated his military prowess by splitting the dining table in two with a heavy blow from his broadsword. The Islamic commander Saladin responded by throwing a silk scarf into the air and cutting it into seven pieces with his Damascus sword as it fluttered to the ground.

Armor was certainly useful in medieval battle, but it could rarely protect a soldier from direct attack. Even in the case of the heaviest armor used in late medieval Europe, at Agincourt, arrows often were found to have pierced the armor covering a French knight's thigh, passed entirely through his flesh, pierced another layer of armor on the way

out, and then gone through a layer of horse armor and struck deeply enough into the horse to kill it. While the heavy plate armor that evolved in Europe had as much to do with display as practical protection, it was a definite improvement over older chain-mail armor. Mail coats hung all of their weight on the shoulders and so hampered a knight's movements severely. Plate armor, though heavier overall, had its weight suspended equally over the whole body, allowing the wearer much freer movement. Armor was a valuable commodity, and poor knights like William Marshal (1146–1219) helped to make their way through tournament victories: Technically, the defeated knight became the winner's prisoner and had to ransom himself with a suit of armor. At Agincourt one of the chief problems faced by the English king Henry V was keeping his Welsh peasant archers from breaking ranks to go out and strip armor from the growing mound of dead French knights before them.

Armies in the Americas and Polynesia and Australia were hampered by having to use stone and wood to manufacture weapons without metal. Warfare in these areas was able nevertheless to destroy cities and amass great death tolls. But these conditions also encouraged primitive ritual and display elements of warfare such as the Plains Indian practice of "counting coup" (which consisted of a warrior demonstrating his courage by touching an armed aggressive opponent without attacking him) or the sacrifice of prisoners of war in elaborate rituals, as by the Mississippian, Aztec, and Mayan cultures.

AFRICA

BY JUSTIN CORFIELD

The weapons used in medieval Africa varied considerably. In some parts of the continent people used iron, but in others wooden weapons were more common. In many cases the weapons were used primarily for hunting and not for fighting, except in limited areas of the continent. The Bushmen of southern Africa relied heavily on bows and arrows for both hunting and defense. Their bows were up to 5 feet tall—taller than the people using them. They were made from hardwood and bent into a sharp curve, with string made from twisted sinews.

The arrows would be 2 to 3 feet in length, usually made from reed, with a heavy point of bone, and with feathers on the tail to steady it in its flight. They were extremely accurate and deadly at less than 20 yards but less so at longer ranges, which made the Bushmen rely on stealth and surprise. The quivers could hold up to 30 arrows. They also carried with them a club known as a *kirri*. It was effectively a cudgel of about 20 inches in length, used for throwing or to kill a wounded animal or as a battle weapon at close quarters.

The Hottentots, also of southern Africa, used bows, similar to those of the Bushmen. By the late medieval period they were using iron as well, and some of their arrows had iron tips, often with barbs. These were attached to arrows that were about 20 inches long, often treated with snake poison to make them deadly in hunting and fighting. The bow generally took second place to the assegai, or hand-held javelin. These were about the height of a man and were sharpened at one end. As with the Bushmen, the Hottentots used the *kirri* and also the *rackum*, which was a longer and pointed version of the club. Made from hardwood, these weapons often were treated with oil to make the wood extremely firm.

Some of the jungle people of central Africa used weapons similar to those of the Hottentots, with the tribes in the Ituri forest region of the modern-day Democratic Republic of Congo making arrows carved from bone, which had up to a dozen barbs. The development of the knife, through use of sharp flints, thigh bone, and hardwood, was an important advance of this period. A knife from the Butua people of modern-day Zimbabwe evidently was made from a human shin bone.

From the early ninth century the empire of Ghana, with its capital at Kumbi Saleh, about 200 miles north of modern-day Bamako, Mali, emerged as one of the great military powers in the region. It gained great wealth from gold and used it to finance wars against its neighbors. During the mid-ninth century the kingdom of Kanem, with its capital at Njimi, northeast of Lake Chad, also emerged as a strong military power, its rulers converting to Islam in the 11th century. Both these states, as well as that of Great Zimbabwe, which also traded gold, relied on large armies, but little information has survived about their weaponry.

The Bantu people during this period clearly used weapons not only for hunting but also for fighting between tribes and within tribes. By the later part of the medieval period they used bronze and iron, and these materials gave them a considerable advantage over their opponents. The Buganda people of modern-day Uganda started using iron as late as 1000, although it seemed to be used in southern Africa before that time, showing a great disparity in the technology of different regions.

During the late medieval period the most advanced African weaponry more closely resembled 11th- and 12th-century European hand weapons, with short daggers; wide, flat-bladed swords; spears; bows and arrows; and clubs. Some surviving daggers from medieval Africa are clearly of Arab design, having a short, curved blade. That these are more common in eastern and northeastern Africa also tends to suggest that the similarities with Arab design were not coincidental. By the late medieval period Arab-style swords became more com-

mon in the Horn of Africa (modern-day Somalia), with flat blades that had a stem narrower than the end, making them useful for hacking opponents rather than thrusting at them.

In battle against each other the Bantu tribes tended to make heavy use of spears, many with large, flat blades. When engaging in hand-to-hand fighting, they tended to rely on wooden clubs similar to those that were being used by the Zulus as late as the early 19th century. Often carved from a single piece of hardwood, the clubs had a handle at one end; the other end featured a large round or oval piece of wood for hitting an opponent in battle with considerable force, with the aim of killing rather than stunning. In southern Africa the clubs had a different design: Generally, the handle was made from one piece of polished hardwood and the head from another piece of hardwood or from metal or even bone. High-status warriors, such as rulers and members of ruling families, might carry clubs with bones made from rhino horn, though the more traditional use of rhino horn was for the handles of Yemeni-style daggers popular in parts of the Horn of Africa and in Zanzibar as well as Yemen. The *oba*, or king, in Benin, western Africa, tended to carry a ceremonial hammer with him.

The swords used in western Africa tended to be for thrusting and cutting, like Roman swords, rather than for fencing or parrying, like the European ones of the same period. In fighting, the height of the soldiers and the lengths of the arms as well as the amount of force they could use were just as important as their weaponry. Because of this style of fighting with swords and also to protect soldiers from the use of heavy clubs, many Africans used large, lightweight shields covered with animal hides to deflect the blows of their opponents. The Zulus used civet skin decoration.

From the number of bronze plaques that have survived in Benin, it is possible to elucidate more about their weaponry than for other tribes in the region. Bows shown on these plaques are much smaller than those used elsewhere in Africa, with most hunters specializing in stalking their prey with heavily barbed spears. The daggers were similar in design to spears but with very short shafts. Swords often had large heads, like the cleavers used for cutting branches and undergrowth in western Africa today. Shields were large and mainly rectangular, except for the pointed top. It is also evident that there were certain regional variations in the use of weapons. The Kikuyu preferred the bow and arrow (with iron arrowheads), while the Masai made much greater use of spears.

Camels had been introduced into North Africa in the third century and were used in battle, as were horses. The latter were put to heavy use by the Bornu from central Sudan, who sent cavalry against their opponents each year. Because of the nature of fighting on horseback, the weaponry used by them and also by their opponents was different from that of

most of the rest of Africa, where fighting was on foot. The Bornu used Arab-style armor with large numbers of small plates sewn together to form "plate mail." Their primary weapon was the lance, which became longer and stronger over time. Their opponents tended to develop spears and short swords for jabbing at the horses of the Bornu, with large oval shields to protect themselves.

During the 15th century some Europeans, primarily the Portuguese, came into contact with Africans in western Africa, and this often resulted in skirmishes. The part of the armory that the Europeans clearly feared most was the poisoned arrow. These arrows were quite effective, as was made evident when a Portuguese slaving party landed on the western African coast after sailing from the Cape Verde Islands in about 1445 or 1446. Nuno Tristão landed with 21 other men and quickly ran into an ambush from the Africans, who killed 20 of the men with poisoned arrows; only two escaped and made their way to Portugal with the story. Gradually, improvements in European musketry turned battles into unequal contests, with some African tribes trying to buy as many muskets as possible to ensure their own survival or to expand their kingdoms into "secondary empires."

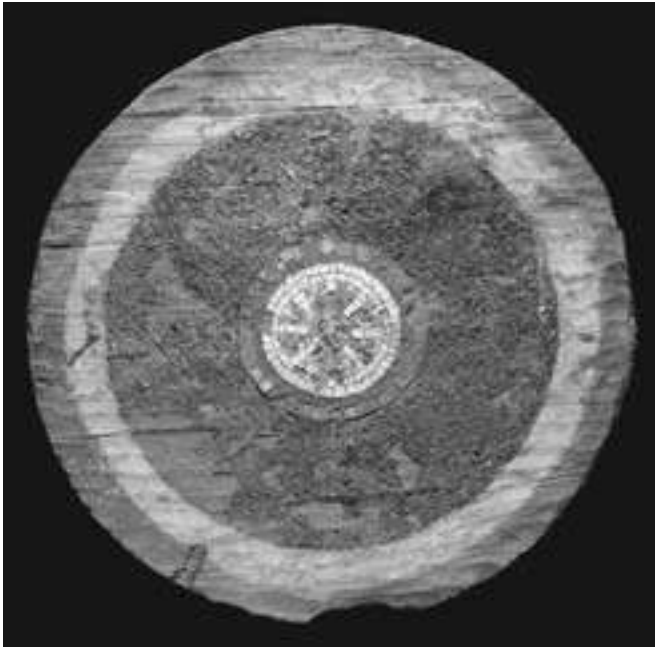
THE AMERICAS

BY J. J. GEORGE

The weaponry and armor of North America during the period 500 to 1500 remained consistent with those of earlier periods, though with a few improvements and additions. The principal weapons used were the spear-thrower (atlatl), sling, spear, and club. Widespread use of the bow and arrow appears to have occurred later, with chipped stone points comparable in size and shape to modern arrows common by about 500. Weapons were normally made of stone, bone, horn, and wood and often were composite, with the point, head, or blade crafted from stone or bone and the handle or shaft from wood.

The atlatl, a device that adds leverage by extending the length of the user's arm and thereby increasing the range, force, and accuracy of the spear, had a particularly wide distribution. Its use was known among the polar Eskimo in the Arctic, the Tlingit of the Northwest Coast, groups in lower California and northwestern New Mexico, Indians at the mouth of the Mississippi and throughout Mesoamerica and in the circum-Caribbean area. Steel weapons did not arrive with the Europeans in the late 15th and early 16th centuries.

Body armor in North America consisted of at least four types. Armor made of slats or plates of bone perforated at the edges and tied together was used among the Eskimo. Similar armor made exclusively of wooden slats was known on the Canadian Plateau and the Northwest Coast. Hide armor was



Shield of wood, shell, and resin; Mexico; 1200–1500 (Los Angeles County Museum of Art, Gift of the Art Museum Council in honor of the museum's twenty-fifth anniversary, Photograph © 2006 Museum Associates/LACMA [M.90.168.27])

more common across much of North America and into Mesoamerica and Central America. Hide armor typically consisted of an untailored hide draped around the body under one arm and tied over the opposite shoulder so that both hands would be free. Shields were also widespread. The most common type, especially in the Plains, was a circular shield made of hide. Other shields were made of rods, slats, or boards fastened together. Helmets also were used and are known from the Arctic, the Northwest Coast, and even in central Mexico, where later Aztec warriors wore helmets as part of elaborate costumes with the insignia of their military orders.

The Mississippian cultures (ca. 750–ca. 1500) of the Midwest and Southeast are known to have been aggressive and warrior-like. According to their mythical worldview, visionary warrior priests journeyed along the Path of Souls to the realm of the dead in search of divine weapons and power. With the use of sacred, spiritual weapons they fought violent battles against powerful mythical creatures, including the Underwater Panther, the Great Serpent, the Old-Woman-Who-Never-Dies, and the Raptor.

Archaeological research and 16th-century European images reflect the preoccupation with war. Axes, knives, clubs, maces, spears, and bows and arrows are known from dig sites and painted imagery. Painted images describe heavily tattooed warriors from the south dressed in loin clothes marching off to battle, some with large medallion-like plates

over their chests and carrying bows and arrows, spears, and wooden clubs with broad, bulbous ends. The Mississippian culture highlighted war imagery in their own practice of representation, favoring repoussé sheet copper, engraved marine shell cups, and engraved marine shell gorgets. One example, an incised shell gorget from the 13th or 14th century, shows two figures engaged in hand-to-hand combat, possibly a ritual war dance, brandishing long flint swords while attempting to decapitate each other with raptor talon-effigy flint knives. Their arms and legs are depicted with protective bands. Although this scene depicts a mythical battle, the actual combat regalia have been recovered from mortuary contexts at Mississippian political centers.

Much farther north, in the Arctic, violence between groups usually involved small bands of men numbering about a dozen and occasionally larger groups in the hundreds, redressing or exacting revenge for an insult or a killing. They often wore protective clothing in the form of special fur or skin vests, and in some regions they wore plate armor manufactured from pieces of bone or ivory linked together with rawhide. Their normal wardrobe of sewn animal furs on its own offered minimal defensive protection. The men were armed with bows and arrows, clubs, spears, and knives and typically meant to catch the entire population of the target settlement involved in a festivity in the *kashim*, or communal structure, at which point the raiding party would send firebrands or smoking debris through the skylight in an attempt to burn or suffocate them to death.

Moving south to central Mexico, Aztec warfare in the 15th and 16th centuries might seem peculiar by comparison. The primary goal of Aztec warfare was to conquer city-states to force them to pay tribute, a kind of tax whereby the conquered territory shipped goods to the Aztec center at Tenochtitlan, now Mexico City. The secondary purpose, however, was to capture warriors for ritual sacrifice. Human sacrifice was a fundamental part of Aztec religion, which to a large extent drove the state. Consequently, to satisfy the sacrificial needs that religion demanded, enemy warriors were captured alive rather than killed.

The primary offensive weapons of the Aztec were thrusting spears and swords. The Aztec sword (*maquahuitl*) consisted of a long, flat wooden handle into which were fitted rows of obsidian blades, which were extremely sharp and highly effective. Like the rest of the Americas, metallurgy in Mexico was limited to softer metals that were ineffective as far as weaponry is concerned. Steel was unknown by the Aztec until Hernán Cortés and his men rode into Tenochtitlan in 1521. Obsidian was an effective replacement. Later Spanish accounts describe instances in which Aztec soldiers cut off the heads of horses with a single blow of the *maquahuitl*.

The bow and arrow also was used, and some groups made use of clubs and slings. Warriors carried shields made of wood and covered with elaborate decoration, often of feathers. They wore body armor made of thick, quilted cotton cloth that was quite effective at stopping arrows and darts.

Quilted cotton body armor was used earlier at Teotihuacán (ca. 1–ca. 700), a major city 40 miles to the northeast of contemporary Mexico City, where it was called *escuiupil*. Painted images from Teotihuacán also depict warriors wielding atlatls, rectangular shields, and thrusting spears and bucklers and wearing helmets. Some Spaniards adopted the use of the cotton armor once they realized that their own armor was not only unnecessary, owing to the lack of metal weapons among the native population, but also repressively hot.

For a long time scholars thought that the Maya were a peaceful and idyllic people. Their weaponry, however, suggests otherwise. Spears, atlatls, darts, and the bow and arrow were common in Classic Period (ca. 200–ca. 900) Mayan civilization. Quilted cotton armor, similar to that from Teotihuacán, was also used. Teotihuacán incursions into Mayan territory at this time suggest that weaponry known at Teotihuacán also would have been known among the Maya. Many images of weaponry are known from Mayan artwork. Archaeologists who opened the tomb of the Tikal (ca. 200–ca. 800) ruler Stormy Sky found that he was flanked by two retainers, who were most likely sacrificed at his death. Stela 31, a large sculpted stone relief, shows Stormy Sky similarly flanked by two guardians dressed in Teotihuacán-style military garb and carrying shields, spear throwers, and feathered darts.

Murals at Bonampak, which date to around 800, depict the horror and confusion of hand-to-hand combat. In one scene a thrown spear penetrates the forehead of a warrior. At the center stands a war leader, dressed in a jaguar tunic

and holding a thrusting spear. These are but a few examples representing the Maya and their weapons. Wall paintings at the Postclassic (ca. 900–1521) site of Chichén Itzá show Toltec warriors from central Mexico reconnoitering the Yucatán coast, bearing shields and bows and arrows. Similarly, a gold repoussé disk from Chichén Itzá shows a Toltec warrior wearing an elaborate headdress and attacking Mayan warriors with a thrusting spear.

South American war practice was well advanced by the time of the Inca (ca. 1450–1532). Flurries of arrows, sling stones, and javelins preceded hand-to-hand combat by troops who wielded maces, clubs, and spears. Some stones were reportedly large enough to fell a horse or break a sword in half at a distance of almost 100 feet. The sling was a belt of wood or fiber that one twirled above the head before releasing a stone with both force and relatively good accuracy. Piles of hundreds of sling stones can still be found within the walls of various Incan forts. The Incas' preferred weapon was a stone or bronze star mace mounted on a wooden handle about 1 foot long, often fitted with sharp spikes. Another favorite was a hard, double-edged, palm wood club shaped like a sword. The bow and arrow were a late addition to the Incan army's repertoire, as warriors from tribes in the Amazon jungle were drafted into service. They also employed wooden lances, though these were much shorter than those the Spanish used against Incan forces to such devastating effect.

Defensive armor consisted of quilted cloth that was so effective against Andean weapons that many Spaniards adopted its use, as they did in Mesoamerica, replacing their own metal plate in favor of the lighter cloth. Incan warriors also frequently carried shields and protected their chests and backs with plates of metal and their heads with cane helmets. Troops defending fortified locations responded with a similar array of weaponry, to which they added large boulders rolled down onto advancing forces. Military service was compulsory for all males between the ages of 15 and 50. Finally, ample storage facilities, an extensive road network, and a system of fortresses might also be thought of as war implements because they aided the efficiency of the Incan war machine, allowing them to deploy and maintain vast armies at great distances.

ASIA AND THE PACIFIC

BY MARK W. ALLEN

There was an astonishing variety of weapons and armor across time and space in Asia and the Pacific during medieval times. At one end of the spectrum, Australian and Melanesian stone and wooden weapons were the same ones used thousands of years earlier, while defensive armor was limited to wooden shields. By contrast, in Asia by 1500 gunpowder was widely



Knife, Inca culture, Peruvian Andes, 1300–1560 (Los Angeles County Museum of Art, The Phil Berg Collection, Photograph © 2006 Museum Associates/LACMA [M.71.73.235])

used in firearms, artillery, and bombs. Consideration of weapons and armor is instructive, as they shed much light on the goals of war and the ways in which combat was conducted. For example, they can indicate to what extent warriors were professional specialists in the art of warfare or merely members of a group that grabbed their personal weapons to join their kin and neighbors when war threatened. Specialized weapons might take years to master and nearly always indicated formalized positions for warriors. Armor was often a huge expense and usually was restricted to full-time soldiers or the elite members of a society. Weapons and armor are important symbols of the rulers and leaders and demonstrate the protective or threatening nature of military power.

In Australia and the Pacific islands weapons either were of an ancient form, as in the case of Australia and much of the Melanesian islands, or were typical of Neolithic cultures, such as those of Micronesia, parts of Melanesia, and Polynesia. The former type includes simple clubs, stone knives, spears, lances, throwing sticks (like the boomerang of Australia), atlatls, and sometimes the bow and arrow. Defensive armor was limited to the wooden shield, typically used to block spears or arrows rather than for protection during hand-to-hand combat. Warfare involved nearly every male capable of bearing arms; there were no specialist warriors. Thus, each man had his personal weapons of choice, often the same ones he would carry while hunting. These weapons, though simple, must be recognized as lethal. Casualty rates could be very high in this type of warfare, with a very large proportion of deaths coming through conflict.

The situation is considerably more complex in the rest of the Pacific. Here are found a remarkable variety of specialized weapons for warfare rather than the mere use of traditional hunting weapons for combat. Neolithic weapons include polished stone axes hafted onto wooden handles, various forms of clubs efficient for cracking skulls, slings for hurling rocks, wooden swords or clubs with edges made of razor-sharp obsidian or sharks' teeth, and stone projectile points (often with flared or even barbed corners at the base) designed especially for human prey, in that they can do tremendous damage to tissue when they are extracted. Armor was also used, particularly on some islands of Micronesia and Polynesia. It was usually woven out of flax or other vegetation and capable of protecting the wearer from some missiles or blows.

Particularly good examples of specialized Neolithic weapons are those of Fiji, a remote group of hundreds of islands at the very eastern edge of Melanesia. Fiji was ruled by powerful chiefs who used warfare as one of their major forms of social power. They often relied on specially trained warriors, who selected from an amazing variety of wooden hand-to-hand weapons such as clubs, maces, battle-axes, spears, and throw-

ing sticks. Much importance was placed on shock combat rather than the use of missile weapons. Armor was fairly limited. Similarly, the Polynesian New Zealand Maori employed a variety of war clubs with sharp polished edges, called *patu*. These could be made of whalebone, wood, or stone. In the hands of an expert they were deadly. Maori *toa* (warriors) also used the *taiaha*, an unusual wooden spear/sword combination—the tip was used to disarm an opponent, and then the butt end was swung like a sword for an incapacitating or fatal blow. Several other special weapons were used as well. Like the Fijians, armor was eschewed by the Maori, who likewise valued hand-to-hand combat rather than reliance on missiles.

Elsewhere in Polynesia, however, warriors did take to the use of missiles as well as specialized sharks' teeth-lined swords and other lethal close-combat weapons. Hawaii is a good example. Archaeologists often find large caches of sling stones piled near a settlement or in a fortification. These stones were lobbed in mass missile assaults. Prudently, many warriors (particularly specialist fighters and chiefs) wore woven armor and carried light shields to help protect against slings and other weapons.

In a very real way, to understand the history of Asia during medieval times, one must appreciate the significance of a number of offensive innovations in warfare. While we see the most drastic changes in offensive weapons, there were less profound changes in armor and protection as well. By the early to middle medieval period of Asia nearly all parts of Asia were characterized by a very different kind of warfare than that of the Pacific islands. Here, warfare was of a much larger scale, with professional armies comprising up to hundreds of thousands of soldiers armed with standardized iron and steel weapons. Wars were led not by chiefs or kin groups but by emperors or kings together with their generals and other officers. Calvary, war elephants, ships, and early forms of artillery were commonly used.

Hand-to-hand weapons included a wide variety of steel and iron swords, axes, maces, daggers, and longer weapons, such as spears and pole arms for use by infantry against mounted opponents. These weapons have a long history in Asia, particularly in China and India. During the medieval period improvements in metal-forging techniques and technologies did lead to the construction of steel weapons, which were less likely to break and which could keep a sharp edge. Some of the finest swords and armor ever made come from medieval armor, particularly in China and Japan.

To find the greatest advances in weaponry in medieval Asia we have to look elsewhere. One major innovation was the refinement of the stirrup by the early medieval period. Although it is not technically a weapon, it permitted a mounted warrior to be much more dangerous by allowing him to stand



Iron sword guard, Japan, ca. 1400 (Los Angeles County Museum of Art, Gift of Caroline and Jarred Morse, Photograph © 2006 Museum Associates/LACMA [M.80.219.1])

up and smite down hard on opponents or to have a more stable firing position for bows. This innovation is tied closely to the development of the composite bow, made of different materials bound together to maximize drawing power and thus improve arrow velocity. The small size of this bow, together with the stirrup, made the steppe horsemen of central Asia the most feared of all opponents by late medieval times in Asia. These armies combined great mobility with deadly accurate and rapid missile fire. With these advantages the Mongols (ca. 1206–1368) succeeded in building the largest contiguous land empire in history through military conquest in just a few generations.

The discovery of gunpowder by the Chinese sometime around 1000 meant the slow but sure end of the ancient practices, tactics, and strategies of warfare. This was no revolution in technology. It was a gradual change over three to four centuries as gunpowder came to be used in weapons such as bombs, handheld firearms, and eventually even canons by the end of the medieval period throughout Europe and Asia. This, of course, meant that personal armor and even city walls that had been so vital in warfare for thousands of years were quickly becoming obsolete, as they could not hope to stand up against increasingly deadly weapons. Wholesale changes were made in the size of armies, how they were trained, how they fought, and even the goals of warfare itself. The world would never be the same.

As noted, advances in protective armor during the medieval period of Asia are not nearly as dramatic as those of offensive weapons. Still, before firearms developed, improved metal technology permitted the development of somewhat more effective armor. Nevertheless, these improvements were largely ineffective against the powerful composite bows of the Mongols and their predecessors. Horse warriors of the steppes actually developed a new form of lamellar armor which was made by lacing together patches of lacquered leather, metal, and other materials. It was lighter than metal rings or plates and thus appropriate for horse archers, who shot while moving. It was also more effective protection against arrows than ring armor (chain mail) and better against crushing blows than plate metal armor. One part of Asia where the widespread use of armor did continue into even the 19th century was Japan. *Samurai* and their leaders resisted the introduction of gunpowder weaponry with some success, though it became increasingly important even there.

EUROPE

BY AMY HACKNEY BLACKWELL

Soldiers in medieval Europe used a variety of weapons. A soldier's choice of armor depended on the time during which he lived, the type of fighting he did, and his economic situation. For hand-to-hand combat soldiers typically used swords, axes, clubs, and spears. Crossbows, bows, and javelins served as projectiles for most of the medieval period, though firearms had begun to appear toward the end of the era. Siege weapons such as catapults helped armies break into castles and towns. Many soldiers wore armor to protect them from opponents' weapons. This armor evolved from mail made of metal links to full plate armor as projectile weapons improved.

Medieval soldiers used a variety of weapons for hand-to-hand combat. All knights carried swords with them, and the best soldiers were expected to be skilled at swordplay. A sword consisted of a long blade and a handle called a hilt. Hilts could be made to accommodate one or two hands. Basic hilts were topped with a crosspiece that kept an opponent's sword from sliding down the blade and striking the soldier's hands. Some later swords had more elaborate hand guards. At the end of the hilt was a lump of metal called a pommel, which served as a counterweight to the blade. Sword blades could have one or two cutting edges, and the blades could be curved or straight, depending on how they were meant to be used. Most swords had a sharp point at the end to allow stabbing thrusts. Sword blade lengths varied greatly. The Vikings in the 800s used a sword that was about 3 feet long with a hilt that was usually held in one hand. Blades grew slightly longer during the 11th and 12th centuries. The long sword was com-

mon in the 14th through 16th centuries. It had a thinner and lighter blade than earlier swords and a long hilt that allowed the user to swing it with both hands. During the 15th century bastard swords appeared. These swords had a hilt that was short enough to be held in one hand but with a little extra space to accommodate a second hand if necessary, making them more versatile than earlier swords.

Many soldiers carried small blades called daggers in addition to their swords. A dagger had a hilt like a sword and a double-edged blade that was typically between 6 and 12 inches long. Daggers were useful as an extra stabbing weapon during hand-to-hand combat. Soldiers wore both swords and daggers in sheaths hung from their belts. Not all would-be fighters could afford swords, nor could they spend time learning the intricacies of knightly fighting. Still, there were a variety of cheaper weapons available in the medieval period. The most primitive type of weapon was a simple club, a heavy object on a handle designed to batter the enemy. Maces were blunt heavy heads mounted on long handles. They were useful for bludgeoning opponents whose armor could turn aside sword blades. The morning star was a mace with multiple points attached to its head, making it resemble a starburst. The flail was a long handle with a heavy metal ball, sometimes spiked, hanging from it on a chain. The user would swing the ball around and use centrifugal force to magnify the impact of his blows.

Medieval people occasionally fought with long sticks called quarterstaves. Quarterstaves were generally not lethal, but they were useful because they were cheap and easy to make and could be used both as clubs and as spears. Battle-axes were cheaper than swords. They were lighter than axes used on wood and had large, sharp blades. Battle-axes could be designed to be held in one or two hands. Some featured points on their ends so that they could be used as stabbing weapons as well. Spears and lances were useful for combat on horseback or on foot when there was a short distance between combatants. Medieval soldiers used throwing spears, or javelins, and spears mounted on longer poles, or pikes, designed to be thrust at the enemy by a stationary soldier. Knights used lances in jousting and in cavalry engagements.

Soldiers used bows and arrows throughout the medieval period. A bow consisted of a piece of wood bent into a curve and held in that position with a length of string that was affixed to each end. Bows shot arrows, which were straight sticks with points at their tips made of metal or another hard substance. Feathers attached to the end of the arrow helped it fly straight. The back end of the arrow had a notch in it. To shoot his bow, an archer would place the notch over the bowstring to hold it in place, pull back the string to increase the tension behind the arrow, and then release the string, sending the arrow flying. For much of the medieval period archers were rather

lowly soldiers in armies, ranking far below the knights who fought on horseback. Nevertheless, archers were very useful for quick raids and for attacking an enemy at a distance.

The introduction of the longbow in the 13th century made archery temporarily a powerful military weapon. A longbow could range from 4 to 7 feet long and had a much stronger draw than earlier bows. This gave it a longer range and much greater strength than its predecessors. Armies used groups of longbowmen to shoot large numbers of arrows rapidly, up to 20 arrows a minute. These massed archers did not aim at particular individuals but simply fired their shots rapidly into the opposing army, counting on the number of arrows to do significant damage. The English army made great use of longbows during the Hundred Years' War, and they were a deciding factor in English victories at the battles of Crécy (1346) and Agincourt (1415). The longbow fell into disuse around 1500 as firearms became more common. Longbows were actually more effective weapons than early guns, but they were extremely difficult to use and required years of training and regular practice. Longbow archers were



Viking battle-axes and spears, Britain, ca. 840–1020 (© Museum of London)

expensive specialists, and rulers eventually decided that they were not worth the money.

The crossbow was a common projectile weapon between about 1100 and 1500. It was a small bow with a string mounted horizontally on a stock and an attached mechanism that could draw back the bow and release it when the soldier pulled a trigger. On some crossbows the string was drawn by hand; most bowstrings were too tight for this to be possible, however, so crossbows often had some sort of mechanical device such as a lever or windlass to draw the string back. Starting in the 1300s the trigger was made of metal, such as bronze, iron, or steel. Instead of arrows, crossbows fired short metal bolts. Crossbows had several advantages over ordinary bows. They were easy to use, so a crossbowman did not require lengthy training. They were also small and easy to carry. A crossbow bolt could hit an enemy with a great deal of energy, making them quite effective. Crossbowmen fought both on horseback and on foot.

Firearms arrived in Europe from Asia in the 13th or 14th century. These early guns used gunpowder to fire projectiles. They were not especially efficient or accurate, but when they hit an enemy, they could do more damage than bows or crossbows. The introduction of firearms was the main factor in the escalation of armor into heavy plate during the late medieval period. Medieval armies used some long-range artillery weapons. Catapults were devices that could hurl objects high into the air and some distance, which made them useful for getting weapons into cities or castles under siege. The objects thrown could be nearly anything, including stones, arrows, burning pitch, beehives, dead animals, and the bodies of people who had died of the Black Death. In the early medieval period armies still used the ballista, a type of catapult favored by the Romans. The trebuchet was a large, powerful, and fairly accurate counterweight catapult that was used throughout the medieval period. The culverin was an early type of cannon that appeared in France during the 1400s.

Many medieval soldiers wore armor to protect themselves from the weapons of their enemies. Soldiers who could not afford anything better might wear leather helmets and jackets that offered little protection against sharp blades and projectiles. Roman soldiers had worn solid metal plates as armor, but early medieval smiths lost the technology needed to produce wearable sheets of metal. Instead they made mail, sometimes called chain mail because it appears to be made of metal chains. Mail was a type of armor formed of interlocking metal links. It could be made into a flexible metal shirt that would ward off some blows and stabs. Although mail was fairly heavy because it was made of metal, it was considerably lighter than plate mail and allowed much more freedom of movement.

During the late medieval period smiths began adding bits of solid metal to mail to make it more impervious to blows. Sometimes they affixed numerous metal disks to the chains, similar to a fish's scales. They added larger metal pieces to the arms and legs. During the 1200s soldiers began wearing metal plates attached to leather shirts. By the 1300s armorers could make solid plates to cover the chest, neck, arms, feet, and shins. Knights continued to wear mail under these plates as protection for vulnerable joints, such as the armpits. Finally, starting in the late 14th century, knights encased themselves completely in solid metal armor with full metal helmets. Sometimes horses also wore full plate armor. The reason for this escalation of armor was the invention of better projectile weapons, including improved crossbows and early firearms. Full suits of armor could stop many projectiles, though the soldier wearing plate armor paid a heavy price in money, discomfort, and lost mobility.

Throughout the medieval period knights carried shields. A soldier would hold his shield in his left arm and use it to protect himself from blows while wielding a sword or other weapon in his right arm. A shield was also a convenient place on which to display a coat of arms, a combination of images that identified the soldier.

THE ISLAMIC WORLD

BY KIRK H. BEETZ

In the seventh century the soldiers of the Islamic world had access to weapons and armor brought from India by sea, from Axumite workshops in Yemen, from the Byzantine Empire, and from the Sassanid Empire. Each individual soldier was responsible for purchasing and maintaining his own weapons and armor. Coats of chain mail were the best armor available but were very expensive because of the painstaking work required to make and interlock the small rings of steel. The Islamic army that invaded what is now Afghanistan had more than 50,000 troops and only 350 coats of chain mail. In the era of Muhammad (ca. 570–632) most soldiers had no armor of any kind and were fortunate to have shields. Many had helmets consisting of four bars stretching from an iron rim to meet at a peak at the top, with leather on the interior of the helmet filling the gaps between the bars. Shields tended to be lightweight and small. Some Muslims took it to be a sign of courage and honor not to wear armor into battle. Husayn ibn Ali (626–80) fought without armor in the battle of Karbala in 680, during which he was martyred. Thereafter Muslim leaders who were clearly on the losing side in a war would sometimes enter their final battles without armor in order to be martyred as Husayn ibn Ali had been.

The primary weapon of the infantry was a composite bow, made by interlaying different kinds of wood and ivory to give the bow flexibility and strength where they were most needed. Masses of archers were crucial to success when Muslims left Arabia to invade the Sassanid and Byzantine empires. The principal weapon for hand-to-hand fighting was a short sword, double-edged and pointed for both hacking and thrusting. Many soldiers had only knives. Others carried javelins, iron-tipped spears, or iron maces. Warhorses were rare and well cared for. Their riders were the social elite of the Islamic world; they were men of wealth and high position in their clans or towns. They were the likeliest to have body armor, and they often carried lances as well as swords. The early Islamic army looked like a motley of colors and gear, but even though they had a ragged appearance, they were very disciplined fighters.

During the Umayyad Dynasty (661–750) felt armor for horses and soldiers was introduced. This armor was cloth of wool and fur. It was sufficient to absorb arrows shot from far away and most slashing from swords, but spear thrusts could penetrate it. Battles against the Byzantine Empire had introduced the Muslims to Greek fire, which they called *naft*. Greek fire was a blending of minerals, such as sulfur and petroleum, that could be fired from large squirt guns as if it were water. When ignited, the Greek fire clung to whatever it struck and resisted being put out by water. Had the field generalship of the Byzantines been more competent, this weapon could have turned back the tide of Muslim soldiers. As it was, it contributed to the Byzantine Empire's continuing dominance of the waters of the eastern Mediterranean because it was used to set opposing ships on fire. The military of the Umayyad Dynasty learned to make *naft*, and Muslim armies of the Near East used it through the rest of the medieval era.

The Umayyad Dynasty created a full-time professional army and built garrison towns to house troops and their dependents. Soldiers of all ranks were supplied with helmets, usually of solid iron, with a flap of chain mail that hung from the back of the helmet over the back of the neck. This flap of chain mail would remain a common feature of Islamic helmets. Helmets of the seventh to ninth centuries tended to be open faced, but some had nose guards, which were common features of helmets in enemy armies. Swords became favored for all troops for close-in fighting. Under the Umayyad Dynasty the swords were straight and long, with iron or brass hilts and handles. When not in use, a sword was held in straps so that it was slung over the soldier's back or hung at the soldier's waist.

During the ninth century soldiers fighting in eastern Iran against holdout provinces from the defunct Sassanid Empire introduced a new kind of sword to Muslim troops. These swords were made in India of a special kind of steel, now called damascened steel. The term refers to the city of Damascus in



Armor, forged steel, Turkey, 15th–16th centuries (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA [M.2002.1.584a-b])

Syria, where European merchants first saw steel that had been manufactured in India. Archaeologists and modern metallurgists have proposed several possibilities as to why the steel from India was very flexible and very hard. A sword made of damascened steel could bow to either side without breaking or losing strength. In addition, it held an edge so sharp and tough that 13th-century European crusaders said that when wielded by an expert swordsman, the sword could cut through steel helmets and iron chain mail; the sword could cut men in two. The likeliest reasons for the fearsome qualities of damascened swords probably came from two significant factors. One factor that the Indian metallurgists could not control was a trace of vanadium in the steel from where it was mined—about 0.003 percent vanadium. The other factor depended on the exceptionally advanced skills of the people who refined the ore. A process of heating in crucibles, hammering, and annealing repeatedly created layers of vanadium mixed with carbon nanotubes that produced the glistening swirls typical of the side of a damascened sword. This product is called wootz steel.

The swords the Muslims found in eastern Iran were curved and intended for slashing, not thrusting. A top-quality sword from India would have soft, low-carbon iron inside a casing of wootz steel; this construction gave the sword its flexibility while retaining a very sharp edge. The process of dousing in water, hammering, and repeating caused the interior iron to become denser, decreasing its volume and making

the sword curve naturally. During medieval times only the swords made in Japan were superior. The scimitar eventually became the blade of choice for most Muslim soldiers during the medieval era. The best scimitars had decorations on their sides and often featured Arabic script that proclaimed the swords' best qualities.

Until about the 1190s, the era of the First Crusade, the Islamic world depended on India and Egypt for its best weapons and armor. Egyptians were especially esteemed for their chain mail, which remained very expensive. Perhaps the disadvantage of Muslim troops who faced better-armored European troops increased demand for chain mail enough for weapons and armor manufacturing industries to arise in Syria and Yemen, where Indian techniques were imitated. Although they were not rated by Islamic soldiers as highly as weapons from India, the weapons from Syria and Yemen were still valued, as were the helmets, shields, and coats of chain mail from these regions.

The use of horses outfitted in chain mail probably began in the 10th century, but only along the border with the Byzantine Empire, where Islamic horsemen faced Byzantine horsemen whose horses were commonly armored. By the 10th century Islamic armies were switching from dependence on infantry to cavalry, and outfitting war horses as well as their riders became an increasing priority because of frequent confrontations with well-armored European knights. When the invasion of the First Crusade began, the armies the crusaders faced were still too lightly armed and armored to fight pitched battles against the Europeans, and a number of battles ended in disasters. To be sure, a general failure of political leadership contributed greatly to the losses of the Muslim armies, but European horsemen were able to absorb more blows and to deliver heavier blows than could their counterparts. Adaptations to the challenges of the European horsemen included lassos, with which to rope and pull down an enemy. Islamic horsemen used lances in ways similar to the Europeans, and they still used swords, maces, spears, and bows.

It took hundreds of years for Islamic armies to retake lands lost to the crusaders. In the process they had to lay siege to walled cities and fortresses. The armies of Islam had never been good at laying siege. Their primary siege weapons were ancient ones: the catapult and the testudo, an armored device with a top under which soldiers could hide while advancing to the wall of an enemy fortification, looking somewhat like turtles. The conquest of Antioch during the First Crusade had demonstrated that just surrounding a city and starving it into submission were not always effective; by overcoming Antioch's formidable defenses with siege engines that enabled European soldiers to enter the city, the crusaders took control of Antioch before a relief army could arrive to aid the city. This siege was a challenge that the armies of medieval Islam did not fully meet; the Christian-held city of Tyre withstood two sieges by Muslim armies during the era of the great commander Saladin (1137 or 1138–93).

Although much of the Islamic world was conservative in its choices of weapons and battlefield tactics, the armies in al-Andalus strove to keep pace with enemies who had access to Europe's latest weaponry. Much of the warring against the Christian kingdoms of the north and among the many Muslim kingdoms of al-Andalus involved traversing mountains. Muslim armies used javelins, slings, bows, and crossbows to defend mountain passes, usually with success. In 1394 Granada used firearms to repel an enemy army. As the Christian kingdoms advanced deeper into al-Andalus, many Muslims and Jews fled, some to North Africa and others to Anatolia, where they may have contributed their knowledge of firearms to the armies of the Turks. Near the end of the medieval era the Ottoman Turks would learn to use canons with effectiveness against opposing fortifications.

See also ART; CLOTHING AND FOOTWEAR; CRAFTS; DEATH AND BURIAL PRACTICES; EMPIRES AND DYNASTIES; HUNTING, FISHING, AND GATHERING; METALLURGY; MILITARY; RELIGION AND COSMOLOGY; WAR AND CONQUEST.

Europe

~ Jean Froissart: Excerpt from "On the Hundred Years War" (1337–1453) ~

THE BATTLE OF CRECY (1346)

The Englishmen, who were in three battles lying on the ground to rest them, as soon as they saw the Frenchmen approach, they rose upon their feet fair and easily without any haste and arranged their battles. The first,

which was the prince's battle, the archers there stood in manner of a herse and the men of arms in the bottom of the battle. The earl of Northampton and the earl of Arundel with the second battle were on a wing in good order, ready to comfort the prince's battle, if need were.

(continued)

(continues)

The lords and knights of France came not to the assembly together in good order, for some came before and some came after in such haste and evil order, that one of them did trouble another. When the French king saw the Englishmen, his blood changed, and [he] said to his marshals: "Make the Genoways go on before and begin the battle in the name of God and Saint Denis." There were of the Genoways crossbows about a fifteen thousand, but they were so weary of going afoot that day a six leagues armed with their crossbows, that they said to their constables: "We be not well ordered to fight this day, for we be not in the case to do any great deed of arms: we have more need of rest." These words came to the earl of Alencon, who said: "A man is well at ease to be charged with such a sort of rascals, to be faint and fail now at most need." Also the same season there fell a great rain and aclipse with a terrible thunder, and before the rain there came flying over both battles a great number of crows for fear of the tempest coming. Then anon the air began to wax clear, and the sun to shine fair and bright, the which was right in the Frenchmen's eyes and on the Englishmen's backs. When the Genoways were assembled together and began to approach, they made a great [shout] and cry to abash the Englishmen, but they stood still and stirred not for all that: then the Genoways again the second time made another

leap and a fell cry, and stept forward a little, and the Englishmen removed not one foot: thirdly, again they lept and cried, and went forth till they came within shot; then they shot fiercely with their crossbows. Then the English archers stept forth one pace and let fly their arrows so wholly [together] and so thick, that it seemed snow. When the Genoways felt the arrows piercing through heads arms and breasts, many of them cast down their crossbows and did cut their strings and returned discomfited. When the French king saw them fly away, he said: "Slay these rascals, for they shall let and trouble us without reason." Then ye should have seen the men at arms dash in among them and killed a great number of them: and ever still the Englishmen shot whereas they saw thickest press; the sharp arrows ran into the men of arms and into their horses, an many fell, horse and men, among the Genoways, and when they were down, they could not relieve again, the press was so thick that on overthrew another. And also among the Englishmen there were certain rascals that went afoot with great knives, and they went in among the men of arms, and slew and murdered many as they lay on the ground, both earls, barons, knights, and squires, whereof the king of England was after displeased, for he had rather they had been taken prisoners.

From G. C. Macauly, ed., *The Chronicles of Froissart*, trans. Lord Berners (London: Macmillan and Co., 1904).

The Islamic World

Excerpt from *De expugnatione Terrae Sanctae per Saladinum* (*The Capture of Jerusalem by Saladin, 1187*)

The Holy City of Jerusalem was besieged on September 20. It was surrounded on every side by unbelievers, who shot arrows everywhere into the air. They were accompanied by frightening armaments and, with a great clamor of trumpets, they shrieked and wailed, "Hai, hai." The city was aroused by the noise and tumult of the barbarians and, for a time, they all cried out: "True and Holy Cross! Sepulchre of Jesus Christ's resurrection! Save the city of Jerusalem and its dwellers!"

The battle was then joined and both sides began courageously to fight. But since so much unhappiness

was produced through sorrow and sadness, we shall not enumerate all the Turkish attacks and assemblies, by which, for two weeks, the Christians were worn down. . . . During this time it seemed that God had charge over the city, for who can say why one man who was hit died, while another wounded man escaped? Arrows fell like raindrops, so that one could not show a finger above the ramparts without being hit. There were so many wounded that all the hospitals and physicians in the city were hard put to it just to extract the missiles from their bodies. I myself was wounded in

the face by an arrow which struck the bridge of my nose. The wooden shaft has been taken out, but the metal tip has remained there to this day. The inhabitants of Jerusalem fought courageously enough for a week, while the enemy settled down opposite the tower of David.

Saladin saw that he was making no progress and that as things were going he could do no damage to the city. Accordingly, he and his aides began to circle around the city and to examine the city's weak points, in search of a place where he could set up his engines without fear of the Christians and where he could more easily attack the town. . . .

The tyrant [Saladin] at once ordered the engines to be constructed and balistas to be put up. He likewise ordered olive branches and branches of other trees to be collected and piled between the city and the engines. That evening he ordered the army to take up arms and the engineers to proceed with their iron tools, so that before the Christians could do anything about it, they would all be prepared at the foot of the walls. The cruelest of tyrants also arrayed up to ten thousand armed knights with bows and lances on horseback, so that if the men of the city attempted a foray they would be blocked. He stationed another ten thousand or more men armed to the teeth with bows for shooting arrows, under cover of shields and targets. He kept the rest with himself and his lieutenants around the engines.

When everything was arranged in this fashion, at daybreak they began to break down the corner of the

tower and to attack all around the walls. The archers began shooting arrows and those who were at the engines began to fire rocks in earnest.

The men of the city expected nothing of the sort and left the city walls without guard. Tired and worn out, they slept until morning, for unless the Lord watch the city, he labors in vain who guards it. When the sun had risen, those who were sleeping in the towers were startled by the noise of the barbarians. When they saw these things they were terrified and overcome with fear. Like madmen they yelled out through the city: "Hurry, men of Jerusalem! Hasten! Help! The walls have already been breached! The foreigners are entering!" Aroused, they hastened through the city as bravely as they could, but they were power less to repulse the Damascenes from the walls, either with spears, lances, arrows, stones, or with molten lead and bronze.

The Turks unceasingly hurled rocks forcefully against the ramparts. Between the walls and the outer defenses they threw rocks and the so-called Greek fire, which burns wood, stone, and whatever it touches. Everywhere the archers shot arrows without measure and without ceasing, while the others were boldly smashing the walls. . . .

The Chaldeans [Saladin and his army] fought the battle fiercely for a few days and triumphed.

From: *De expugnatione Terrae Sanctae per Saladinum*, ed. Joseph Stevenson (London: Longmans, 1875); trans. James Brundage, *The Crusades: A Documentary History* (Milwaukee, Wisc.: Marquette University Press, 1962).

FURTHER READING

- James Chambers, *Ancient Weapons: An Illustrated History of Their Impact* (Oxford, U.K.: ABC-CLIO, 2006).
- Albert Hourani, "The Making of a World (Seventh–Tenth Century)," in his *History of the Arab Peoples* (New York: Warner Books, 1992).
- John Keegan, *A History of Warfare* (New York: Alfred A. Knopf, 1994).
- Robert E. Krebs and Carolyn A. Krebs, *Groundbreaking Scientific Experiments, Inventions, and Discoveries of the Ancient World* (Westport, Conn.: Greenwood Publishing Group, 2003).
- Steven A. LeBlanc and Katherine E. Register, *Constant Battles: The Myth of the Peaceful, Noble Savage* (New York: St. Martin's Press, 2003).
- James E. Lindsay, "Warfare and Politics," in his *Daily Life in the Medieval Islamic World* (Westport, Conn.: Greenwood Press, 2005).
- John Powell, *Weapons and Warfare*, vol. 1 (Pasadena, Calif.: Salem Press, 2002).

- Eduard Wagner, Zoroslav Drobna, and Jan Durdik, *Medieval Costume, Armour, and Weapons* (Mineola, N.Y.: Dover, 2000).
- Weapon: A Visual History of Arms and Armor* (New York: DK Publishing, 2006).
- Weapons: An International Encyclopedia From 5000 B.C. to 2000 A.D.* (New York: St. Martin's Griffin, 2007)

► weights and measures

INTRODUCTION

One of the important differences between the medieval world and the modern one may be found in weights and measures. In most cultures of the present, people who buy something that is supposed to be an inch in diameter or weigh 10 pounds

know what they are getting and can measure or weigh their purchases to accurately test them. Just imagine considering the purchase of a tool set and not having the matching tools of various sets be of uniform size, instead being the sizes that were determined by each craftsperson who worked on manufacturing the tools. This would make wrenches unusable; how would any home mechanic repair an automobile engine if the tools and the automobile parts did not mesh? But in almost the entire medieval world, standard weights and measures either did not exist or, when a government set standards, the standards were ignored.

An industrial economy with mass production would be almost unattainable without standard weights and measures, and their absence in medieval cultures meant that achieving a modern-style economy was impossible. This did not stop political leaders with foresight from trying to take the step that could have transformed their economies into fully consumer-based economic engines. Certainly, the Chinese tried repeatedly to make the leap, from the short-lived Qin Dynasty (221–206 B.C.E.) all the way through the Ming Dynasty (1368–1644). Instituting universal standards for weights and measures aided China greatly in its industrial development; its craftspeople were able to mass-produce metal and ceramic household goods in factories, thereby not only satisfying the needs of consumers but also creating employment for semi-skilled or unskilled workers who did not need to have the experienced eye and skills of a craftsperson in order to help produce goods. Marketplaces were easier to regulate with universal weights and measures in place. But China had difficulty maintaining standardized weights and measures. Wars and rebellions overthrew Chinese governments, and often China was divided in several nations. People who lived outside cities, in places where government regulators had trouble reaching them, tended to prefer their local ways of judging a length or a weight.

During the medieval era several governments recognized the value of standardized weights and measures for their marketplaces. Such weights and measures made taxing people's transactions easier. They increased confidence of both local and foreign traders in the honesty of the marketplace, which in turn inspired more commerce in the marketplace. The empires of Mali and Songhai of western Africa tried to impose standardization but met with determined resistance among the rural peoples of their territories, who clung to their traditional ways of weighing and measuring. The city-states of East Africa were somewhat more successful, although some of their measures remained vague; their prosperity depended on international trade, and at least some broadly recognized that measures were necessary to foster such trade. The Islamic world saw many efforts to standardize weights and measures,

which usually were at least partly unsuccessful because the Islamic world encompassed many diverse local cultures in which people wished to retain their comfortable old ways of weighing and measuring. Even so, the Islamic world did manage to introduce a system of weights that proved valuable from the Near East to sub-Saharan Africa, even though the standards of the system varied somewhat from time to time and place to place.

So how did most medieval people weigh and measure things? The approaches to weighing and measuring had logic to them, despite being vague. People used body parts and the limits of human movement to create loose ways of quantifying their work. The most common measures were spans, cubits, feet, and paces. A span was usually the width of a palm; a cubit was typically the length from the elbow to the tip of the outstretched middle finger; the foot was the length of a person's foot; the pace was the length of a person's stride. Some cultures ignored weighing altogether, instead using volume to measure both liquids and solids. This worked for wine and grains but was unsuitable for solids such as silver. Sometimes a person had to use a trained eye or just lift up goods in order to judge their weight. Such ways of measuring would be maddeningly imprecise for many modern peoples, but for people living in villages and towns, often remote from cities, such ways of measuring could be satisfactory. For instance, if a house were being built with local labor, its size relative to other houses would not be as important as that its own measurements be made by a single craftsperson, perhaps the chief builder, whose feet would be used for measuring all posts, whose hands would be used for measuring all windows, and so on.

AFRICA

BY KIRK H. BEETZ

The peoples of Africa had a multitude of systems of weights and measures. Sometimes weights and measures varied for every village in a region. Most medieval African cultures had weights and measures, but modern scholars usually do not know exactly how these systems compare to modern systems of measurement or even what words were used for specific weights and measures.

It seems that for all African cultures of medieval times, body parts served as the inspirations for measurements. Archaeologists refer to measurements for length and distance as the span, the foot, the cubit, and the pace. A span was the distance across a palm of a hand. This measure was often divided into fingers, often meaning the distance between thumb and forefinger. Such short measurements were used for small manufactured objects, such as wooden images, ivory carv-

ings, and small household goods. In central Africa a post used for building a house was often measured by someone walking next to the post on the ground, heel to toe, giving its length in feet; sometimes the post would be measured in paces, the distance of a person's stride from heel to heel.

Cubits were universally used for measuring textiles, although the definition of a cubit and its actual length varied. In general, a cubit was the distance from a person's elbow to the tip of his or her outstretched finger. In East Africa a cubit was the length from a buyer's elbow to the tip of the middle finger, and buyers often brought long-armed friends with them to market to buy cloth. In Benin the cubit was determined by the length from the seller's elbow to the tip of the middle finger, and consequently the sellers with the longest arms did the most business. Some cultures in western and central Africa used three variations of cubits. A short-armed person's cubit was the length from the elbow to the tip of the outstretched middle finger plus an additional fold back of cloth on the middle finger. An average-armed person would have the standard cubit. A long-armed person would have a cubit ending at one of the knuckles of the middle finger. Even with these modifications of the cubit, sellers who tried to cheat customers on lengths were a persistent problem, even in societies with market inspectors.

A fundamental problem with all these measurements of length is that they were approximations. They worked satisfactorily in many cultures composed of independent villages, each village having people with the basic skills necessary for homebuilding, farming, smithing, and carpentry. In a large trading society with greater specialization of crafts, the absence of universally standard weights and measures could cause difficulties. For example, if a skilled craftsman in one town made a window frame for a purchaser in another town, the frame might not fit the window opening. This chronic problem was not fully solved in medieval Africa, although some governments periodically tried to impose standardized weights and measures throughout their lands. With much determination, Africans resisted efforts to modify their traditional ways of weighing and measuring; thus, only in the weighing of gold and salt did established standard weights take hold.

Of all the commodities of medieval Africa, gold may have been most in demand wherever there were urban areas. Controlling the trade in gold was part of the business of kingdoms and empires because their economies depended on gold for purchasing goods from traders. The western African empires of Ghana, Mali, and Songhai were the most famous of all gold-trading societies, but Ethiopia and the East African city-states also traded large quantities of gold. In western Africa governments distinguished between two types of gold:

gold dust and solid gold. Gold dust was used for everyday trading in markets, whereas solid gold belonged exclusively to the central government. The government would sometimes render gold nuggets into powder for use in public trading.

Most of these African cultures lacked scales for weighing objects. In general, weight was determined by holding two different objects, one on each outstretched palm, and judging their relative weights. Studies of people of the Congo River area show that they were very good at making such judgments as well as at judging by eye alone the volume of grain. Even so, such fuzzy measurements were inadequate for assuring traders that they were getting their full value in gold for their goods. The Mali and Songhai empires turned to Islamic weights and measures to help them, with the *mithqal* becoming the most important unit of measurement. The *mithqal* filtered out of the empires of western Africa through most of central Africa, and it was the primary unit for measuring gold in west Africa and central Africa when the Portuguese began arriving on the west coast of Africa.

Exactly how the *mithqal* of gold dust was determined by medieval Africans is not known for certain. In the case of Mali and probably Songhai as well, a *mithqal* probably followed the practice in the Islamic world that 1 *mithqal* equaled one golden dinar, a coin. The weight of a *mithqal* of gold dust



Weight for measuring gold dust, Ghana, Côte d'Ivoire, as early as the 15th century (National Museum of African Art, Smithsonian Institution, Photograph by Franko Khoury, Gift of Philip L. Ravenhill in memory of Sylvia H. Williams, 96-42-1.6)

could be determined by comparing it to the weight of a dinar, either a golden coin or an object made to equal a dinar's weight, such as glass coins made in the Islamic world for measuring against real coins. An animal skin could be filled with gold dust, sealed by a market official, and marked with a symbol denoting its value in mithqals. Even in societies that were otherwise nonliterate, such symbols were well understood. During the 15th century and perhaps earlier, people in the Niger River region developed another practice that resulted in the production of frequently charming artifacts: brass or bronze figurines or geometrical images. These are best known from the Asante of the 17th century and later but were apparently in circulation before the Asante culture became prominent. Shaped like people, animals, plants, and household objects, or in symbolic patterns, these generally came in three sizes: A large mithqal was about 0.15 ounces, a small mithqal was about 0.12 ounces, and an ackie was about 0.06 ounces. Every trader carried a set of 10 to 12 of these weights, which could be compared with the weights of customers to determine how much gold was involved in a transaction.

The region of medieval Africa that developed the most refined system of measurements was probably East Africa, whose city-states depended on international trade for their survival and therefore would wish for measurements that everyone could understand. Despite the influence of Islam on the cities, local African measurements seem to have become the basis for the East African measuring system, also sometimes called the Swahili system. The demands of trade called for standardized weights. In much of Africa the terminology for weight varied with the product being weighed. That is, the terms for weight varied depending on whether rice, wheat, or some other grain was being weighed. Examples of how different units of measurement could be used for different products may be found in the practices of the Ganda in modern-day Uganda. For them, salt was measured by lubya, possibly 30 pounds or more; sweet potatoes were measured by lutata, perhaps 30 pounds; and coffee was measured by kiribwa, perhaps 20 pounds. Gandans used gourds to measure liquids.

In East Africa the weights were wakia, about 1 ounce; ratli, 16 wakia; and frasila, 36 ratli. Measuring volume was somewhat more complex; these units of measure included kibaba, about 1 pint; kisaga, 2 kibaba; and pishi, 2 kisaga. In addition were two methods for measuring grain: kibaba cha mfuto, which was a level kibaba, and kibaba cha tele, which was a heaped kibaba. Measuring length had similar complications: Shibiri was 1 span, mkono was 2 shibiri, and pima was 4 mkono. For length of textiles the mkono mkonde was a short cubit, perhaps less the middle finger, and the mkono mkamili was a full cubit. These two lengths were determined by the buyer's arm.

Even though it was an ancient civilization, Ethiopia does not seem to have developed the kind of standardized system used in the East African city-states or attempted by the western African empires of Mali and Songhai. Axum, the kingdom that gave rise to Ethiopia, had developed a standardized system for its coinage by the medieval era. The values of its coins were determined by weight. The most important coin was gold and contained from 0.09 to 0.10 ounces of gold. Silver coins contained from 0.74 to 0.90 ounces of silver. Axum seems to have had market inspectors, suggesting that it had standards for measuring goods, but those standards await more archaeological discoveries. Standardized weights and measures would have been employed mostly in towns and cities, where most of Axum's coins were used. Rural areas would have used local traditional ways of weighing and measuring.

Ethiopia used imprecise measures throughout the medieval era. For short lengths Ethiopians used the span of a palm, four fingers, a finger joint, and the width of a finger. Longer lengths were measured in cubits and fathoms; fathoms were about two arm lengths. For long distances, measurements were expressed in days of travel. For example, the city of Axum was six days' travel from Adulis, the kingdom's main port city. An Ethiopian acre was the area that could be plowed in a day by a farmer using two yoked oxen. Ethiopians did not use weight to measure grain or liquids. Small units of volume were mouthful, handful, and armful, with large units measured as mule loads. Made to hold a particular one of these measurements were baskets, horns, sewn skins, and bowls of gourds, wood, or clay.

THE AMERICAS

MICHAEL J. O'NEAL

The existence of a system of weights and measures depends, first, on the development of a mathematical system. Measuring land, weighing commodities, and the like require a system of counting and manipulating numbers, in particular, through multiplication and division. Just as a modern yard is divisible into 3 feet and a foot is divisible into 12 inches (and the reverse: an inch multiplied by 12 equals a foot, and so on), so any meaningful system of measurement depends on small units that make up larger units, which in turn make up yet larger units. Mathematicians typically refer to this process as metrology, the science of measurement and the mathematics of measurement.

Second, the existence of a system of measurement presupposes that the culture that produces it has a reason for having it. Typically, in the Americas before the Europeans arrived, there would have been at least three reasons for measuring and weighing. One was to allocate land and by exten-

sion to compute taxes, usually in the form of a percentage of a crop, that a farmer owed to a ruler. But such cultures as the Inuit of the sub-Arctic regions of North America or the numerous Indian nations that inhabited most of North and South America did not allocate land. Land was not regarded as private property; rather, to the extent that it was “owned,” it was owned communally, often in the name of a ruler. This would have been particularly true of groups that continued to live primarily by hunting, fishing, and gathering. As might be expected, these groups did not have a system for measuring lengths, nor did they have an understanding of geometry that would have allowed the calculation of the size of a parcel of land, other than in the most general sense.

A second reason for developing a system of measurement would be to underpin the work of engineers and builders. While many bands built such structures as mounds, shelters, and grain-storage facilities, they did not create monumental architecture according to strict and precise specifications. Buildings tended to be improvised, not engineered. Such was not the case, though, with the Maya of Mesoamerica and the Inca of South America, who did design monumental architecture based on a system of measurement that enabled builders and engineers to construct buildings of remarkable symmetry and balance.

A third reason for having a system of weights and measures is to facilitate trade. Trading goods with other people is easier if there is a common system of measurement—if traders can agree on the value of, say, an ounce of gold or a bolt of cloth. But the peoples of North America or the Amazon rain forest, in particular, did not take part in complex trading networks. To the extent that they traded with other people, trade was conducted strictly by barter, where items were traded one at a time, or perhaps in small clusters. No sophisticated system of weights was needed to trade, for example, a particular basket of corn for something of equivalent value.

Since these reasons did not apply to them, many American groups did not have systems of weights and measures that extended beyond counting, or perhaps designating a longer unit of distance, such as the distance that a person could walk in a day. Like their ancient ancestors, they probably used body parts—the hand span, the knuckle, the length of an arm, a stride—to indicate relative lengths, and any items that needed it could be weighed in comparison to stones or other objects. The emphasis was on the particular, not the general.

This lack of a mathematics of measurement did not apply universally, however. The Aztec, for example, had a complex, sophisticated culture that teemed with economic activity. Records of land ownership were kept, with each parcel designated and its area measured. The basic unit of measurement was the *quahuatl*, a unit about 8 feet in length. Additionally,

Aztec cities featured markets that were often attended by thousands of people. Inspectors mingled with the crowd to ensure that goods were being sold at the proper prices (based not on currency but on units of exchange determined by the value of cloth and cacao beans). These inspectors also ensured that scales and measuring devices were accurate. Any vendor guilty of violating the laws could be fined. Those guilty of serious violations could be beaten to death in the middle of the marketplace. The Maya, too, had complex trade networks that required the ability to weigh commodities.

One of the primary features of Mayan measurement systems is that they seemed to be based on relative measures rather than absolute values. Note that the plural *systems* is accurate, for the surviving evidence shows that there was no single, uniform measurement system throughout the vast Mayan territories. Rather, each city, with its own set of builders, engineers, and land surveyors, applied its own system to its own building and measurement projects. Measurements taken of rooms, wall thicknesses, and the like show that while the system used for a specific building was internally consistent, and usually consistent with other buildings in the community, it differed in small ways from the system used in other locales. This seems strange in modern life where a foot, yard, meter, or any other unit of measurement is always precisely the same. However, in these medieval societies, such uniformity was not necessary. Building materials, for example, were found locally rather than shipped in from elsewhere, hence it sufficed that people in the region agreed on a unit of measurement. In Germany the length of a foot was not decided on until the 19th century, so the Mayan system is not all that unusual.

Despite the local nature of measurements, some generalizations can be made. The Maya appear to have used a system of measurement based on the rod, which was almost 58 inches in length. The rod was divided into either 16 “rules,” each divided in turn into 9 “marks” (*xóot*), or 9 rules divided into 16 marks. The result either way was 144 marks in a rod. This measurement was handy because 144 equals 12 squared. Furthermore, the use of a number such as 16 was useful because 16 can be progressively divided in half, into 8, then 4, then 2, then 1. Similarly, 9 can be conveniently divided into thirds. Note that the square root of 9 is 3, the square root of 16 is 4, and 4 times 3 is 12, the square root of 144. All of these correspondences and mathematical regularities suggest that Mayan builders, as well as land surveyors and others who needed to measure, emphasized the notion of uniform divisibility rather than absolute length.

Like premodern cultures the world over, the Maya of the medieval period used body parts as a basis for measurement. On the Yucatán Peninsula, the *oc* was a foot, roughly equiva-

THE SPANISH CONQUISTADORES AND UNITS OF MEASUREMENT

Much of what modern historians know about the cultures of Mesoamerica and South America before Europeans arrived is based on chronicles and records produced by the Spanish, usually written in the 1500s after the Spanish had conquered the people in these regions. Many of these documents were written by Spanish priests. Unfortunately, the Spanish destroyed nearly all written materials the Aztec, the Inca, and other peoples had produced. They did this for religious reasons primarily. They wanted to eradicate all elements of indigenous culture that supported the people's religious beliefs so that they could then convert the conquered peoples to Christianity more easily.

Although the various Spanish accounts, chronicles, and histories are written entirely from a Spanish perspective, these works nevertheless provide scholars with insights about the Inca. One of these Spanish writers was Pedro de Cieza de León (1518–60), whose three-part *Chronicle of Peru* has been invaluable to historians. Cieza was able to publish only the first part of his monumental work before he died. Part 3, which details Inca life, was published after his death. Cieza took note of units of weight and measurement that the Inca used, assigning Spanish names to them. Thus, according to Cieza, there was a unit of weight he called the arroba equal to about 25.3 pounds; a larger unit of weight was the quintal, equal to about 101.5 pounds. A fanega was equivalent to about 1.5 bushels, and a carga equaled about 3 to 4 fanegas. For vertical measurements, the Inca used the estado, about 5.5 feet. For longer measurements, the legua, or league, was about 3.5 miles.

Other chroniclers provided similar information. In two works, the *General History of Peru, Origins and Descent of the Inca* (1590–1600) and the similarly titled *General History of Peru* (1605), a priest named Fray Martín de Murúa recorded many details of Inca life. According to his account, the Inca used the thatki, a unit of length equal to about a pace, and there were 6,000 thatki in a tupu. A tupu, though, was a unit of area, not length, so there is an inconsistency that has not been resolved but that is indicative of the difficulties of pinning down these units.

lent to a person's foot, or 16 marks. The chekoc was the foot-step, approximately equivalent to a modern yard. A kab was a hand span (9 marks), and the zap or zapal was the distance of outstretched arms. The zapalche, or zap stick, was a common length for a walking cane, which was also used in land measurement.

Archaeological evidence, as well as testimony from 16th-century Spanish conquerors, strongly suggests that the Mesoamericans did not use scales nor did they have a system of weights. Rather, commodities were measured by volume. The Maya used such loose volume measurements as the arm-load, the fistful, and the load, consisting of a volume of corn, although sets of bowls with progressively descending measurements have been found that suggest, but do not prove conclusively, that they were used in measuring volumes of goods. Some evidence also suggests that the Maya could have used stone weights for measuring commodities.

The later Aztec also measured commodities largely by volume rather than weight. They employed a wooden box called a *quauhchiaquihuitl*, which was divided into 12 parts and used to measure goods such as grain. Additionally, they used sets of jars to measure liquids and cups, roughly equivalent to the modern ounce, to measure gold tribute payments. While surviving buildings allow archaeologists to take measurements and draw inferences about systems of measure-

ment, there is no corresponding way to make inferences about weights. Most of the Mayan written materials, along with those of the Aztec, were destroyed by the Spanish conquerors, so archaeologists continue to debate these matters because the historical record is almost entirely gone.

The Inca, like the Maya, relied more on relative rather than absolute measurements. They, too, used body parts for shorter measurements; the rok'ana, for instance, was about the length of a finger, the k'apa was just under 8 inches, or a hand span; the khococ was about 17 inches, perhaps the length of a forearm; and the rikra was about 5.3 feet, about the height of a person. Longer units, however, were based more on time (for example, the time that it took to walk a certain distance) rather than on a unit of linear measure. For land measurement, the tupu (or topo) was used. Although it remains uncertain what the measurement of a tupu was, it was probably in the range of 300 by 150 feet, or about one-eighth of an acre.

ASIA AND THE PACIFIC

BY KENNETH HALL

The standardization of weights and measures in Asia's medieval age was the result of the appearance of more complexly interdependent societies and economies. Regularization of

land measurements that defined property boundaries became necessary when marketplace and governmental activity required greater accuracy regarding income measurement and land-use rights. Governments required taxation, which was more efficiently collected when there was a system of standardized weights and measures. The establishment and regulation of weight and liquid standards and the equitable rates of exchanges of other commodities reflected the increasing volume and greater complexity of marketplace exchanges.

The weights and measures of medieval China were initially set by the Qin Dynasty (221–206 B.C.E.) by standardizing traditional weight and measure units derived from measurements of the human body. The shih unit of weight was equivalent to 132 pounds. The jin, which was roughly equivalent to a pound, was the normal Chinese weight standard, equaling 16 liang; a liang was 24 zhu. The dan unit of mass was associated with measurements of rice. A dan was equal to 10 dou (a peck), and a dou equaled 10 sheng (roughly a liquid quart). In the early records Chinese official's salaries were called dan, since they were paid in units of rice.

Chinese units of length included the cun (roughly 1 inch), the chi (9.8 inches), and the zhang (9.8 feet). Different professions had different standards of length, for example, a carpenter length, a mason length, and a tailor length. Another vital measurement of length was the bolt (pi) of cloth, equal to 4 zhang, which was frequently how peasants were required to pay taxes on their houses (in bolts of silk). The Chinese distance standard, a li, was roughly 1,640 feet. The chi was the basic historical unit of distance, set at 360 paces (bu, or roughly 1,895 feet) by the Qin Dynasty, revised to 1,364 feet by the Han Dynasty, and to 1,060 feet by the Tang Dynasty. The Chinese thought of 10,000 as being "very many."

Land measurements were calculated in mou, which fluctuated according to regional tradition from 0.2 to 0.3 acres. During the medieval era Chinese measurements of liquids and grains were further standardized and achieved greater accuracy through the use of vessels that were defined by their similar weight and pitch. When struck, these vessels produced a uniform pitch according to the weight or volume of their contents.

Japanese and Korean weights and measures were established in the eighth century, based on those then common in Tang China (618–906). The basic unit of length in Japan was the shaku, as demonstrated in a 1-shaku standard ruler displayed in a Nara temple dating to this era. One shaku equaled 0.33 yards, 10 sun, and 100 bu. A cho was 60 ken (1.9 yards) and 360 shaku. A jo was equal to 3.3 yards: 6 shaku equaled 1 ken; 10 shaku equaled 1 jo. The ken was the architectural standard, the measure of the distance between the support poles of a house (about 6 feet). Jo, the equivalent of a tatami

mat (used as floor covering), was the vital standard for the measurement of a room.

Japan's volume units were measured in go, equal to 100 shaku (about 0.01 liquid quart and 1.6 dry quarts); 10 go equaled a sho (1.9 liquid quarts and about 7 dry quarts); 10 sho equaled 1 to. A koku (goku) was 10 to, or about 58 liquid gallons or 50 dry gallons. Rice measurements were done in koku, roughly equal to 5 bushels of rice or 160 dry quarts. Koku yields of rice fields were important in determining the income potentials of lands subject to a samurai lord's authority.

Weight was expressed in momme units, equaling 0.1,323 ounce; 160 momme equaled 1 kin (1.3 pounds), which was just larger than a Chinese jin; 1,000 momme equaled 1 kan or 1 kamme (8.25 pounds). Distance was measured in cho, equal to 0.068 miles; 30 cho equaled 2.44 miles. Medieval-era Japanese modified the Chinese standard li to a ri, measuring 36 cho, equal to 2.6 miles. Land was measured in tan (0.2 acre), which equaled 10 se or 300 tsubo. A cho of land equaled 10 tan.

Korean measurements of length included the pun, equal to 0.1 inch; chi, 1 inch; cha, 11.8 inches; and kan, 70.9 inches. The Koreans adopted the Tang li of 1,060 feet as a measurement of distance traveled. Korean weight measures were the pun (0.0075 ounces), ton (0.075 ounces), nyang (0.75 ounces), kun (1.2 pounds), and kwan (8.3 pounds). Volume measurement standards were the hop (0.32 pints), toe (3.2 pints), mal (3.96 gallons), and som (39.6 gallons).

India and Southeast Asia used a variety of regional weight and measurement standards during the medieval era. As in east Asia, concern for measurement standards was related to increased marketplace activity, the need to define local income rights in increasingly hierarchical societies, and the need to determine appropriate rates of taxation payable to new centralizing governments. Indian and Southeast Asian records commonly address standards of gold; liquid and grain measures that quantified local production and marketplace exchanges; and units of land and land use (dry land, wet land, and cultivated and uncultivated lands) as the basis for establishing property rights, validating land transfers, and taxation.

A representative inscription dated 1236 from what is now Myanmar demonstrates the prevailing local use of a silver standard, the klyap, which referred to silver ingots that were weighed and given at each transaction, as the local basis of measurement. This inscription recounted the expenses of the local Buddhist temple, quoted in the marketplace standards: At that time five cows were purchased for 20 klyap, a quantity of toddy juice (coconut liquor) for five klyap, 248 tanale of milk for 25 klyap, 1,350 betel nuts for two klyap, four tan (bushels) of paddy rice for two klyap, and a white cloth for one klyap.

As trade in Southeast Asia became more important, the countries of the region tended to adopt international measures common to their chief trading partners. Burma, Thailand, and Cambodia tended to use Indian standards, while Vietnam and the kingdoms of Indonesia used Chinese standards. In Indonesia, in particular, these were retained even after the spread of Islam.

Polynesia lacked a sophisticated system of weights and measures in the Middle Ages, probably owing to the relatively low volume of trade in the area. Dry and wet measures were taken by using any handy familiar vessel as a temporary standard—a cumbersome but relatively common practice in many isolated areas in the Middle Ages. The basic unit of measure was the fathom (*etaeta* in the Tahitian dialect) or span between the fingers with the arms held outstretched. Large lengths (as in rope making) were reckoned in umi of 10 fathoms. Smaller lengths were just called remnants (*tapê*). Distances were reckoned in the time it took to walk or sail them. Time was calculated according to the rising and falling tides. The passage of time was reckoned in nights rather than days, probably because a lunar calendar was in use.

EUROPE

BY BRADLEY A. SKEEN

The metric system of measurement now standard throughout the world was devised during the French Revolution and did not exist during the Middle Ages. The so-called English system of measurement still used in the United States in the form of modern U.S. Customary Units was also standardized in modern times to make it suitable for industrial use and so has only a tenuous connection with medieval systems of measurement. What existed during the Middle Ages was an incredible confusion of different standards of weights and measures that might vary among locations within a few miles of one another because of different jurisdictions or just different traditions and might vary again from profession to profession.

Precise measurements are needed to facilitate the trade of goods and in building and manufacturing. The most common measurements are based on the human body—that is, on the body of the person making the measurement. They are very imprecise and not of much use to anyone else because they are not standardized. These include the finger (width), the palm (the length usually from the middle finger tip to the base of the palm), the span or hand (the width of the palm), and the cubit (the length from the tip of the middle finger to the elbow). Although one might logically measure all lengths in the same units or system of units, this was not the case in practice. Different systems of measurement were created for



Steelyard weight, an example of bronze weights that were slid along a balance arm until they counterbalanced the object being weighed, Britain, 13th century (© Museum of London)

different uses. The hand- and arm-based measures were usually applied to dimensions of objects. Measurement of distances over which one walked were reckoned in feet. The unit was the pace; that is, the distance between the spot where one foot rested on the ground while taking a step and the place that it came down on the ground again after a second step. It was convenient to measure longer distances in units of 1,000 paces (4,850 feet, after the Romans set 1 pace as the equivalent of 4.85 feet), which became known in the Middle Ages as a mile from the Latin word *mille* for “thousand.” Instead of miles, leagues were used to measure long distances. In England a league was 7,500 feet, and in France it was 10,000 feet (bearing in mind that the feet in question were not equal in length either).

Thanks to the political unity of the Roman Empire, the Romans had been able to establish some order on basic measurements, fixing standard lengths for each unit involved (although archaeologists have discovered that variation continued in practice), at least in the Western Roman Empire. In the Eastern Roman Empire the Romans had been able to standardize and impose a combination of the old Greek Attic and Olympian systems, which continued to be used into Byzantine times.

Once the Roman Empire collapsed, all practical possibility of standardization disappeared. Individual merchants,

stewards, carpenters, and other professionals whose work involved units of measure were cut off from precise knowledge of the old standards and left to devise their own standards and systems. For instance, the city of Paris had its own foot, as did royal officials in England and every city in the Rhineland and Flanders. Merchants from these areas constantly had to convert units when trading with one another. The modern standard foot is 12 inches long, but medieval feet could vary from a little under 10 inches to almost 16 inches. Medieval government officials were aware of the difficulties produced by this confusion of systems and sometimes made attempts to standardize matters. For instance, a new standard foot was based on the actual measurement of Charlemagne's foot (r. 800–14), and later Henry I of England (r. 1100–35) had the distance from the tip of his nose to his thumb measured to fix the yard. At one point the length of the French foot changed with each new monarch. How anyone could have thought such chaotic changing of basic units of measurement would help matters is difficult to see, but it was done because it was traditional. Not only was it traditional, officials for the most part were powerless to enforce any standards even among their own subjects (there was far too little governmental infrastructure to allow a corps of inspectors to be employed), and there was no international body capable of standardizing measures on a European-wide basis.

Despite the lack of standardization, new units of measure were introduced in the Middle Ages. The yard was originally used to measure the volume of large vats by noting the depth of the liquid stored inside and was only later fixed at 3 feet to the yard. The rod (later fixed at 6 feet) was established by Charlemagne's court to measure the dimensions of parcels of land. The fathom, used by sailors and boatmen to measure the depth of waters they navigated, although later also fixed at six feet, was originally the length between the fingertips on the right and left hands when the arms were stretched out. The nautical mile was a length of rope containing 1,000 knots tied at intervals that might be standardized within a given rope but might vary considerably between different sailing traditions (Portuguese or Venetian, for instance). This device was originally used to measure the speed of a ship in the water and only later did it become a measure of distance.

An example from the very end of the Middle Ages of the confusion produced by the lack of standardization had the most profound consequences for the history of the world. Christopher Columbus (1451–1506) had read a Latin translation of a book by the Arab astronomer Alfraganus (d. after 861) in which he very carefully measured the physical distance represented by 1 degree of longitude. The answer Alfraganus obtained was that 1 degree of longitude on the equator covered $56\frac{2}{3}$ miles in his system. Reading this gave Columbus

the impression that a journey from Portugal to Japan (whose longitudinal positions were approximately known), expressed in modern terms, would be less than 3,100 miles.

It happens that the actual distance from Portugal to the West Indies is about 3,100 miles, but the distance to Japan is nearly 12,420 miles—a distance Columbus's small ships could never have covered without reprovisioning. So, except for the happy accident of discovering the Americas, Columbus's voyage would have been doomed, as most experts at the time thought it was. How did Columbus make this mistake? He failed to make a conversion. He was thinking in terms of the Italian nautical mile, which was much shorter than the Arabic miles Alfraganus used. This mistake led Columbus to miscalculate the distance. If he had understood that he was dealing with different units of distance and had made the conversion accurately, he might well never have sailed. If Alfraganus's calculation is converted into modern units, by the way, he was correct to within 1.2 miles of the actual figure of 68.9 miles.

Volume was originally measured by filling a receptacle with small seeds. A merchant determined whether his vessels were the same size as those of the merchant he was trading with by filling one of his own with seeds (or water) and pouring them into one of his trading partner's vessels. A unit of measure in this system was called the carat: one carob seed. Yet the carat soon shifted from a measure of volume to one of weight, and, as usual, there was no way to standardize it. The measurements of weight and volume were, if anything, more confused than those of length and distance. Besides the lack of standardization, another problem was the use of entirely different systems of measurement by different types of merchants. Cloth and wool, for instance, were both sold by weight, but cloth sellers and wool sellers used entirely different systems of weighing their goods. Yet another problem had been recognized as far back as the time of the Hebrew Bible in which the prophets complain that merchants and landowners routinely used crooked scales to cheat farmers and other customers in order to increase their own profit. The validity of this complaint has been confirmed archaeologically for the Middle Ages as well as antiquity. Scales used in marketplaces (as opposed to those used by a textile maker to measure the ingredients of dye stuffs, for instance) almost always vary from the true weights they were supposed to measure.

THE ISLAMIC WORLD

BY AMY HACKNEY BLACKWELL

Medieval Muslims were capable of very accurate measurements. Precise measurements and calculations allowed them

to build mosques with enormous domes, construct globes depicting the earth, and make numerous astronomical discoveries. Islamic merchants paid close attention to the details of their transactions, measuring out precise amounts of their products when making sales. At the same time, however, for many people, measurements did not need to be especially precise. It did not matter to them how Muslims in another country measured lengths or weights as long as everyone in their locality agreed on standards.

Weights and measures in the medieval world were far from standard. Although people throughout the Islamic region used similar measurements, often with similar names, the actual values of these measurements varied from time to time and place to place. Historians attempting to discern ancient and medieval measurements are often frustrated by the fact that these values were not consistent. Medieval systems of measurement evolved from ancient ones. The Islamic system developed out of existing Persian, Greek, and Roman systems.

The basic length measurement was the foot, which roughly corresponded to the Western foot. This measurement was originally made by placing a person's foot against the object being measured, but this method presented obvious problems of standardization. Once people began using

sticks to measure lengths, the foot was standardized at about 12.6 inches. This foot then served as the basis for other measures. An arsh was between 1.5 and 2 Arabic feet. A dirha was about a cubit, or the length of a forearm. An orgye was 6 Arabic feet. A seir, which corresponded to the Latin stadium, was 600 Arabic feet. A farasakh was 18,000 Arabic feet, or about 3 to 4 miles, depending on the size of the foot. On the smaller end of the spectrum, a cabda was one-fourth of an Arabic foot, and an assba was 1/16th of an Arabic foot, or about the length of a finger.

Different places used different names and standards for their measurements. In Baghdad during the ninth and 10th centuries a unit called the *habl* was about 43 yards long, and 250 *habl* were equal to about 11,000 yards. One *mil* was equal to about 2,020 yards. A *djarib* was equivalent to a square *habl*, or about 1,900 square yards. Contemporary scholars computed that Baghdad's total area at the time was about 43,750 *djarib*.

To provide standards in weights and volumes, towns, merchants, and anyone else who was concerned about weights would own weights of a standard size and weight. Most standard weights were made of glass or bronze, though during the Fatimid era (909–1171) some weights were made of lead. Historians have found some bronze weights in Egypt, many of them shaped like barrels with smooth sides or like octagons with faceted sides. These were similar in shape to contemporary Byzantine weights. Many weights were made with a small punch mark on one side bearing a legend of a weight's value, the name of the current ruler, and a guarantee. These standard weights could vary depending on the commodity being measured; for example, salt might be weighed against one standard, while wheat might be weighed against another. Standard sizes included 1 *dirhem*, 2 *dirhems*, 10 *dirhems*, and 1 *ratl*.

Many Arabic weights were made of glass, often shaped like coins. Governments maintained standards in weights and measures and in coinage, and often there was considerable overlap between the names and values of weights and coins. Glass coin weights were small, round, and flat with Arabic inscriptions on either side. Modern historians who unearthed medieval coin weights at first thought that they were indeed money but later realized that they were weights. These weights did, in fact, sometimes function as small change between the 10th and 13th centuries, especially when silver was in short supply.

Many Islamic measurements corresponded to earlier Greek and Latin units of measure. For example, the *dirhem* was a unit of weight in the Middle East. The *dirham* was also a coin. Historians have suggested that the names *dirhem*



Weight, mold-pressed glass, eastern Mediterranean, seventh or eighth century (Los Angeles County Museum of Art, The Madina Collection of Islamic Art, gift of Camilla Chandler Frost, Photograph © 2006 Museum Associates/LACMA [M.2002.1.471])

and *dirham* came from the ancient Greek coins and units of weight called “drachmas.” The dirhem varied in weight by time and place. During economic depressions throughout the medieval period the value of the dirhem was debased, to less than 0.10 ounces. In some areas the dirhem was defined by the weights of seeds. In medieval Egypt a dirhem weighed as much as 60 husked barley seeds.

The awqiyyah, or uqiya, was a unit of weight throughout the Islamic world. It corresponded to the ounce, or uncia in Latin. Its value varied by time and place; it usually weighed about 1 ounce, though it could weigh over 2 pounds. There were 12 uqiya to a pound. The pound weight was called a ratl in Arabic. It weighed 128 dirhems, or about 14.5 ounces, though this weight varied; historians have reported values for the ratl ranging from less than 1 pound to over 4 pounds. When a ratl weighed 14.5 ounces, an uqiya weighed about 1.2 ounces.

Weight measures were often defined by practical everyday units, such as numbers of seeds or commodities, such as dates. The kirat was 1/16 of a dirhem. It was equivalent to the weight of four barley seeds, approximately 0.007 ounces. This unit was the origin of the carat measurement for gemstones. The miskal or mithqal was the weight of 6,000 mustard seeds, or about 0.15 ounces. It was based on the Byzantine weight called the solidus. The gold coin known as the dinar corresponded with the miskal. A daniq was one-sixth of a dinar; it could also be one-sixth of a dirham. Pearl merchants used a weight called the methkal, which might have been related to the miskal, though historians do not know precisely how much it weighed. Pearl merchants also used units called the yeka and the rthi, which could have come from the Indian unit of weight known as the rati. Muslim pearl merchants imported many of their pearls from India, so it would not be surprising to find Indian units of measure in that trade.

In the Persian Gulf region dates were a common commodity, and the people of the area created several standard measures to quantify dates. These measures took the form of baskets or sacks woven from date palm fronds, and they could hold dried, pressed, or fresh dates. Because the sacks were made to the same size, merchants and customers could count on them holding more or less the right weight of dates. For example, a sack that was about 27.6 inches long and 15.7 inches wide could hold approximately 88 pounds of dates. This unit was known as a jirab. Towns and regions had their own local standards, and these could vary widely.

The main measurement in the Gulf region was the mun, which weighed about 9 pounds. The mun was divided into 24 kiyas, which weighed about 6 ounces each. A family of six needed 20 mun of wheat to survive for six months. That

same family needed an additional 12 jirab of dates to make it through the rest of the year.

Measures of volume varied widely. The measure known as the qadah was similar to the liter or quart, though it was not standardized. A mudd also was about 1.8 pints, or perhaps a little more. An ardabb or irdabb was about 20 gallons. Grain and pulse merchants used a type of measuring cup or scoop called a cheeas to measure out precise amounts of wheat, lentils, or other dry items. The cheeas was a wooden scoop that held about 2.7 pints, or half a mun. There were also scoops that would parcel out half or one-quarter of a cheeas.

See also AGRICULTURE; ALCHEMY AND MAGIC; ARCHITECTURE; BUILDING TECHNIQUES AND MATERIALS; CALENDARS AND CLOCKS; ECONOMY; FOREIGNERS AND BARBARIANS; GOVERNMENT ORGANIZATION; HOUSEHOLD GOODS; METALLURGY; MONEY AND COINAGE; NUMBERS AND COUNTING; SCIENCE; SEAFARING AND NAVIGATION; TEXTILES AND NEEDLEWORK; TRADE AND EXCHANGE.

FURTHER READING

- François Cardarelli, *Encyclopedia of Scientific Units, Weights and Measures: Their SI Equivalences and Origins* (Berlin: Springer, 2003).
- Pedro de Cieza de León, *The Discovery and Conquest of Peru: Chronicles of the New World Encounter*, ed. and trans. Alexandra Parma Cook and Noble David Cook (Durham, N.C.: Duke University Press, 1998).
- Francisco Guerra, “Weights and Measures in Pre-Columbian America,” *Journal of the History of Medicine and Allied Sciences* 15 (1960): 342–344.
- T. Henry, “Ancient Tahiti,” *Bernice P. Bishop Museum Bulletin* 48 (1928): 323–335. Available online. URL: <http://www.ethnomath.org/resources/henry1928.pdf>. Downloaded on December 10, 2007.
- Philip Iddison, “Weights, Measures and Money (and Sundry Associated Matters),” Emirates Natural History Group. Available online. URL: <http://enhg.4t.com/iddison/weights.htm>. Downloaded on October 10, 2007.
- Bruno Kisch, *Scales and Weights: A Historical Outline* (New Haven, Conn.: Yale University Press, 1965).
- Patricia J. O’Brien and Hanne D. Christiansen, “An Ancient Maya Measurement System,” *American Antiquity* 51, no. 1 (1986): 136–151.
- F. G. Skinner, *Weights and Measures: Their Ancient Origins and Their Development in Great Britain up to A.D. 1855* (London: HMSO, 1967).
- Ian Whitelaw, *A Measure of All Things: The Story of Man and Measurement* (New York: St. Martin’s, 2007).
- R. A. Young and T. J. Glover, *Measure for Measure* (Littleton, Colo.: Blue Willow, 1996).
- Claudia Zaslavsky, “Those Familiar Weights and Measures!” in her *Africa Counts: Number and Pattern in African Cultures*, 3rd ed. (Chicago: Lawrence Hill Books, 1999).

► writing

INTRODUCTION

Writing is a system for recording human speech through symbols drawn on paper (or similar material). In the Middle Ages writing was much nearer its origin in speech than it is now, since texts generally were read aloud even during private study, when reading letters, and in most other circumstances. Writing had been invented independently at least four times in antiquity: in Sumeria, in the Indus Valley (still not deciphered), in China, and in Central America (by the Maya). In other cases entirely new writing systems were devised by people who had some familiarity with an existing writing system. Egyptian hieroglyphs were created this way in reaction to the cuneiform writing of Sumeria. In many other cases, existing scripts were adapted to record new languages that had never before been written down. Many new and modified alphabets came into existence during the Middle Ages. Throughout much of the world the Middle Ages were also a golden age of calligraphy, the transformation of writing into a fine art.

One of the oldest forms of writing and the most widespread in the Middle Ages is the alphabet. Earlier forms of writing had been logographic (each sign representing an individual idea or word), like Egyptian hieroglyphs, or syllabic (each sign representing a discrete syllable), like Sumerian and Akkadian cuneiform. These scripts required hundreds or even thousands of different signs. But the alphabet is phonetic: Each sign represents just one or a few related sounds, so the whole range of human speech can be represented using fewer than 30 letters. The alphabet was invented by speakers of Semitic languages who came from the Levant but were living in Egypt in about 1800 B.C.E (or perhaps even earlier). They had no means of writing their own language, so they borrowed 22 hieroglyphic signs in a simplified form to make the first alphabet. The same signs were constantly transformed over the next thousand years but finally gave rise to the Hebrew alphabet and to the Latin and Greek alphabets. (The name comes from the first two letters in the Greek alphabet: *alpha* and *beta*.) The same system of writing was borrowed by India and became the basis of a whole family of scripts.

In the Middle Ages the Germanic peoples borrowed the Latin alphabet as the basis of their runic system of writing. Later, Christian scholars devised new forms of the alphabet to record the Gothic language and the Cyrillic alphabet to record Slavic languages (a form of which is still in use today). One of the Semitic languages recorded in the alphabet was Aramaic, and the Aramaic alphabet was borrowed and transformed to become the Arabic script. Another branch of the alphabet was used in southern Arabia and Ethiopia

from ancient times to record a variety of Semitic and African languages. Persian, one of the most widespread languages in southwestern Asia, never developed its own script but in different periods was written in cuneiform or in Aramaic letters. In the Middle Ages, Persians finally adopted and still use the Arabic alphabet.

Indian forms of the alphabet gave rise to dozens of different writing systems in eastern Asia, from Mongolia to Indonesia. Egyptians eventually devised their own separate alphabetic writing system based on simplified hieroglyphs, known as demotic, and this was combined with the Greek alphabet to produce a script for Coptic, the latest spoken form of the Egyptian language, which is still used as the liturgical language of the Coptic Orthodox Church. The characteristically modern practice of using the Roman alphabet to transcribe indigenous languages began in the late Middle Ages (after 1482) when the Portuguese made contact with the kingdom of Congo in central Africa.

In the Middle Ages most Jews spoke the language of whatever people they happened to live among. While most people were illiterate, an unusual number of Jews learned to read and write Hebrew to a limited degree to fulfill religious requirements. As a consequence, they developed systems of writing their spoken language in Hebrew letters, such as Yiddish (a Germanic dialect) or Ladino (a form of Spanish).

Two logographic systems of writing were important in the Middle Ages—those used to write Chinese and Mayan. Both used thousands of signs to represent individual words but also used other signs to phonetically represent syllables and words. Both were systems widely adopted by neighboring civilizations. In eastern Asia, Korea and Japan also developed their own phonetic systems of writing, though they both used Chinese characters as a prestigious form of writing their own languages. Although earlier groups in Mexico, such as the Toltec, had been influenced by Mayan writing, the Aztec used their own pictographic system, which conveyed information through a series of small sketches but which did not directly record speech.

AFRICA

BY DIANNE WHITE OYLER

Writing in the African society and culture of the medieval world built upon the indigenous and imported writing systems from the Mediterranean basin with the new languages and writing systems arriving from the Middle East and Europe. While northeast Africa and North Africa added to their variety of writing systems through trade and conquest, these new writing systems were also delivered to East Africa and western Africa through trade.

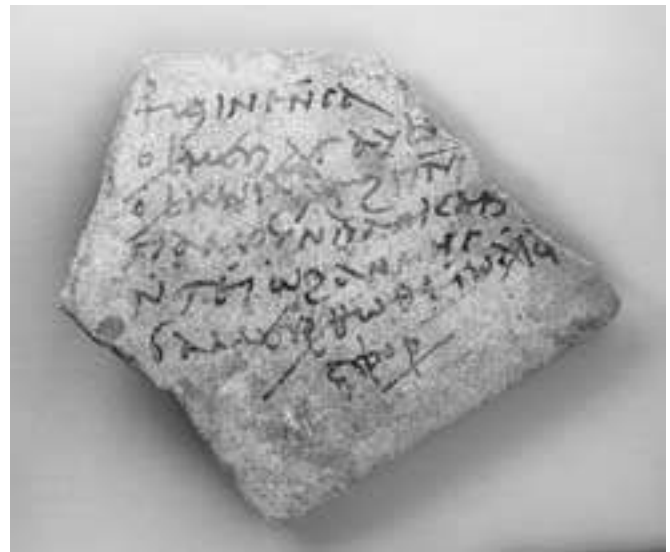
Northeast Africa was the home of Egypt's hieroglyphs, which evolved into the Coptic (Egyptian) script. The Coptic script used Greek letters and a few demotic signs (signs relating to the more ancient hieratic Egyptian writing but simplified) to write the Egyptian language and to translate and transcribe the Bible for a growing Egyptian Christian (Coptic) population in the Byzantine Empire. After the Arab conquest of Egypt in 642 the use of Coptic as a language declined. Medieval Egyptians used the Coptic script and the Greek alphabet as writing systems as they incorporated the new Arabic script. After the Arab conquest, Christian religious texts were written in the Coptic language using Arabic script.

In Axum (present-day Ethiopia) the Ge'ez writing system evolved into the Ethiopic script. This writing system was used for religious and secular reasons; after King Ezana (fourth century) made Christianity Axum's state religion, it also was used to write biblical texts translated from the Coptic language and script. The genealogy of the biblical kings and queens of Axum is recorded in the *Kebra Nagast*, which was written in the Ethiopic script and dates to the 13th century. Other works written in the Ethiopic script include the *Royal Chronicles* and religious sermons by the Orthodox Christian priests.

Axum received its earliest imported writing systems by migration and by trade. The Hebrew alphabet arrived through migration and continues to be used today by the groups identified as the Beta Israel of Ethiopia. The earliest recounting of Jews in Axum is written in the Ethiopic script and relates the creation myth in which the Queen of Sheba from Axum meets King Solomon of Israel (10th century B.C.E.), and their child, Menelik I, and his entourage of Jewish youth bring Hebrew, Judaism, and the Ark of the Covenant to Axum. The Greek alphabet entered Axum through the port of Adulis on the Red Sea and is referred to in the Greek sailor's manual *Periplus of the Erythrean Sea*. In the seventh century the Arabic alphabet was imported to the coastal region by the Beja as this coastal plain was incorporated into the major Muslim empires of the period; Axum reconquered the coastal plain known as Eritrea in ninth century.

North Africa and the Maghreb were home to an indigenous group of people known as the Berbers, who had developed the Tafineq writing system, which may have been influenced by the Punic writing system based on the Phoenician alphabet used in the colony of Carthage. In addition, Greek and Latin writing systems were imported through trade and conquest as a part of both the Roman and Byzantine empires and were used to write religious texts in the Roman Catholic Church.

The Hebrew alphabet arrived in North Africa when many Spanish Jews migrated to the coastal towns of the Byzantine



Ostracon with Coptic inscription, Egypt, ca. 250–650 (Los Angeles County Museum of Art, Gift of Jerome F. Snyder, Photograph © 2006 Museum Associates/LACMA [M.80.202.174])

Empire in the seventh century. Writing in Arabic, Ibn Khaldun (1332–1406), a famous Muslim historian from Tunisia, reports that some Jews moved inland to convert the indigenous Berber speakers and that at the end of the seventh century Jews led the resistance to the Muslim conquest; however, after the Jewish Berber defeat many of them converted to Islam. In the 10th century many Jewish traders arrived in present-day Tunisia because the Abbasid Caliphate had become hostile to them, and the largest forced migration of Jews into the region came with the Spanish Inquisition around 1492.

The Arabic alphabet arrived in North Africa in the seventh century as well. Arabic-speaking Muslims conquered the region from Egypt to Morocco, and with this conquest came the use of the Arabic language and writing system for official business. The form of the Arabic alphabet used by the inhabitants of North Africa is the Maghrebi script, a cursive form of Arabic writing that was derived from Iraq and the Hejaz during the eighth and ninth centuries. This alphabet was used by the Moroccan Ibn Battuta (1304–68 or 69), who wrote an epic based on his travels throughout the Muslim world, where Arabic was spoken and where the Arabic alphabet was used. Ibn Battuta wrote his reminiscences of his 14th-century visits to Mali in western Africa and the East African states of Mogadishu (Somalia), Mombasa (Kenya), and Kilwa (Tanzania).

In East Africa the Arabic alphabet arrived by way of the Indian Ocean trade, which was governed by the monsoon winds that blow toward the East African coast from May to October and away from the coast from November to April.

Traders who arrived in East Africa at the beginning of the monsoon season had to remain there until the winds changed, so many lived with their African families in such coastal city-states as Lamu, Pemba, Zanzibar, and Kilwa. Arabic and its script were used for official documents.

This trading system also connected the coastal city-states to the interior using the Swahili trade language, which kept records by using the Arabic script. The word *sawahil* is Arabic for “coast,” and incorporating Arabic loan words, the language was understood by the loose association of ethnic groups on the mainland and the coastal islands and as far inland as the Katanga province of present-day Republic of the Congo.

Written in Arabic, the *Lamu Chronicle* shows that the Umayyad Caliphate (661–750) sent traders to the East African coast in the seventh century. The *Kilwa Chronicle* of Zanzibar recounts the story of seven Muslim brothers emigrating from Shiraz, Persia, in the eighth century. This founding myth may attempt to distinguish the Swahili from the Indian Muslims arriving later in the 12th century. These two Arabic chronicles imply that the Arabic script was being taught in Koranic schools on Africa’s east coast. The arrival of the Portuguese for trade and eventual conquest brought the Roman alphabet to the region in the early 16th century.

In western Africa the Hebrew and Arabic alphabets arrived early to the interior through the north-to-south trans-Saharan trade from the Maghreb to points south, including Timbuktu (present-day Mali). According to Muslim accounts—the *Tarikh el-Fettash*, written in Arabic—there were several Jewish communities in the Ghana, Mali, and Songhai empires, and in 1402 there was a large Jewish community in Tirdirma. Undoubtedly, these Hebrew speakers were using the Hebrew alphabet for religious and interpersonal communication among themselves and with the regions they had left behind in Egypt, Morocco, Portugal, and Gojjam (present-day Ethiopia). In the 14th century Jews from Portugal and Spain fled these Catholic states and migrated to the trade city of Timbuktu in the Songhai Empire. However, by 1492 Jews were no longer allowed to live freely in the city, and they were forced to convert to Islam or leave.

The Arabic alphabet traveled to Kumbi Saleh, the capital of the ancient kingdom and empire of Ghana, by way of Muslims entering the trans-Saharan trade in the eighth century. While the urban merchants were impressed by the wealth of the traders, the *ghana* (title for the king) was impressed by the writing system. Although there is no evidence of the king’s conversion to Islam, he did employ Muslim clerics to use the Arabic writing system to keep governmental records.

Further influence from North African Muslims, the Almoravids, increased the use of the Arabic language and script

in the region. The leadership of the Mali and Songhai empires was decidedly Muslim. Mansa (King) Musa (r. ca. 1312–ca. 1332) is renowned for his pilgrimage to Mecca (1324–25) on which he handed out gold to every community through which he traveled. Moreover, he is responsible for bringing Arab Muslim clerics back from al-Ahzar University in Cairo, Egypt, to teach Arabic as a second language (and the alphabet) to black Muslims at the Sankorè University in Timbuktu. The Muslim clerics and scribes of Timbuktu further developed their own form of the Arabic script from the Iraq and Hejaz forms that had been developed in the eighth and ninth centuries. While many books were written or copied in Timbuktu, others were imported through trade, so manuscripts can be found that are written in other forms of Arabic, such as those used in Egypt and Syria.

The Arabic language and alphabet arrived in Hausaland (northern Nigeria and Niger) in the 14th century through merchants and the seminomadic Muslim Fulfulde speakers, who brought Islam with them across western Africa. Arabic writing spread with religion and through trade to the kingdom of Kanem and Bornu (modern-day Chad). In addition to Fulfulde contact, this kingdom traded with the Ottoman Empire on the North African coast. Ibn Furtu of Niger wrote *Mai Idris of Bornu* (late 16th century), about the reign of King Idris Alawma.

In west-central Africa the Portuguese explorer Diogo Cão (b. ca. 1450) introduced the kingdom of Kongo to the Roman alphabet in 1482. Nzinga a Nkuwu, king of the Kongo, established a relationship with King John II of Portugal (r. 1481–95), through which the Kongolese king became enamored with Portuguese culture and civilization. Nzinga a Nkuwu sent four Bakongo men to Portugal to study for the priesthood of the Catholic Church, and Portuguese missionaries baptized the Kongolese king in 1491. The king’s son became Afonso I, who spoke Portuguese and wrote the Roman alphabet, while his grandson Henry became even more skilled in the use of the alphabet as a bishop in the Catholic Church.

Writing in African society and culture of the medieval world drew the continent into the widening global economy by developing intricate economic connections with the interior and with sub-Saharan Africa. While the ancient world witnessed writing only in the north and east of the continent, the new forms of writing spread to East Africa, western Africa, west-central Africa, and southern Africa. The Arabic language and writing system bound together large areas of North Africa, western Africa, and East Africa for government documents, business transactions, and correspondence prior to the arrival of the Europeans and the Roman alphabet that came to dominate the world.

THE AMERICAS

BY MIGUEL ARISA

Of all the writing systems that had developed already during the first four centuries of the Common Era, the Incan quipu system in the Andean region and the Mesoamerican systems developed by the Maya and the Zapotec are the most exemplary of a complex form that evolved from ancient times. Amerindian pictographs of the indigenous populations of what are now Canada and the United States did not develop until after the arrival of the Europeans, and especially through the syllabaries that the Sioux and Cherokee tribes introduced in the 19th century.

The knotted cords ordered around a horizontal rope called a quipu became a very sophisticated form of writing for the Inca in South America. Some scholars believe that the black rope, from which the other cords hung, indicated time. The other strings would be uncolored, and at certain gaps knots would be tied, providing meaning to the intervals. The whole system depended on the different colors of the strings and their position within the whole organization. It has been suggested recently that poems or verses could have been stored in the quipu, an assumption based on the fact that Quechuan words are not as abundant as are words in other languages. Such a complex device was probably managed only by dedicated specialists whose expertise was highly regarded.



Shell ornament with series of Mayan hieroglyphs incised on the interior, ca. 600–800 (© The Trustees of the British Museum)

Although writing systems evolved simultaneously throughout the Mesoamerican region during the Preclassic, Classic, and Postclassic periods, it is the Mayan glyphs that have attracted the greatest attention in recent years due to successful decipherment that has taken place since the 1980s. Mayan hieroglyphs are akin to a true writing system in that rather than merely expressing concepts or ideas, they represent actual speech. Great strides have been made in the late 20th and early 21st centuries to decipher Mayan inscriptions. Lacking a Rosetta Stone to help crack the millenary code, modern scholars are coming to grips with this highly complex form of writing.

Even considering that writing did not develop alongside sculptural images at first, some scholars believe that once the dynastic structures were established at the end of the late Preclassic Period and as competition between city-states increased, writing became a principal means to dominate as well as to ascertain legitimacy. In this way, Mayan writing has been discerned to contain a plethora of historical information, including the biographies of the rulers as well as the most important dates of their rise to power and their demise. Rulers were equated to gods, and their rituals included the use of hallucinogens in order to establish contact with the cosmic forces. Fanatical in their attitude toward war and conquest, the inscriptions often represent the capturing of neighboring city-states by power-hungry rulers bent on exercising their dynastic privilege and expanding their territories. Marriages between dynasties were also recorded, regarded as part of continuous cycles.

Emblem glyphs, referring to actual places as well as calendrical dates, and names of historical characters are some of the main features of these representations. In some form Diego de Landa (1524–79), who in 1566 became the first Spaniard to make reference to Mayan writing, had already surmised some of the meanings of the glyphs and described the calendrical usage. These glyphs were carved in stone by scribes, who were often highly educated members of the royal elite. In some cases, kings themselves were also scribes, as is shown in depictions of a number of vases, on which the kings are shown wearing elaborate headdresses made out of pens. It is thought that scribe schools existed where a demanding course of study was required to grasp a thorough knowledge. Judging from their depiction on vases and other monuments, scribes were highly esteemed.

The Classic Period in the Mesoamerican world was characterized by the hegemony (social dominance) of the Teotihuacán urban center, whose writing, pictographic in nature, had evolved from earlier periods into highly geometric forms. The largest city in Mesoamerica, Teotihuacán, was believed never to have had a writing system. However, two different

writing systems have been detected in recent discoveries, contemporary to Monte Albán. One resembles Zapotec and Mayan glyphs; the other is more illustrative of the city's own murals. The murals show name glyphs, but it is not certain if they refer to rulers or gods. It also seems that at its height, the city had several quarters in which different languages coexisted, such as Zapotec, Mixtec, Mayan, and Nahuatlán. The metropolis collapsed around 600 to 650, and the meaning of its murals probably influenced future generations, which regarded the site as sacred.

By the late Classic Period the Mayan language was becoming more and more phonetic. It featured squarish blocks that contained more than a pattern representing a sound or a combination of sounds. The Zapotec language, by around the same time, still employed large-format sculpture to display texts that are both pictographic and phonetic. The correspondences between these systems and the ones in the highlands have led scholars to assume that contacts between the Teotihuacán, the Zapotec, and the Maya were not isolated.

It was from this foundation that the Aztec acquired their system of writing once they had migrated to the Mexican basin in the latter part of the 13th century. The Aztec perfected the system of rebus writing, in which an existing symbol was used to represent a sound and then that symbol represented that sound for other words. This form of abbreviation reduced the need to represent many words. Like the Maya and the Zapotec, the Aztec used this system in their calendrical and divinatory manuscripts, whose manufacture contributed to the elaboration of more complex imagery.

The Maya made a distinction between the scribe (*aj ts'ib*) who used pens to inscribe and the scribe who carved in stone. We know that books existed because many are illustrated on vases; however, few survive. During the Spanish colonization missionaries and government officials forbade the use of the indigenous languages and inscriptions, and many of the historical and divinatory books were burned, as they were deemed diabolical. Once they realized the error of destroying the culture of the people they were trying to dominate, some Spanish friars began the painstaking labor of reconstructing the ancient documents with the aid of natives who had not yet lost the memory of their past, kept alive mostly by oral tradition. In this way the Mayan creation myth Popul Vuh, along with other calendrical and divinatory codices, was commissioned. These works form part of a body of codices produced after the Spanish conquest that are scattered in museums around the world.

A small number of early pre-Columbian manuscripts survived the Spanish conquest. These include Mixtec histories, Mayan religious works, and other books from the highlands, also with religious or divinatory content. Some of

these codices were made as screen folds and inscribed on animal skin. Perhaps the most important of the codices are the ones denominated in the Borgia group, which are believed to have been painted just before the conquest and which consist mostly of religious material. Fortunately for scholars, this particular group was spared destruction as it was one of the few that were sent to Europe as a curiosity in the early part of the 16th century.

The best preserved pre-Columbian books are Mixtec codices, beautifully painted in maguey cloth and folded like an accordion. When the books are opened, two pages are visible, each page divided by red or black lines into smaller sections. The complex imagery can be read from top to bottom, although it varies in some codices, in which the order of pictograms can be followed in a zigzag form.

These books resemble European medieval manuscripts in that they seem to have been produced singly and with similar tools. For example, the use of animal skins, the use of organic and mineral pigments, and the fact that the books were of religious nature mark a distinct similarity with their European counterparts. It is hard to ascertain what other kinds of books existed in pre-Columbian times. Some believe that since tribute was a mainstay in the expansion of Aztec as well as Mayan rulers, books designed to keep track of these accounts must have existed, although their existence is hard to prove.

The survival of these codices and their decipherment cast light on a rich and varied culture that originated more than 3,000 years ago. The social structures, language, religion, science, and history were carved or painted in jade, stone, and gold, as well as on monumental pyramids and tombs—evidence of a rich and evolving culture cut short by the advent of the Europeans.

ASIA AND THE PACIFIC

BY KENNETH HALL

During the medieval era the Pacific islands had not yet developed a writing tradition, but in the early first millennium C.E. in mainland and island Asia stone and metal (gold, silver, brass, bronze, iron, tin, and copper) plates were inscribed with official and private records, royal proclamations, land grants, eulogies, and memorials. In the tropical regions of southern Asia and Southeast Asia, most petitions to royal courts and poetic and religious writings were done on strips of palm leaf, using the point of a knife, a sharpened piece of iron, or other pointed object that served as a stylus to carve the script into the palm leaf surface. Books and religious treatises were formed by running a string through strips of palm leaves and connecting it to wooden book covers at the top

and bottom. Early mainland Southeast Asians and northern Indians used parchment-like sheets made from animal skins. They also used a less expensive substitute made from tree bark, which was prepared by soaking, pounding, drying, and pressing the bark. The Chinese began to use paper in the second century, and by the sixth century Chinese paper technology had spread to the neighbor countries.

In southern and Southeast Asia inscriptions carved in stone and metal were an important form of local expression and historical record throughout the medieval era. The earliest were the records of the societal elite addressing ancestral and spiritual issues that were foundational to the social and spiritual bonds of a community. In southern India alone there are more than 20,000 inscribed records that remain for the era from 1000 to 1500. Most are temple inscriptions that record gifts to temples, usually of land or money. Many are eulogies for political figures and expressions of local devotion to a specific divine. These surviving inscriptions are a record not only of political and religious piety but also of the local society and its economy. Personal references included places of origin and current residence, occupation, memberships and linkages; above all they were a public record of social superiority or dependency.

The earliest inscriptions portrayed kingship that was heroic rather than institutional; kings were overlords rather than managers. In the 10th and 11th centuries inscriptions became less mythological and more detailed, with a focus on the certification of landholding and income rights. Inscriptions provided public announcements and enduring records of specific political and economic transactions that served as

a legal record and allowed government agents to acquire an accurate picture of the standard of local stability and local prosperity, which might justify royal intervention and tax assessments.

According to Chinese tradition, Cai Lun (50?–?118) invented paper in 105 by improving upon previous papermaking techniques, which used only hemp, and developing a process in which a variety of materials could be used, initially tree bark, hemp, and cloth rags but later other barks, grasses, and vegetation. Cai Lun discovered that fibers could be formed into a thin sheet on a screen. He worked with numerous fibers mixed with water in a vat, in which they were washed, soaked, and beaten to a pulp with a wooden mallet. He then submerged a four-sided bamboo-framed cloth screen in the vat and lifted it, catching the fibers on its surface. When dried and pressed with a covering mold, the thin layer of fiber became paper.

Initially, Chinese paper was made from hemp waste from old rugs and fishnets; then, beginning in the second century, the fiber of the mulberry tree was used, which was displaced in favor of rattan from the third to the 12th centuries and bamboo from the eighth century. Bamboo paper, which was soft, smooth, white, absorbent, and durable, was favored by Chinese artists and calligraphers in the Tang Dynasty era (589–907). Specialized paper came from rice and wheat straw, stalks of hibiscus, seaweed, sandalwood bark, and the waste from silkworm cocoons. The vast collection of more than 10,000 rolls of Buddhist manuscripts, which date from 406 to 1035, were written by Buddhist monks at Dunhuang, a pilgrimage center in Chinese Turkestan; here and elsewhere in



Daoist Scripture of Constant Purity and Tranquility, in standard script, ink on silk, Yuan Dynasty, China, ca. 1292 (Freer Gallery of Art, Smithsonian Institution, Purchase—Regents' Collections Acquisition Program, F1980-8)

CHINESE CHARACTERS AND CALLIGRAPHY

The 26 letters of the Latin alphabet seem like arbitrary representations, each one standing for one or more sounds. They have their origin, however, in ancient Semitic letters and, for the most part, are descended from minute sketches that represented typical words that in northwestern Semitic languages happened to begin with the various letters. The letter *A*, for instance, was originally a picture of a cow: One can still see the triangular face of the animal and the two horns, though the letter has been rotated about 180 degrees from its original form.

The approach to writing in ancient China was completely different, however, and does not express individual sounds. Many Chinese characters are pictographs, that is, small painted sketches of the subject they name (similar to a stick figure for person); others are ideographs, representing abstract ideas, such as a base line and an upright element for the word *up* or three lines for the number 3. Other characters are made by combining signs into larger units. In any case, each character stands for an entire word or idea, and because a good vocabulary consists of at least 4,000 signs (a Song Dynasty dictionary published in 1039 has over 53,000 characters), each one is a remarkably intricate collection of brushstrokes. Moreover, characters were typically painted with a small brush in antiquity and in the Middle Ages. These factors together ensured that calligraphy, the art of painting letters onto paper, would become a fine art in a way that writing never has been among users of the Latin alphabet.

While Western calligraphy aims to produce precise and elegant letterforms that are nevertheless uniform throughout a text, Chinese calligraphy is flowing and demonstrative in a fashion more reminiscent of Western abstract painting, where variation and interpretation of the character forms express emotional and intellectual meanings. Letterforms could be modified to imitate natural beauty. Because the same materials of brush, ink, and paper are used, calligraphy gave rise to ink-and-wash painting, which became the premier graphic art of the East Asian tradition. Frequently, the writing of a poem is made inseparable in form and style from an accompanying painting. Since Chinese characters were adopted for writing Korean and Japanese, calligraphy is equally an important part of those nations' traditions.

the Chinese Buddhist realm, paper replaced other materials for calligraphy. By the third century papermaking technology had been introduced to Vietnam and Tibet, by the fourth century to Korea, and by the sixth century to Japan. In each case paper was ideal for keeping records of the ever-increasing volume and complexity of government, religious, and economic transactions.

Before the invention of paper, however, the earliest Chinese writing was done on wood, bamboo, and silk. The Chinese also erected stone tablets on which the Chinese classics and other public proclamations were inscribed. By the end of the second century these stone texts were transferred to paper by making stone rubbings, an early form of printing. By the early fifth century lampblack ink—a mixture of pine soot and lamp oil blended with the gelatin made from donkey skin and musk (a mixture that became known as “india ink”)—was used to blacken the surface of stone-carved hieroglyphics. A sheet of thin white paper was dampened and placed on the stone surface and then rubbed with a small flat stone. Paper pushed down into the carved-out areas remained white, while the raised areas remained black, producing a white-on-black text.

By the mid-fifth century the Chinese were using red and black inks and seals of engraved or carved stone, metal, jade,

bamboo, and horn to make their personal marks on paper. Commercial printing evolved from the production of seals; by the seventh century Chinese artisans were carving full-page woodblocks of pictures and texts. Using this technique, in 770 the Japanese empress Koken (r. 749–58) commissioned the printing of *dharani* (prayer charms) on paper made from hemp, using wood, metal, stone, and porcelain stamps. The earliest printed book, the Buddhist Diamond Sutra recovered from Dunhuang, dates to 868. In 953, the first block printing of the Confucian classics was completed after 21 years, and soon all types of printed books were available. These initial books were made up of a series of consecutive printed blocks that produced a scroll text. Block prints were spaced on the long sheets of paper so that they could be folded, and the sheets stitched back to back to produce continuous double-folded pages.

Chinese printing paired with paper production to make scholarship and education potentially available throughout Asia. Standard histories were written in the Tang and Song eras, supplemented by new historical scholarship that addressed how history had and should be written, encyclopedia compilations, gazetteers, and collections of literary works and commentaries on political institutions and economic de-

velopments. Printing reinforced the spread of literacy and the development of urban culture.

In about 1041 to 1049 movable type had been introduced to China from Korea, but the complexity and vast number of characters in the Chinese language made it less useful in China than elsewhere. Chinese printers found it more efficient to print books with whole blocks of wood rather than movable type, although they had wood, porcelain, and copper type available. In contrast, in 1390 the reigning Korean emperor established a type foundry to encourage the printing of literature using movable type; the first known Korean printed book dates from 1409. In 1298 the Venetian traveler Marco Polo reported China's use of printed paper money, which was the first printed material seen by Europeans.

The 11th-century Persian scholar al-Biruni (973–1048) provided extensive descriptions of the writing traditions of India. Then, as in rural villages today, students wrote on black wood tablets with pieces of chalk. They also wrote on pieces of the bark of trees—the tuz tree in central and northern India, the inner bark of the bhurja tree in northwestern India—that had been oiled and polished to make them hard and smooth. Southern Indians recorded their manuscripts on palm leaves. Unlike their Middle Eastern neighbors, Indians rarely wrote on animal hides because of their beliefs about ritual pollution. By al-Biruni's time Indians no longer wrote on cloth but instead were just beginning to use paper.

Al-Biruni reports that the earliest Indian paper was attributed to the spread of paper technology from Samarqand in central Asia, where two Chinese papermakers had been taken as war prisoners following a battle near Talas (751). In Samarqand they prepared paper using linen, flax, and hemp rags. Arabian artisans based in Persia improved on the Samarqand paper in the eighth century, producing Khorasani paper using flax and vegetable fibers.

According to one tradition, the production of Khorasani paper spread from Sind to India in the eighth century and took root in the Delhi and Lahore regions. Other traditions assert that the first Indian paper industry developed in Kashmir in the 15th century, following Timur's invasion of the region in 1398. Subsequently, according to the region's *Tarikh-i-Farishta* chronicle, Timur took the local khan's son to Samarqand as his hostage, where Samarqand artisans introduced him to the local papermaking industry. Shahi Khan eventually returned to India, bringing with him numbers of skilled Samarqand papermakers and bookbinders. Soon they were producing high-quality Kashmiri paper, which was the Indian standard. That era's chronicle scribes all wrote on Kashmiri paper. Papermaking spread to other northern Indian production centers. Punjab Sialkot paper was white. Zafarabad in Oudh, which became known as Kaghdi Shahar

("paper city"), produced a glossy polished bamboo paper. Other Indian papers also had glossy surfaces.

Indian papermakers followed the same production techniques as the Chinese, using hammers, screens, teakwood frames, soft date-palm brushes, and polished stones. Indian papermakers were especially proficient in the recycling of waste paper, which they tore into pieces and sorted according to color. The paper scraps were moistened with river water and pounded and repeatedly washed for three days. The pulp was placed in a pit filled with water, soaked until the pulp could be evenly spread into a thin layer on a screen, and then removed to be pressed by a stone cover while it dried. The highest-quality paper was then polished on a wooden board by rubbing it with a shell.

By the third century the Vietnamese were using Chinese paper, later incorporating Chinese woodblock printing. A 13th-century Chinese text reports that China, Korea, and Java made paper. In the 15th century Chinese visitors to Java observed the use of thick paper scrolls made from the fibers of the mulberry tree, known locally as *dluwang*, that were painted with stories chanted by narrators; but most Javanese writing was still done on palm leaves. In contrast, the western Indonesian archipelago transitioned to the use of *dluwang* paper in the 15th century, in part because it was difficult to cut the curves and dots of Arabic script into palm leaves. In these regions the Arabic word for "paper" (*kradaat*) was borrowed, as in the Malay *kertas*, as were the Arabic terms for "pen" and "ink." According to the reports of the earliest Portuguese visitors, by the end of the 15th century Melaka was importing quantities of Chinese paper supplied by Ryukyu islanders, and Chinese paper was also being used in Java, Thailand, and Cambodia.

In the 15th century the Thai produced their own paper, which was finer in quality than that of Java. Some Thai paper, similar to that of China and Java, was made from the tree fibers of the *khui* tree, but Thais also began to produce paper using cotton rags. Long strips of the Thai paper were folded rather than rolled. Court records were written on paper using a clay pen. The Burmese also used a coarse paper but blackened it and wrote on it using a white chalk pencil.

EUROPE

BY JULIE-ANN VICKERS

Handwritten text was one of the primary means of communicating throughout the Middle Ages. The written word was essential for relaying complex information across distances, and, importantly, it was the only method for transmitting information across time to future generations. Yet for most of the medieval period the ability to write was confined to an

educated elite, made up primarily of clerics. This situation began to change in the 12th century as literacy levels increased within secular society. Styles of writing also changed a great deal from the early to late Middle Ages. The materials used in the writing process were a fundamental influence on the stylistic forms of letters. But other factors, such as the purpose of the text, local traditions, political influences, and wider cultural trends, also helped form particular styles of writing.

For most of the medieval period, from the fifth century to the 12th century, writing was strongly associated with the church. After the decline of the Roman Empire religious institutions assumed the responsibility for education. The ability to write became a specialized skill associated with the training of some members of the clergy, particularly monks. Many monasteries held rare collections of books and became centers of intellectual and scholarly activity. In the larger monasteries there was usually a dedicated writing room, known as a scriptorium, where the monks studied, wrote, and made copies of manuscripts. Yet even in these highly literate monastic communities not everyone could write. An indication of the degree to which writing skills in the early Middle Ages were restricted to particular groups can be seen in the fact that such an important ruler as Charlemagne (r. 800–14) was unable to sign his name. However, from the 12th century onward, increasing prosperity and wider access to education meant that more and more laypeople acquired the ability to write. Exceptions to this general trend were the Jewish communities, which had maintained high literacy rates throughout the period.

The implements and materials used for writing remained fairly constant during the Middle Ages, although there was some change in the type of material used for writing surfaces. In ancient Rome, papyrus, a material made from the stalk of the papyrus plant, was the most common form of writing surface. But in the fourth century C.E., parchment, which was made from animal skins, gradually replaced the use of papyrus. In both eastern and western Europe parchment soon became the most common type of writing surface. Papyrus did, however, continue to be used for some administrative documents until the 11th century. Paper mills began to spread in Europe only from the 13th century onward. In this early stage of papermaking, paper was generally made from linen rags. But it was not until after the medieval period that the production of paper became widespread; its use in the Middle Ages was generally restricted to writing that was deemed unimportant and insignificant. Wax tablets were also used for day-to-day, casual writing. To make a tablet, a shallow depression was made in a piece of flat wood; the hollow was then filled with wax onto which letters could be scratched and erased. But papyrus, paper, and wax tablets all had a limited use;



Bone writing tablet and leather case of a type typically used as a notebook for jottings, Britain, 14th century (© Museum of London)

throughout the Middle Ages parchment remained the dominant and preferred writing material.

The most commonly used skins for parchment were those of goats, sheep, and calves. Calfskin was particularly valued because of its thinness and suppleness. A writing sheet made from calfskin, or the skin of another young animal, is sometimes referred to as vellum in order to distinguish it from other forms of parchment. Preparing the parchment was a time-consuming process, and large numbers of animals were necessary to supply enough parchment for one codex, or book. Thus, parchment was a highly valued commodity, and every effort was made to ensure that this limited resource was fully used. For instance, medieval scribes developed an elaborate system of abbreviations in order to maximize the amount of text that would fit onto a page. In addition, parchment from books or documents that were no longer in use was sometimes recycled. The surface of the old parchment was scraped down to erase the writing so that the material could be used again for another piece of text; parchment recycled in this way is called a palimpsest.

The pens and inks used for writing on parchment were made from easily accessible natural resources. Quills were the most common form of pen. They were made from the strong flight feathers of a large bird, such as a goose. The feathers were stripped back and then a nib was cut into the pointed end of the feather. These nibs wore down with continuous use and scribes had to periodically sharpen their quill by recutting the nib. Inks were made from a number of different substances, and recipes could vary on a local basis, but the two most common types of ink are known as iron gall ink and carbon ink. To make iron gall ink, oak galls, formed on trees by insect attacks, were mixed with iron vitriol (ferrous sul-

fate) along with rainwater, wine, or vinegar. Carbon ink was made using either charcoal or soot mixed with gum. Minerals were used to create colored inks.

Besides a pen and writing surface, the medieval scribe needed other materials in order to write. Rulers made of wood, ivory, or stone were employed for laying down the guiding lines on a page. These could be dry-ruled with an implement such as a stylus, which was also used for writing on wax tablets. A tool called a *punctorium*, which made evenly spaced holes along the side of a page, was also used to guide ruled lines. Mistakes in writing were erased using knives or scrapers, and the surface of the page was then smoothed with a pumice stone to prepare it for the corrected text. For holding inks, animal horns were used. Scribes usually did their work at a sloping desk because it is easier to write with a quill on an upright surface. A sloping desk also had the advantage of being better able to catch whatever daylight was available.

The materials used for writing fundamentally influenced the way people wrote in the Middle Ages. Parchment and quills predisposed scribes to form letters with strokes that varied from thick to thin, curved to linear. Elongated flourishes at the end of strokes are another characteristic effect produced by the use of these materials. In contrast, letters formed on wax tablets were made of sharp, straight, and angular lines owing to the consistency of the wax.

The use of the quill and parchment, however, afforded enough flexibility to enable different styles of writing, known as scripts, to develop. Stylistic changes to scripts occurred over time, but within any one period scripts also varied from region to region, and local stylistic traditions tended to develop. In addition, within any one region a variety of different scripts, some more formal than others, were employed at any given time. The choice of one script over another depended largely on the purpose of the written document. For instance, formal scripts were used for important books or legal documents, whereas informal scripts were used for daily correspondence, notes, and draft copies of text. In some cases, scribes employed what is known as a hierarchy of scripts, where different scripts are used for headings or important pieces of text to distinguish them from the surrounding writing.

Scripts can be categorized according to whether they are cursive scripts or book hands. Cursive scripts are those in which letters are joined together, thus requiring less lifting of the pen from the page. These types of script are quicker to execute and therefore were often used in the Middle Ages for less formal types of writing or for administrative documents. However, some cursive scripts were adapted for formal writings as well. Book hands are scripts that contain more formalized characteristics. Separate strokes are used to shape letters in order to produce a consistent, clear, and even style. As the

name suggests, these scripts were used in the medieval period for transcribing books. The aesthetic value of formal scripts was important, and some could be highly decorative and difficult to read.

Owing to the number of regional variations, the history of the development of scripts during the Middle Ages is quite complex and constitutes a field of study all its own called medieval palaeography. In western Europe, however, two important general developments took place. In the eighth century, Charlemagne, who ruled over much of western Europe, instigated a number of educational and ecclesiastical reforms, one of which was the standardization of writing. His efforts resulted in a script known as the Caroline minuscule. Renowned for its clarity and harmony of letterforms, this script spread throughout western Europe, and by the 10th century it was the most widely used script of the period. Charlemagne's reforms are an important example of how writing styles were influenced by political directives, as well as by organic change.

While the adoption of Caroline minuscule signaled an era of convergence in script forms, the second major development was one of divergence. In northern Europe during the latter part of the 11th century a new type of script, known as Gothic, began to emerge. More angular, extended, and elaborate than Caroline minuscule, this script signaled a move away from simple letterforms. It also heralded a period of diversification. Gothic script developed in a number of different centers of northern Europe, giving rise to variants that shared some common elements but nevertheless exhibited distinct characteristics. The rise of Gothic variants occurred at the same time that people began to use their local vernacular language, instead of Latin, for some types of writing. Various forms of this script remained in use until the end of the medieval period.

The history of script in the Byzantine Empire is far less complex than that of western Europe because of the cultural and linguistic unity of the region. Yet the developments in scripts there followed a trajectory similar to that of the Latin West. In the early Middle Ages, Byzantine scripts were influenced by the majuscule, or upper-case letterforms used in the classical world. Minuscule scripts, which generally used lower-case letters, developed in the ninth century at the same time that Caroline minuscule was spreading in western Europe. Variations of minuscule scripts dominated Byzantine writing until the end of the Middle Ages and beyond. Unlike the Latin West, the trend to Gothic forms did not happen in the East. The major development in Byzantine scripts during the later Middle Ages was the introduction of more cursive types of minuscule, influenced by the increasing use of paper.

THE ISLAMIC WORLD

BY ROSE ASLAN

The Arabic language is a Semitic language, and its alphabet is written from right to left in cursive form, with rounded characters joined together. Because the language of the Koran is Arabic and the Arabic language was closely tied to Islam, both spoken Arabic and the Arabic alphabet spread with the arrival of Muslims in non-Muslim lands. While a large number of lands adopted the Arabic language and its writing as their own, other regions where people spoke languages such as Persian and Turkish adopted the Arabic alphabet but used it to write their native languages. From Morocco to India the literate used the Arabic alphabet, with Arabic being the language of the Muslim elite; in addition, scribes and calligraphers worked hard to refine the Arabic writing system, creating one of the most beautiful scripts of any language. Because pictorial representation was forbidden in Islam, Muslim calligraphers developed scripts that were literally pieces of art, complete with embellishments and ornate arabesque designs.

Before Islam, very few people were literate. The Arabs were nomads primarily and although they had a rich oral tradition, they did not record most of it, including the poetry that was their most distinguished literary achievement. With the advent of Islam in the early seventh century certain Muslims were assigned to memorize the Koran. It was not until a number of those who had memorized it were killed in battle in 633 that the second caliph, Umar (r. 634–44), persuaded the first caliph, Abu Bakr (r. 632–34), to write down the Koran, which before then had been recorded only on loose leaves of

parchment, pieces of bone, and other miscellaneous surfaces. The third caliph, Uthman ibn Affan (r. 644–56), codified the Koran during his reign. At this point, Arabic script was fairly primitive, but very quickly calligraphers endeavored to turn it into a work of art.

While there may have been Arabic scripts earlier, the oldest existing records of the North Arabic script, the forerunner of classical Arabic, go back to the fifth century. Most scholars agree that North Arabic script evolved from Nabataean script, which in turn evolved from Aramaic script. North Arabic script developed in the northeastern region of Arabia among ethnic groups that occupied the areas known as Hira and Anbar. Subsequently, the script spread throughout the western part of Arabia and was introduced by Bishr ibn Abd al-Malik and his father-in-law, Harb ibn Umayyah, into Mecca. The two men were close companions of the prophet Muhammad (ca. 570–632) and learned how to read and write and participated in the early stages of Islam. One scribe named Zayd ibn Thabit was also close to the prophet Muhammad, serving as his secretary; he was responsible for compiling the first written Koran.

The earliest reference to Arabic script refers to it as *Jazm*, and scholars usually agree that it was an evolved version of the Nabataean alphabet. The *Jazm* script became widespread and was the most commonly used script among the Arabs; it eventually became the common script of Islam and the Muslims. Essentially, the Koran laid the ground for Arabic grammar and script. To the devout Muslim, the Koran holds the canon of the Arabic language as revealed by God to the prophet Muhammad through the angel Gabriel and thus is considered to be divine.



Pen box, brass inlaid with copper, silver, and black organic material; Iran, 13th century (Freer Gallery of Art, Smithsonian Institution, Purchase, F1936-7)

In early Islam copies of Uthman's codified Koran were made first in the *Jazm* and its Mecca and Medina variants and later in the Kufic scripts, which were developed in the town of Al-Kufa in present-day Iraq. By this time several other variants of the *Jazm* script had developed in different regions, but ultimately there were three primary script styles: *Tim*, a script with both triangular and rounded letters; *muthallath*, a triangular script; and *mudawwar*, a rounded script. From these, two types of scripts continued to be used, one called *muqawwar*, which was cursive and simplistic, and the other *mab-sut*, which was angular and rectangular. These two scripts were dominant on the Arabian Peninsula and were the basis of other styles, such as *maail*, which was a commonly used slanted script; *mashq*, which was an elongated script; and *naskh*, which was elegant and inscriptional. These scripts developed independently at the same time that the Kufic script was rapidly evolving into an extremely refined form.

As Islam became more established in Basra and al-Kufa, both of which are in modern-day Iraq, the cities became cultural and intellectual centers for the Islamic Empire, and calligraphers developed the Mecca and Medina scripts into the Kufic script. With its proportional measurements and angularity, Kufic script gained in popularity, reached its height toward the end of the eighth century, and remained dominant for more than 300 years; it was the only script in which the Koran was written during this time. As Islam spread through the lands of those who did not speak Arabic as their native language, reforms had to be made to simplify the language for them.

Originally the Arabic alphabet did not include any diacritical marks, until Abu al-Aswad al-Duali (d. 688), who was also responsible for establishing a system for Arabic grammar, began using colored dots to help those who were learning Arabic pronounce the words. One problem was that there were a number of consonants that had the same shapes yet had different sounds. It was al-Hajjaj ibn Yusuf al-Thaqafi (661–714), an Umayyad viceroy, who commissioned Nasr ibn Asim (d. 707) and Yahya ibn Yamus (d. 708) to solve this problem. They derived vowel signs and marks from the Syriac alphabet and applied it to Arabic in order to differentiate consonants. Because the colored dots and vowel signs, when used together, were overly complex, al-Khalil ibn Ahmad al-Farahidi (d. 786) exchanged Hajjaj's system of diacritical dots on letters with one using diacritical marks that would complement his letter-pointing system.

The Kufic script was also instrumental in forming the diverse scripts that were to come. It was an oblong script, rectangular and quite plain, although beginning in the early ninth century calligraphers would add embellishments and ornamentations. What made it so unique and momentous

was the fact that the height of the letters was almost always much less than their width. Many scholars note that the refinement of the Kufic script developed in accordance with the burgeoning Islamic civilization. The Kufic script was the dominant script in all forms of writing until the late 12th century, when it became mainly ornamental, used in art, while simpler and more functional scripts replaced it for everyday communications.

While several scripts developed up to the ninth century, it was not until the 10th century that Muhammad ibn Muqlah (886–940), an accomplished calligrapher in Baghdad, brought about a momentous change in the Arabic script. Ibn Muqlah developed a perfectly proportioned and elegant script based on his knowledge of geometric and mathematical sciences. Essentially, he was responsible for developing a standard form of the Arabic script based on strict rules. Soon after came Ibn al-Bawwab (d. 1022 or 1031), who further improved Ibn Muqlah's style by giving it more polish and sophistication.

Throughout the medieval period there were six primary Arabic scripts: *thuluth*, *naskhi*, *muhaqqaq*, *rayhani*, *riqa*, and *tawqi*. Outside of the present-day Middle East calligraphers developed their own regional styles of script, such as the Sudani style of sub-Saharan northwestern Africa and the Maghrebi style in present-day Morocco, Libya, Tunisia, and Algeria as well as Islamic Spain.

Because calligraphy was a highly technical occupation and required expertise, students attended special schools to study it for many years. As a refined art, it had special implements that were used to produce the different types of scripts. Scribes worked in the courts as secretaries, recording important documents for the ruling class; in addition, calligraphers were always in demand to produce copies of the Koran and other religious texts. The most important tool for calligraphers was the *qalam*, or pen, which was almost always made from reeds. The reed was cut at an angle and then dipped into ink to write. Differently cut angles on the tip of the pen would produce varying thicknesses of line.

Cutting pens at the most accurate angle to produce the desired effect was a science of its own, and some calligraphers covetously guarded their secret methods of cutting pens and even holding them, only passing their secrets on to close apprentices. The famous calligrapher Yaqut al-Mustasimi (d. 1298) was responsible for inventing a new way of trimming his reed pens, which helped give calligraphic styles even more beauty. Other implements that were essential to the calligraphic trade included a knife for cutting and shaping the pen, brushes, scissors, an ink pot, and a mortar for mixing the ingredients to make ink. These implements would be kept in specially crafted and often



Illuminated opening page from a manuscript of the Hadith, writings concerning the life of the Prophet, ink, watercolor, and gold on paper; Iraq or Iran; 12th to early 13th century (Los Angeles County Museum of Art, The Nasli M. Heeramanek Collection, gift of Joan Palevsky, Photograph © 2006 Museum Associates/LACMA [M.73.5.556])

elaborately decorated cases that were sometimes made of precious materials, such as ivory or silver.

Ink was usually colored black, using natural plant and mineral ingredients; other colors such as indigo and red were also used, as were expensive silver leaf and gold leaf in illuminated manuscripts. The first materials to which inks were applied were hard surfaces, such as stones and bones. In Egypt papyrus had been common since pharaonic times and continued to be used throughout the Middle East. However, manufacturing papyrus was labor-intensive and very costly,

so calligraphers might often use a single sheet many times over, writing on both sides and erasing old text. Parchment and paper could be sold as single sheets or, more commonly, as rolls of sheets that were glued together. Parchment made of animal hide was also used, and in the middle of the ninth century paper arrived in the Islamic world from China. Although paper was expensive in relation to other consumer goods, it was widely available and offered a smoother and thus more desirable writing surface than papyrus.

See also ALCHEMY AND MAGIC; ART; CRAFTS; ECONOMY; EDUCATION; EMPIRES AND DYNASTIES; INVENTIONS; LANGUAGE; LITERATURE; MONEY AND COINAGE; OCCUPATIONS; RELIGION AND COSMOLOGY; TRADE AND EXCHANGE; WAR AND CONQUEST.

FURTHER READING

- Sheila Blair, *Islamic Calligraphy* (Edinburgh: Edinburgh University Press, 2006).
- Michelle P. Brown, *A Guide to Western Historical Scripts from Antiquity to 1600* (London: British Library, 1993).
- Vernier W. Clapp, *The Story of Permanent Durable Bookpaper, 1115–1970* (Toronto: University of Toronto Press, 1971).
- Christopher de Hamel, *Scribes and Illuminators* (Toronto: University of Toronto Press, 1992).
- Department of Medieval Studies at Central European University, Budapest, *Medieval Manuscript Manual*. Available online. URL: <http://www.ceu.hu/medstud/manual/MMM/home.html>. Accessed on May 15, 2007.
- Marc Drogin, *Medieval Calligraphy: Its History and Technique* (Montclair, N.J.: Allanheld and Schram, 1980).
- Noboru Karashima, ed., *Indus Valley to Mekong Delta, Explorations in Epigraphy* (Madras, India: New Era Publications, 1985).
- Abdelkebir Khatibi, *The Splendour of Islamic Calligraphy* (London: Thames and Hudson, 1976).
- Martin Lings, *The Quranic Art of Calligraphy and Illumination* (London: World of Islam Festival Trust, 1976).
- Joseph Needham and Tsien Tsuen-Hsuei, *Science and Technology in China*. Vol. 5, *Paper and Printing* (Cambridge, U.K.: Cambridge University Press, 1985).
- Y. H. Safadi, *Islamic Calligraphy* (Boulder, Colo.: Shambhala, 1979).
- Richard Salomon, *Indian Epigraphy: A Guide to the Study of Inscriptions in Sanskrit, Prakrit, and the Other Indo-Aryan Languages* (New York: Oxford University Press, 1998).
- Annemarie Schimmel, *Calligraphy and Islamic Culture* (New York: New York University Press, 1984).
- Gary Urton, *Signs of the Inka Khipu: Binary Coding in the Andean Knotted-String Records* (Austin: University of Texas Press, 2003).

Glossary

- a cappella** Performed or sung without instrumental accompaniment.
- abacus** A counting board used to perform simple mathematical calculations by manually sliding counters along wires set in a framework.
- ablution** Washing or cleansing of the body as part of a religious rite.
- acropolis** A fortified district of a city.
- adhan** In Islam, the call to prayer.
- adit** Nearly horizontal passage from the surface in a mine.
- adobe** A building material made from a mixture of water, clay, and straw, often shaped into bricks and dried in the sun.
- adze** A chopping and carving tool made with a thin blade attached at right angles to a handle.
- age set** A group of people in the same age range who undergo all life transitions together.
- age-grade system** An arrangement in which communities consciously promote internal cohesion within age cohorts; the community delegates some tasks to each age group, and members undergo a rite of passage before succeeding to the next (older) cohort.
- agropastoral subsistence** A livelihood based on a combination of farming and herding, often involving the migration of herds between pasturelands.
- alchemy** The science of trying to transmute base metals into gold, usually practiced by an elite in medieval laboratories.
- alderman** An Anglo-Saxon term meaning “chief” and often used to designate the head of a guild and more generally a member of a town council.
- amalgamation** Extraction of precious metals from their ores by treatment with mercury.
- amphora** A special type of ceramic pot, manufactured on an industrial scale and used for storage throughout the Roman Empire and later by other cultures.
- amulet** A charm, or object meant to ward off evil influences and bad luck.
- animism** A belief system that holds that the universe is full of spirits who are mostly indifferent to earth and humanity and that anything can have its own spirit, including rocks, plants, and animals.
- anneal** To heat and slowly cool metal to make it less brittle and stronger.
- anthropomorphize** To endow an inanimate object, animal, or natural phenomenon with human characteristics.
- apostasy** Renunciation of a particular religious faith.
- apse** The rounded end of a building, such as a church.
- aqueducts** Man-made tunnels that bring water from one place to another.
- arabesque** In architecture, a style of ornamentation that involves interlacing plant forms and abstract curvilinear motifs, characterized by a series of counterpoised and leafy stems that split off and return into the main stem.
- Arabic numerals** Graphic symbols standing for quantities, developed in India and transmitted to Europe by Arabic scholars in the medieval period.
- arboriculture** Cultivation of fruit and other foods from trees.
- archaeoastronomy** The study of the ways in which ancient cultures interpreted celestial objects.
- archaeofauna** A collection of animal bones from an archaeological site.
- archipelago** A geographically linked group of islands.

- armillary sphere** A celestial globe or model of the heavenly bodies used as a sighting instrument to determine the relative positions and movements of the stars.
- asceticism** Practices to control or discipline the body, such as fasting or refraining from sleep or sexual activity, usually undertaken in connection with religious rites or as a spiritual discipline.
- ashlar** An individual piece of dressed stone used in construction.
- assay** Analysis of ore for particular components.
- astrolabe** An instrument used to mathematically determine the positions of celestial bodies.
- astrology** A pseudoscience whose validity was almost universally accepted in the Middle Ages and that proposed that a detailed analysis of the positions of the stars and planets can reveal information about the future or about what actions ought to be taken or not taken.
- atlatl** A device for throwing a spear or dart that consists of a rod or board with a projection (as a hook or thong) at the rear end to hold the weapon in place until it is released.
- atoll** A coral reef island surrounding a lagoon and set in the open sea.
- aurora borealis** A spectacular pattern of lights seen near the North Pole when charged particles from the sun are caught in the earth's magnetic field; also called the northern lights.
- autonomous** Independent, not subject to outside control.
- bailiff** An official whose job in the medieval age was to supervise the work of farmers, enforce the laws of the manor, and dispense justice on behalf of the lord.
- baride** The Islamic mail system.
- barrel vault** An architectural feature, usually referring to roofs, that starts with a rounded arch and extrudes it horizontally, creating a barrel effect.
- barter** Exchange goods for goods without using money.
- base metal** A common metal, like lead or iron, that is less valuable than other metals, such as silver and gold, but that alchemists believed they could transform into the more precious substance.
- basilica** A large building built by joining parallel rows of arches, creating a long, relatively narrow space.
- bas-relief** A sculptural form in which the projection from the surrounding surface is slight and no part of the modeled form is undercut.
- batik** A technique for dying cloth in which portions are left undyed in such a way as to form a pattern or design.
- bellows** A device for forcing air through a furnace; essentially a bag or box that releases air under pressure when compressed.
- benefaction** A contribution to charity.
- berm** An earthen embankment or mound.
- bestiary** Collection of stories describing real or imaginary animals and offering moral interpretations of their behavior.
- biomass** Estimate of the weight per area of living and dead organisms, which can be limited to specific species.
- biome** A particular ecological zone determined by the combination of temperature and precipitation (such as a rain forest, a savanna, or a desert).
- Black Death** A medieval epidemic of bubonic and pneumonic plague, an infectious and sometimes fatal bacterial disease transmitted by fleas.
- blast furnace** Large furnace in which combustion (and heat) is intensified by a blast of air, especially those used for smelting iron with mineral fuel, resulting in a very efficient extraction.
- bloomery furnace** Traditional furnace used for smelting iron in preindustrial times, fueled with charcoal and with relatively low efficiency.
- book hand** A term used to describe a number of formal scripts that were used to transcribe books.
- bride-price** A fee of money or property given by a prospective groom or his family to the male guardian of a woman as part of the marriage contract, to compensate the family for the loss of the productive powers of their daughter; also called bride-wealth.
- brigandage** Highway robbery.
- brine** Water saturated with salt.
- bubo** A dark swelling under the skin, symptomatic of bubonic plague.
- bubonic plague** The most common type of plague that infects humans; transmitted from the bite of infected fleas living on rodents.
- bull** An official decree of a pope.
- bullion** Bars of gold or silver.
- burgage plot** A defined parcel of land usually occupied on a rental basis paid to the town lord or a king.
- burgess** Generally an inhabitant of a town but often, in particular, one who enjoys the privileges and duties of a free-man or citizen.
- burqa (or burka)** Loose garment made of a single piece of material that covers the entire body, face, and hair.
- cabaret shows** In medieval European theater, performances involving singing, dancing, juggling, and magic acts.
- cacique** In Latin America, the chief of a clan or tribe.
- cadastral survey** A collection of information about individual land parcels, providing information on such variables as location, use, value, and ownership.
- calendar round** A period of 52 years.

- caliph** Deputy or ruler of the Muslim community, who acts as both religious and political leader; considered to be a successor of Muhammad as a spiritual and secular leader of Islam.
- caliphate** A realm established to extend political and religious authority over the entire community of Muslim believers.
- camera obscura** A dark enclosure with an opening, possibly fitted with a lens, through which an image can enter, to be projected on the opposite wall of the enclosure.
- canon law** The law code of the Catholic Church, based in form on Roman law, that regulates matters such as heresy and discipline of the clergy.
- canonical** Belonging to a set of writings, usually religious, that are regarded as authentic and authoritative.
- canonization** Process by which a holy person becomes included in the canon, or body, of officially recognized saints.
- canopy cover** Measure of the area covered by vegetation.
- carat** A measure of the fineness of gold or the unit mass used to measure gemstones.
- caravan** A group of travelers and merchants who travel together.
- caravansary** A rest station or inn that accommodates caravans along trade routes, usually with a large courtyard and necessary facilities for travelers.
- caravel** Small, maneuverable sailing vessel that enables seafaring nations to sail long distances against contrary winds and currents.
- carburization** Treatment of iron with charcoal to increase its carbon content, thereby forming steel.
- carrack** Small, sturdy boat made of wood and hides.
- cartography** The making and studying of maps.
- case law** Law based on court interpretations.
- cash economy** Economy that primarily uses money for buying and selling goods.
- cast iron** Iron and carbon alloy produced as a liquid metal that can be cast into molds but is relatively brittle when hardened.
- caste** A subdivision of social class used in medieval India; caste determined a person's occupation and marital choices.
- cataphract** A heavy cavalry trooper of the Byzantine Empire.
- cavalry** The portion of a military force composed of soldiers mounted on horseback.
- celestial navigation** Navigation by the use of the stars in the night sky.
- cenote** Natural limestone sinkhole, a source of freshwater in the desert areas of Yucatán Peninsula and considered a sacred place.
- censer** A vessel inside which incense is burned.
- central place** A settlement that plays a central role in state political authority, economic control, or religious activities (usually the "capital" of a kingdom or empire or one of its provincial "capitals"), often centrally located within the polity.
- chain mail** Flexible armor made of small, interlinked metal rings.
- chanson de geste** Name given to the French heroic epics of the 12th and 13th centuries, traditionally featuring Charlemagne (742–814) and his barons fighting against the Saracens.
- charnel house** A chamber or building in which bodies or bones are deposited.
- charter** A document describing the rights, privileges, and duties that define government, usually of a town.
- chasing** Indentation or grooving in metal.
- chattel** Property; often used in the phrase *chattel slavery*, referring to a slave system in which slaves are regarded as the property of their owners.
- chi** In Chinese philosophy, the animating force of the body and of the entire cosmos.
- chiefdom** A type of intermediate social and political organization, one that usually numbers in the thousands and is headed by a leader who often has inherited authority from ancestors.
- child oblation** The permanent donation of a child to the church by its parents, especially prevalent prior to the 12th century in Europe.
- chivalry** The art of acting as a knight; the upholding of the ideals of religion, valor, and charity.
- chronometer** A device for measuring time at sea.
- churching** The ritual of receiving a mother back into the church after childbirth.
- cinnabar** Red mineral consisting of native mercuric sulfide that is used as a cosmetic pigment for coloring cheeks or lips red.
- city-state** Independent city and its surrounding territory.
- cladding** Metal coating bonded to another metal.
- clan** A group of one or more lineages or kin groups related together to a common distant ancestor, sometimes regarded as of divine origin.
- clepsydra** A water clock.
- clientship** A social relationship between two people in which one acknowledges his or her dependence on and lower social status to that of a wealthy patron in return for the patron's protection.
- codex (pl. codices)** Manuscript book, especially scripture, classics, or ancient annals.
- codification** Act of organizing rules or laws into a code or prescribed system.

- colonnades** Series of columns that support a roof.
- colophon** A symbol or symbols printed in a book and representing the publisher or details of publication.
- common law** Traditional law system of the Germanic tribes, within which the precedent established by earlier legal decisions is binding on future judgments.
- commune** A self-governing city or town, typical of medieval Italy.
- compass** An instrument used for navigation that points north-south.
- concubine** A woman who serves as a sexual partner to a man but who is not married to him.
- conscripts** Soldiers who are forced into involuntary military service by a government or ruling authority.
- consecrate** To make sacred or holy.
- consumer economy** An economy in which the satisfying of human wants is an important aspect of creating wealth.
- coppice** The practice of cutting trees above ground level to create a sprouting stump that yields a significant number of smaller branches.
- corbel vault** An arched structure created when stones are offset and project toward the center of the arch to support weight.
- corvée** Labor exacted by a local authority for little or no pay; typically a form of taxation.
- cosmology** Branch of philosophy dealing with the origin and structure of the universe.
- coulter** A vertical blade that breaks up hard earth ahead of a plowshare.
- council** A body of church elders including a majority of bishops who meet together to conduct church business.
- cowrie shell** The shell of a marine mollusk commonly used as currency in Africa, the Americas, and other parts of the world.
- cranial deformation** The practice of using boards, mats, or vices to shape the cranium or skull of an infant before the bone has fused together and hardened.
- cresset** A stone or metal basket, typically mounted at the top of a pole, in which fuel is burned.
- crucible** A vessel made of a heat-resistant material in which metal or glass is melted into liquid.
- cruciform** Having the shape of a cross.
- crusade** Military action that serves the ends of the church and is called for by the pope, especially the Crusades by western European knights in the Near East between 1095 and 1291.
- cubit** A unit of measure equal to the distance from a man's elbow to the tip of his middle finger.
- cuirass** An armored jacket or breastplate that protected a soldier's upper body.
- cultigen** A cultivated or domesticated plant or animal.
- cuneiform** Script with wedge-shaped characters used in ancient writing systems.
- cunning men or women** In medieval Europe, folk healers who cast spells or used herbal remedies to promote healing.
- curtive** A script that uses connecting strokes and letters, which means that it can be written rapidly.
- customary law** System of law based on common usage and customs of a particular group or community.
- dactylonomy** A system of counting and signing numerals using the fingers of the hand.
- daimyo** A Japanese feudal lord.
- damascening** Ornamentation with wavy lines and shapes or inlaying with various metal compositions (including gold or silver); typically done to iron or steel.
- debase** To lower the amount of precious metal in a coin.
- debt bondage** Selling oneself into slavery to pay off a debt.
- decimal** A system of counting with 10 distinct numerals representing the quantities zero through 9.
- demesne** The estate of a feudal lord, which included productive land, forests, pasture, villages, and any income-producing property such as mills and workshops.
- denary scale** A system of numeration based on the number 10.
- derivation** The formation of a word from another word or from a root in the same or another language.
- descant** A musical technique, developed in medieval Europe, in which the upper voice and the lower voice move at approximately the same rate with a steady beat.
- dhimma** A covenant or pact originally created by Muhammad following the conquest of Jewish Arab tribes in Khaybar, which formed the model for subsequent treatment of conquered Christians and Jews.
- dhimmi** A non-Muslim living in the Muslim world who follows a religion that is tolerated by Islam, mainly Christianity and Judaism.
- dhow** A small boat with a triangular sail and a low mast.
- diaspora** The dispersal of an ethnic or religious group so that members live as minorities or "strangers" in places seen as the ethnic preserve of other peoples.
- didgeridoo** A pipe played by aboriginal Australians.
- die** An engraved metal cylinder used to transfer an image to a coin.
- diets** Regional assemblies or legislatures.
- digvijaya** A series of campaigns conducted by Indian kings to extend their rule in the four major directions, symbolizing conquest of the four corners of the earth.

- dike** A hill of earth built alongside a river, stream, or other body of water to prevent it from overflowing its banks and flooding the surrounding area.
- dimorphic zone** A region where both pastoral and sedentary activities and modes of production may overlap.
- direct reckoning** The direct, sequential numbering of days of the month.
- disease climate** The general healthiness or unhealthiness of an area, including both indigenous and foreign diseases as well as other factors, such as nutrition and warfare, that affect the body's ability to fight off disease and infection.
- divination** Any ritual means of consulting the divine about matters that cannot be humanly known, such as foretelling the future.
- divine right** The belief that God, rather than the people, gives a ruler the right to rule.
- diviner** A person who divines, or prophesizes, also called a soothsayer or prophet.
- doge** The chief magistrate of Venice or Genoa.
- domestication** The biological process by which plant and animal species undergo morphological changes (changes in form), usually coming to depend on human intervention for their survival.
- dou gong** In Chinese architecture, a bracket that can be placed atop a post to increase its weight-bearing capacity.
- dowry** The money, lands, or goods that a bride brings to her husband in marriage or the contribution that a woman makes to a convent upon becoming a nun.
- drawplate** Usually made of iron, a device with holes of different diameters through which hot metal could be drawn to form wires or rods.
- dress** To carve stone into a desired shape and smoothness.
- drought** A period in which little or no rain falls, reducing water levels below the level required to sustain crops and natural vegetation.
- Druid** Ancient Celtic priest or religious leader.
- dry farming** The practice of raising crops while relying only on natural rainfall as a water source.
- drystone walls** Walls built of stones fitted together without mortar.
- ecliptic** Path of the sun across the celestial sphere.
- economic recession** A decline in economic activity, often during an otherwise prosperous era.
- El Niño** A cyclical weather phenomenon caused by warming of the waters of the eastern Pacific Ocean, often resulting in drought.
- elixir** A mixture of ingredients once thought capable of transmuting, or transforming, base metals into gold.
- embossing** An ornamentation technique that applies a raised pattern of design on the surfaces of metal or wood.
- emir** A local governor or administrator of an Arab province or state.
- emporia** Trade and manufacturing settlements connected to long-distance exchange networks, often founded and administered through royal control.
- engraving** A method of decorating used to create a three-dimensional effect by inlaying gold, silver, or precious stones into a metal surface to create designs.
- entrepôts** Intermediary trade centers along a trade route.
- epicenter** The geological center of an earthquake.
- epicycle** In early astronomy, a planet's circular motion, or orbit, moving around the circumference of another, larger circle with the earth at the center.
- epidemiologist** Scientist who studies the causes and spread of epidemics.
- equant** Mathematical concept introduced by Ptolemy to account for the motions of the heavenly bodies.
- equator** An imaginary line drawn around the middle of the earth, separating the Northern Hemisphere and Southern Hemisphere.
- equinox** Either of two times each year (in March and September) when the sun crosses the equator and the length of day and night are about equal.
- escapement** A device in a clock or other timepiece that controls the rate of the clock by advancing the movement of a gear train at regular intervals.
- escarpment** A cliff or steep slope separating two plateaus or level surfaces, usually formed by erosion or geological faulting.
- eschatology** A theological discourse concerned with the end of time and the final day of the world, during which human deeds may be examined by God on a day of judgment.
- ethnography** The scientific study of culture, particularly of the cultural character of various nations and peoples.
- etymology** The linguistic history of a word.
- eunuch** A castrated man.
- evisceration** Removal of the internal organs.
- excommunication** The order of a bishop cutting off from the sacraments of the church an individual who is deemed not to be in a state of grace.
- exedra** A domelike structure that forms a recess in a building's facade.
- exegesis** The interpretation of texts, especially religious formative texts.
- exogamous marriage** Marrying outside a particular group, usually as prescribed by law or social custom.
- falconry** The sport of hunting small game with falcons.

- fallow** Left unseeded during a growing season to conserve and renew the soil.
- fallow forest** The developmental stage and types of forest species that grow up after a forest has been cleared.
- fermentation** Controlled chemical change in an organic product (such as food) caused by a microorganism such as a yeast.
- feudal law** Body of law that governed the personal relations and mutual obligations between lords and freemen in medieval society.
- feudalism** System of governance in which a monarch or other landholder (lord) lets control of a given region to a vassal in return for military service.
- fief** A grant of land in return for military service and aid.
- filial piety** Respect for one's parents, in-laws, and ancestors, a key virtue in both Confucianism and Hinduism.
- finial** Decorative object placed on the peak or corner of a roof.
- flail** A small tool consisting of two stout pieces of wood joined by a rope or chain used to winnow crops or to separate edible grains from inedible stalks and chaff.
- flux** Substance used to promote fusion of metals in soldering.
- flying buttress** An exterior buttress, or wall reinforcement, that is connected to an interior arch and transfers weight to supports outside the building.
- foundry** A place where metal is melted.
- four-iwan plan** In medieval Islamic architecture, a plan in which rooms were located around a rectangular or square central courtyard.
- fulling mill** A mill, common in medieval Europe, that used waterpower to pound woolen cloth in a process known as fulling.
- gable** A triangular section of a roof.
- gamelan** An Indonesian orchestra composed primarily of a variety of wood, iron, and bronze drums and gongs.
- geocentric theory** The belief that the earth stands motionless at the center of the solar system while the moon, sun, planets, and stars revolve around it.
- geoglyph** A symbolic figure sketched in the earth.
- geomancy** Study of the landscape and of geographical features, as a way to make predictions about the future.
- gesso** A mixture of plaster and glue used as a background for paintings.
- ghazal** An Arabic love lyric consisting of five to 12 verses.
- ghetto** A walled community within a larger city in which Jews were compelled to live in the latter Middle Ages and after.
- gibbet** Upright post with a projecting arm for hanging the bodies of executed criminals as a warning.
- gilding** Coating or decorating a metal object with gold or another golden substance.
- glaze** Shine and color effects in pottery achieved by applying a mixture of silica, alkaline, or metal oxides to the surfaces of vessels.
- glyph** A symbolic figure or a character usually incised or carved in relief.
- gorget** An article of armor worn at the throat.
- grave goods** Material possessions, which might include food, tools, jewelry, and other people, that are placed with the deceased when they are buried.
- griot (female, griotte)** Professional poet, singer, and performer of western Africa.
- gristmill** A mill that grinds grain.
- groin vault** An architectural feature produced by the horizontal intersection of two barrel vaults at right angles.
- guild** An organization of people, based on their occupation, that protects members from competition, standardizes prices and training practices, and provides aid to the families of members in need.
- Hadith** The narrative collection of sayings and deeds of Muhammad as passed down by individuals who heard or saw the Prophet's deeds and actions during his lifetime.
- hagiography** Biographical account of a saint or revered person written to commemorate and glorify his or her life and for devotional rather than scholarly purposes.
- hajj** Pilgrimage to Mecca, considered a sacred duty for Muslims.
- halal** In Islam, that which is permitted or fit for use by Islamic law or codes of morality.
- hallucinogen** A plant or drug that induces visions or imagined perceptions.
- haram** In Islam, that which is forbidden or unfit for use by Islamic law or codes of morality.
- harem** In the Middle East, an area inside a home set aside for women and children.
- Harmattan** Dry northeast trade wind, found on the Atlantic coast of Africa.
- harrowing** The task of covering planted seeds with soil to protect them from wind, rain, and animal predators.
- hayward** In medieval Europe, a guardian of the fields and hedges, responsible for preventing damage to the properties from the herds and corralling any stray animals.
- hegemony** Authority over others; social domination of one group over another.
- hegira** Migration.
- heliocentric theory** The belief that the sun lies at the center of the solar system and that the earth revolves around it with the rest of the planets.

- henna** Reddish-orange dye that comes from leaves of a plant and is used to dye hair and decorate hands and feet.
- herbalist** A physician who seeks to alleviate symptoms through the use of medicine made from plants.
- heresy** Beliefs concerning theological matters that are condemned by church authorities as opposing orthodox beliefs.
- heterodox** At variance with established or accepted beliefs or practices.
- hexadecimal** A system of counting by 16, with symbols representing quantities 1 through 16.
- historical linguistics** Study that determines the historical relations between communities by analyzing present-day language.
- historiography** Historical writing, or the study of historical writing.
- hornbook** An aid used to teach medieval European children to read, consisting of a wooden tablet with a handle at the bottom onto which the alphabet was copied.
- humor** In ancient medicine, one of four body fluids that were thought to govern the constitution of the body and a person's basic temperament.
- hunter-gatherer** A person who lives by hunting and gathering wild foods instead of cultivating plants or herding domesticated livestock.
- hydrological engineers** Experts in the effects of moving water on surfaces.
- hypostyle** A building in which the roof rests on rows of columns.
- hypotenuse** The side of a right triangle opposite the right angle.
- iconography** The pictorial representation of a subject through specific visual symbolic strategies that often become standardized over time.
- illumination** Miniature painting that often uses gold, silver, or other bright colors and is placed inside a manuscript alongside text.
- imam** Generally denoting a spiritual leader of Islam, such as the person who leads prayers in a mosque.
- incantation** A spoken chant that works as a magic spell.
- inclusive counting** A system of counting within some calendars in which both the first and the last day are included in the calculation.
- incrustation** A method of decorating by applying an additional coat or inlay of enriching material to the surface of an object.
- indulgence** In the Roman Catholic Church, the granting of remission by the pope of time spent in purgatory for having committed sins.
- infanticide** Killing an infant, usually at birth.
- infantry** Soldiers or military units that fight on foot.
- infidel** Disparaging term applied by medieval Christians to any group that was not Christian, especially Muslims; derived from the Latin for "faithless."
- infix** A formative element inserted in the body of a word.
- inlay** Decoration of a metal object achieved by inserting or applying fine layers of different metals on the object's surface.
- interdict** An official Roman Catholic censure, banning a person or group from receiving the sacraments and Christian burial.
- Ionic numeral system** Sometimes known as the Greek alphabetic system, a number system used in ancient Greece and the Byzantine Empire in which the letters of the Greek alphabet represent numerals.
- isostatic rebound** Rise of land masses after the weight of glaciers is removed.
- ius commune** Literally, "common law"; in medieval Europe, a common body of civil law that formed out of canon law and Roman law in the 12th century.
- Janissaries** Turkish corps of slave soldiers drawn from Christian towns and villages, converted, and given military training.
- jihad** An Arabic word denoting a struggle undertaken for the sake of Islam.
- jinn** In Islamic belief, spirits or supernatural beings that dwell in various forms on the earth and exercise supernatural powers.
- kami** In Shinto, local guardian spirits.
- kamikaze** A Japanese word that means "divine wind"; originally a description of the two typhoons that prevented the Mongol rulers of China from invading Japan in the 14th century, it later came to refer to Japanese suicide pilots during World War II.
- kana** A script for writing the syllables of Japanese.
- khan** Ruler of a Mongol khanate, one of the Asian domains established during the conquests of Genghis Khan and his successors in the 13th century.
- kimono** A long, wide-sleeved Japanese robe.
- kinship** Ties (either biological or cultural) that determine human groups.
- kiva** A North American Indian ceremonial structure that is typically round and partly underground.
- labor services** Taxation in the form of unpaid labor rather than through the payment of cash or goods.
- laity** Religious worshippers who are not ordained members of the clergy.
- lamellar** Composed of small plates laced together.
- lateen sail** A triangular sail.

- lathe** A device for spinning wood while the wood is carved by a cutting tool.
- latitude and longitude** A regular grid of imaginary lines laid over the earth to give precise and consistent references to the locations of geographical features; latitude measures distances north and south of the equator, and longitude measures distances east and west of the prime meridian.
- latticework** A decoration technique in which strips of metal or wood are crossed, resulting in a crisscross pattern of design; commonly used in furniture and building ornamentation.
- league** Unit of distance equal to about 3 miles.
- lexical** Relating to words and word roots.
- lexicon** The vocabulary of a language or branch of knowledge.
- limbus puerorum** In the Christian religion, the destination of the souls of the unbaptized who have died in infancy.
- lineage** Line of descent from a common ancestor.
- lingua franca** A common language between speakers whose native languages are different.
- linguistics** The study of grammar, syntax, vocabulary, and other aspects of language.
- lintel** A horizontal architectural beam spanning and usually carrying the load above an opening (such as a window or door), across vertical posts.
- liquation** Method of extracting silver from copper containing silver by treating the metal with lead.
- Little Ice Age** A period of cooler temperatures and longer winters that began just after the close of the Middle Ages.
- Little Renaissance** In 12th-century western Europe, the reception of a great mass of lost Greek literature in Arabic translation and its effects on learning and civilization.
- liturgy** A rite having to do with the Eucharist, the sacrament commemorating Christ's Last Supper.
- livery** Distinctive clothing or emblems worn to signal membership in a particular group, such as a guild.
- loanword** A word adopted from another language.
- lodestone** A piece of intensely magnetic magnetite, a magnetic mineral form of iron, used as an early form of magnetic compass.
- loincloth** A piece of cloth wrapped around the hips and groin, typically worn by men in warm climates.
- Long Count** A Mesoamerican nonrepeating calendrical system of counting days from a specific origin date.
- lost-wax casting** A process in which a wax sculpture is encased in clay, the wax is melted, and the resulting cavity is filled with molten metal and allowed to cool; the clay is then broken, making a metal copy of the original wax sculpture.
- lunar calendar** A calendar based on a period of 12 lunar months (approximately 354 days total).
- lunation** A lunar month, that is, the period between new moons.
- luster paint** A glaze coloring technique in which dissolved gold or other precious metal oxides are applied as a base to the surfaces of pottery or glass vessels, resulting in a metallic shine and color.
- macroregion** A large area.
- madrassa** A Muslim school, college, or university, typically attached to or associated with a mosque.
- mail** Armor made of rings of metal interwoven to make a sort of cloth.
- maize** The main staple grain of the Americas, frequently called "corn" in the United States.
- majuscule** Any script written using letters of equal height, such as all capital letters.
- manna** A divine animating energy.
- manor** A system of medieval landholding in which a large agricultural area held by a lord in return for a pledge of military service to a higher authority, such as the king, was worked by peasants bound to the land.
- manorial justice** Also called seigneurial justice, part of the economic and administrative system known as manorialism or seigneurialism in medieval Europe, wherein landlords had jurisdictional authority over their estates and held courts in which they dispensed justice.
- mansard** A roof with two slopes on each of its four sides.
- mantle** A sleeveless cloak.
- manumission** The freeing of slaves.
- maqamah** A literary genre, popular in the medieval Islamic world, used to tell basically simple and entertaining stories in rhymed prose.
- marquetry** A method of inlaying wood with various colors or other materials to achieve elaborate design effects.
- mashrabiya** In the Middle East, bay windows enclosed with decorative wood screens that allow cross-ventilation as well as family privacy.
- masnavi** A poetic form that originated in Persia and that involves a rhyming couplet; closest to the epic poem in Islamic literature.
- materia medica** A variety of natural substances used in medical remedies.
- matriarchy** Social organization dominated by women.
- matrilineal** Tracing ancestry through a female line of descent.

- matrilocal** Term used to describe a social custom according to which a groom lives with his bride's mother's kin rather than his own.
- mausoleum** A large structure that contains one or more tombs.
- mead** An alcoholic beverage made by fermenting honey boiled with water.
- Medieval Warm Period** A period of generally high temperatures and longer growing seasons that occurred from the ninth to the 14th centuries in Europe.
- melismas** Musical devices, common in medieval chants, in which many notes are set to a single syllable of text.
- melothesia** The belief that the human body is a direct reflection of the universe as a whole, especially of the stars and constellations.
- mendicant** Begging friar who lives off the alms of others.
- mercenaries** Soldiers who fight for pay rather than allegiance to a ruler or a national cause.
- mestizo** A person of mixed European and American Indian ancestry.
- middens** Heaps of discarded items or refuse; examined in archaeological contexts to determine materials used by a community.
- mihrab** A niche in a mosque that indicates the direction of Mecca.
- millstone** A flat stone with grooves carved in it used as a grinding surface in a mill.
- minaret** A tower attached to an Islamic mosque and from which a muezzin calls the faithful to prayer.
- minbar** Pulpit in a mosque.
- minuscule** A script in which the strokes of letters may include strokes above and below the line (ascenders and descenders) that create letterforms of unequal height, such as lower-case letters.
- miracle play** A play that focuses on the lives and deeds of Christian saints and heroes.
- moldboard** A horizontal bar that turns soil after it has been dug by a plowshare.
- monastery** Secluded house in which monks live and concentrate on living a pious existence.
- monolith** A large freestanding stone, usually set up for or associated with a religious function.
- monolithic** Carved of a single block of stone.
- monophony** Music that has one melodic line with little or no accompaniment; characteristic of medieval chant or plainsong.
- monsoon** A tropical climate characterized by long, dry winters and rainy summers that arrive predictably; might refer to the climate, the summer rains, or the prolonged winds blowing from the equator and preceding the rains.
- monumental** With reference to artworks, generally large in scale or created to commemorate an event, such as an important historical occurrence or a death.
- morality play** An allegorical play with a moralistic message wherein the characters embody abstract qualities, such as Virtue and Vice.
- mortar and pestle** A hand mill that consists of a bowl (mortar) and a heavy stick with a rounded end (pestle).
- mortise** A hole in stone, wood, concrete, or some other material that is designed to hold a projecting piece of material called a tenon.
- mosaic** Image or pattern made by arranging and affixing small pieces of colored tile, stone, glass or other materials to a flat surface.
- motet** A musical composition in which a fragment of a chant, given a repeated rhythmic pattern, underlies one to three other voices, each with its own text.
- movable feast** A festival or religious holiday that falls on different days in different years.
- nagual** The Aztec concept of a human's animal alter ego.
- natal family** A surrogate kinship group based on an intense bond of loyalty between a mother and her children.
- natal horoscopy** The idea that a person's future may be known in detail from looking at the position of the planets at the instant of his or her birth.
- nave** The central aisle of a church or cathedral.
- nayaka** The military aristocracy of medieval India.
- neologism** The extended meaning of an existing word.
- niello** Amalgam of dark metals applied to etched portions of a silver receptacle to create silver patterns against black backgrounds.
- night soil** Human excrement commonly used as agricultural fertilizer in the Middle Ages; so called because the workmen who dealt with it were allowed to transport it only at night.
- niqab** Veil that covers the face and leaves a slit for the eyes.
- nixtamalization** A process in which grain is boiled in limewater, removing the outer husk to make vitamins and proteins more available in finished food products.
- nomadic pastoralism** A form of pastoralism in which herders are seasonally or constantly mobile to ensure adequate water and pasture for their livestock.
- noria** A device for lifting water from one level to another using a series of buckets attached to a wheel.
- nucleated settlement** A compactly settled village or town in which the houses and other buildings are all grouped close to one another, with the main agricultural lands (except kitchen gardens) surrounding the settlement as a sea surrounds an island.

- obliquity** Angular deviation from a reference line; the obliquity of the ecliptic (the path of the sun across the celestial sphere) is the angle between the plane of the earth's equator and the plane of its orbit.
- occult science** A clearly defined set of practices within a religious or philosophical tradition that usually involves initiation and the teaching of secret information between master and pupil, such as with alchemy.
- occultation** Astronomical event wherein a planet passes behind the moon.
- ogive** Any pointed shape, figure, or feature; often used to refer to the pointed arches of medieval Gothic architecture.
- open-field agriculture** A system of medieval farm management in which households did not fence their individual plots and were subject to the regime of a shared calendar, with plots managed by separate households during the growing season but subject to communal grazing after the harvest.
- orthodoxy** Established and accepted practice or belief.
- ossuary** A storage container for bones, which might be an urn, a chest, or even the vault of church.
- paddle-and-anvil technique** A technique used to form a pottery vessel in which the potter holds a supporting tool, the anvil, on the inside of the vessel while striking the outside with a paddle, usually made of wood.
- paduka** Indian sandals with a large knob that was gripped between the toes.
- pagan** A Latin word suggesting lack of sophistication; used by Christians to describe Greeks, Romans, and other peoples who practiced traditional religions not related to Judaism, Christianity, or Islam.
- pagoda** A tall tower found in eastern Asia, typically built to honor the Buddha.
- palimpsest** A piece of parchment used a second time by scraping off the original text before writing on it again.
- palisade** A fence of wooden stakes set into the ground and used for enclosure or defense.
- pampa** Large, grass-covered plain found in South America to the east of the Andes.
- panacea** A substance that can cure all ills and was once thought to restore youth.
- pannage** The act of allowing pigs to forage at will in a forest for food; also the law that allows this practice.
- papacy** The system of government of the Roman Catholic Church, headed by the pope.
- parchment** Animal skin—typically goat, sheep, or calf—that has been cleaned and prepared for use as writing material.
- parliament** Popular assemblies in western Europe descended from assemblies of the old Germanic tribes.
- partitive inheritance** A system under which each son inherits a share of his father's wealth.
- pastoral nomadism** A lifestyle that is migratory in nature and involves the shepherding of animals.
- pastoral** Related to the lifestyle of herding animals, such as sheep or goats.
- pastoralism** A type of economy emphasizing the raising and tending of livestock such as cattle, camels, goats, and sheep to produce food and utility items, such as skins, for trade and consumption.
- pastoralists** People living on an economy of herded domesticated animals, usually associated with extensive grasslands suitable for grazing.
- patriarchy** A form of social organization in which men dominate women.
- patrilineage** A kinship system based on tracing kin group membership through one's father.
- patristic texts** Works pertaining to the writings of the church fathers.
- patron-client relations** A system of social relations, common throughout the ancient and medieval Mediterranean world, in which a wealthy and powerful person gave legal and economic protection to a group of dependent clients in exchange for their political support.
- pavilion** A large tent like that used by nomadic Arabs.
- pectoral** A flat ornament or adornment worn on the chest.
- penance** Atonement of sin, generally consisted of a confession to a priest.
- pendentive** A triangular segment of a sphere, which tapers to a point at the bottom and flanges outward at the top.
- peonage** Forced labor to pay off debts or to be performed in lieu of taxes.
- permafrost** Soil whose water is permanently frozen, even in summer.
- personality of the law** Legal principle whereby the laws governing individuals were applied according to a person's ethnic origin rather than the territory in which they lived.
- petroglyph** A carving or inscription on a rock.
- pharmacopoeia** A book that contains descriptions of medications and drugs along with directions for compounding prescriptions.
- philosopher's stone** A substance thought to cure all diseases and bestow perpetual life on its user.
- phonetics** The system of sounds of speech in a particular language or languages.
- physiognomy** The pseudoscience of predicting character from the shape of the head.
- pier** A wall support, similar to a column but generally thicker and more massive.

- pig iron** Iron and carbon alloy produced as a liquid metal in a blast furnace; it can be decarburized to form wrought iron or steel, suitable for smithing into objects.
- pilgrimage** Journey to a shrine of religious faith, such as Mecca, Santiago, or Jerusalem, for devotional purposes.
- pit house** An ancient form of dwelling consisting of a pit excavated in the earth and roofed over.
- placebo effect** The psychological effect that causes patients to feel better after they receive medical treatment, whether or not it is actually effective.
- place-value notation** Also called positional notation, a numerical system in which the value of a digit is determined by its unit value multiplied by the base raised to the power of its position.
- plaque** A thin plate or inscribed tablet of metal, porcelain, or other materials used for decoration or commemoration on a piece of furniture, walls, or doors of a building, usually displaying a decoration with a geometric interlace.
- play out** To exhaust a source of a mineral.
- plectrum** A pick used to pluck stringed musical instruments.
- plowshare** The main blade on a plow, designed to dig and loosen soil for later planting.
- pneumonic plague** The most deadly and contagious type of plague; this type of plague settles in the lungs and is transmitted from person to person.
- polder** A field recovered from the sea through a system of dikes and drainage canals, enabling farmers in coastal areas of the Netherlands to increase the land under cultivation.
- political cycling** The cycling of regional political power between competing polities in a region, with the rapid rise and equally rapid collapse of dominant polities due to economic competition, warfare, and other forms of intense interpolity interaction.
- polities** Organized societies, each with one specific kind of government.
- pollard** The practice of cutting trees high on the trunk so that young sprouts are out of the reach of grazing animals.
- polygyny** The practice of marrying more than one woman.
- polyphony** Music that contains two or more melodic lines.
- polytheist** Person who worships more than one god.
- pontoon bridge** A bridge, often military, made by tying boats side by side at a landing stage and covering them with planks.
- portcullis** An iron grille used to protect the wooden doors of a castle entrance.
- portico** A porch supported by pillars.
- potter's wheel** A large stone wheel mounted parallel to the ground so that it could spin freely; its circular motion (long-lasting because of the weight) allowed potters to form clay into pottery.
- precession** The earlier occurrence of the equinoxes due to a slow variation in the rotation of the earth.
- prefecture** An administrative division of territory in medieval China.
- prefix** An element placed at the beginning of a word as an inflection to express a grammatical function or attribute such as tense, mood, person, number, case, and gender.
- primogeniture** The right of the eldest son to inherit an entire estate without dividing it among younger siblings.
- prosody** The metrical or rhythmical aspects of verse.
- pseudepigraphy** The practice of publishing a book under a name other than the actual author's, chosen to attract attention to the work or to suggest continuity with the tradition of the supposed author.
- pseudoscience** A body of knowledge that is meant to describe or control the physical world but which fails as a science because it relies on unverifiable wisdom rather than on observation and experiment.
- psychotropic** Type of plant or drug that affects a person's state of mind.
- qanat** In the Islamic Middle East, an underground irrigation network of wells and canals that brings water to crop fields with minimal loss through evaporation.
- qasida** An elaborately structured Arabic ode of 20 to 100 verses that opens with a short prelude, usually a love poem, followed by an account of the poet's journey and a tribute to the poet's patron, his tribe, or even himself.
- quadrant** In early astronomy, an instrument that takes angular and altitude measurements of the stars.
- quadrivium** The four advanced subjects in medieval education: arithmetic, geometry, astronomy, and music.
- quetzal** A bird native to Central America whose bright green feathers were used to decorate ceremonial costumes and headdresses.
- quinary scale** A system of numeration based on the number 5.
- quipu** A horizontal rope from which hung knotted cords of various colors; used by the Inca in South America for making calculations or indicating time and possibly to record historical and phonetic information.
- raffia** A textile woven from the soft fronds of a palm tree indigenous to sub-Saharan Africa.
- raga** A traditional Indian melody.
- raja-mandala** An ancient Indian geopolitical concept in which rulers attempted to extend their power outward in a circular pattern representing the cosmos.

- ramparts** Broad elevations or mounds of earth raised as fortifications.
- reeve** In medieval Europe, a supervisor who ensured proper use of the land and payments by the peasantry; the chief authority in a large village or town who served on behalf of the king.
- relic** An object said to be part of the physical remains of a holy person or object or the former possession of a holy person, supposedly imbued with spiritual and magical powers and venerated for its spiritual power.
- relief carving** Figure that is carved away from a material, such as stone or wood, and is not freestanding but part of the background; low-relief carving is shallow, and high-relief carving is comparatively deep.
- reliquary** An object designed to house relics, or holy objects associated with saints and other venerated persons.
- repoussé** Metal shaped or ornamented with patterns in relief made by hammering or pressing on the reverse side.
- revetment** A facing that holds up an embankment.
- rite of passage** A ritual event that marks the change in an individual's social or physical status.
- Roman law** Legal system descended from the law of the Roman Empire, within which legal decisions are not based on precedent but on a law code established by the authority of the central government (that is, the king or emperor).
- Romance languages** Languages such as Spanish, French, Italian, and Romanian that developed from Latin during the Middle Ages.
- roof comb** A highly decorated stone structure placed on top of buildings.
- Rosetta Stone** A basalt stone, discovered in 1799, that gives clues to deciphering Egyptian hieroglyphs.
- roulette** A small wheel, especially one with sharp teeth, mounted in a handle, for making lines of marks, dots, or perforations.
- royal road** The largest type of road in medieval Europe, wide enough to support a great deal of foot traffic and the passing of armies.
- rushlight** A type of candle made by coating a rush with tallow or grease.
- saga** Heroic poem in Old Norse retelling the deeds of legendary or historical figures or families.
- sage** A wise man, philosopher, or scholar whose opinions and pronouncements are generally respected by his culture.
- samurai** Professional, aristocratic warriors who formed military regiments in medieval Japan.
- sarcophagus** A stone container, often elaborately carved or decorated, used as a coffin.
- sarong** A rectangular length of cloth that can be tied in various ways to form a skirt, dress, or cloak.
- sawmill** A mill, common during the Middle Ages, that used gears to power saws to cut wood.
- scarification** The practice of cutting decorative scars into the skin.
- schism** A split within the church occasioned by disagreement over doctrinal matters (as in the great schism between Orthodoxy and Catholicism in 1054) or by confusion over the legitimate head of the church (as in the Western Schism after the period from 1378 to 1417).
- scriptorium** A room in a monastery where monks copied out and wrote manuscripts.
- secondary burial** A burial in which the remains have been moved from one site to another.
- sedentarism** Settled life; shift from an impermanent to a permanent way of living; also called sedentism.
- sedentary** Term used by historians to describe cultures that maintain more or less permanent communities, usually because of their dependence on agriculture rather than nomadic hunting and gathering.
- segmentary lineage system** A social structure in which different kin descent groups compete for scarce resources, achieving internal cohesion only against a common external threat.
- serfdom** The relationship of a person to an elite patron, in which there is an obligation to pay tribute and to perform military, agricultural, craft, or other services but the individual cannot be sold to another patron.
- sextant** An instrument used to calculate latitude by measuring the angle between the horizon and the sun.
- shahada** The first pillar of wisdom in Islam: that there is no god but God and Muhammad is his messenger.
- shaman** A spiritual practitioner who acts as intermediary between the natural and supernatural worlds, using magic or sorcery for purposes of healing, divination, and control over natural events.
- sharia** Islamic law derived from the Koran.
- shifting cultivation** An agricultural strategy in which farmers cut vegetation to form new fields, burn the vegetation to enrich the field's soil, grow crops in the field for two to three years, and finally leave the field fallow for 10 to 20 years while they move on to make new fields.
- shinden-zukuri** Aristocratic style of Japanese architecture featuring a central hall and surrounding symmetrical rooms.
- shogun** Any of a line of military leaders who governed Japan during the medieval and early modern periods.

- shoin-zukuri** Style of Japanese architecture employed by samurai, featuring gardens and asymmetrical layouts.
- sidereal compass** A chart of specific stars that allows a person to determine his or her position relative to them and to known landmarks.
- siege** The particular military art of surrounding an enemy fortification such as a castle in order to starve the garrison out and eventually assaulting it if necessary.
- sigla** In Islam, scribal abbreviations in the form of symbols that commonly stand for God's holy names.
- skraelings** Norse term for Native Americans.
- slag** What remains after ore is smelted and the metal is removed.
- slash-and-burn agriculture** The cutting and burning of forest or woodlands to create fields for agriculture; also called shifting cultivation.
- slip** Thinned potter's clay used to coat ceramics.
- sluices** Floodgates.
- smelt** To melt ore to separate out the metal from the other parts of the ore.
- snuff** A powdered substance that is inhaled, often through the nostrils.
- social banking** Building social obligations by giving and receiving help and goods.
- social stratification** The division of people into social classes based on birth, wealth, prestige, status, and similar factors.
- sod** Surface soil held together by the matted roots of grass.
- solar calendar** A calendar based on one full revolution of the earth around the sun.
- solstice** Either of the times each year when the sun is at its farthest point from the equator, marking the longest and shortest days of the year (in June and December, respectively).
- sphere of influence** An area in which one nation or culture dominates economically, politically, or militarily.
- splinter** A thin strip of wood coated in tallow that acted as a type of candle.
- spolia** Pieces of architecture from former buildings that are reused to create new monuments.
- state** A type of social and political organization involving centralized control, formal territories, large populations, and usually some form of urban settlements.
- stateless economy** Economy unregulated by a government.
- stela (pl. stelae)** A carved stone marker used to commemorate deaths or historical events.
- steppe** A geographic area of flat, semiarid grassland.
- stop** In speech, a consonant sound produced by closing off the airflow in the vocal tract.
- storm surge** A significant increase in sea levels caused by a storm.
- stucco** Plaster made of gypsum or lime used to decorate walls made with statues.
- stupa** A hemispherical shrine that holds relics of the Buddha or that lies somewhere the Buddha passed during his life.
- stylized** Describing a work in which the artist uses artistic forms to create unnatural effects.
- subsistence economy** Economy in which people produce little more than what they need for basic survival from one day to the next.
- sudd** In the Middle East, a dam, whether used to divert or store water.
- suffix** An element placed at the end of a word as an inflection to express a grammatical function or attribute such as tense, mood, person, number, case, and gender.
- sultan** A title assumed by some Muslim rulers after the 11th century that signifies full sovereignty or independence of a higher ruler.
- sumptuary laws** Laws that attempt to regulate or prevent extravagant spending and consumption.
- sunspots** Dark spots that are cooler than the rest of the sun and appear in a cyclical pattern on the sun's surface.
- sura** A chapter of the Koran.
- sutras** Teachings of the Buddha.
- suttee** The Hindu custom in which a dead man's sonless widow throws herself on her husband's funeral pyre to be cremated with him.
- swaddling** The custom of wrapping babies' bodies tightly in cloths or narrow bands with the intention of keeping them warm and preventing their limbs from growing crooked.
- syllabaries** Sets of written symbols or characters that represent syllables, or parts of words.
- syntax** The organization of words into sentences; the order and structure of sentences.
- talionic** Based on the concept of retaliation.
- talisman** An object thought to have magical properties, which could be imparted to the person who wore or carried it.
- tallow** Rendered animal fat.
- talud-tablero** A stepped pyramid design in which each terrace is composed of a vertical panel with recessed inset and a sloping wall (talud) that is topped by a rectangular inset panel (tablero).
- tannin** Chemical used for treating animal skin to make leather.
- tariff** A payment exacted by a government for the importation or exportation of goods.

- tectonic plates** Seven major and numerous minor sections of the outermost part of the earth's interior that slowly float atop a less solid part of the interior of the earth.
- tenon** A projection from the side of a piece of stone, wood, or other material that is designed to fit into a hole of similar size and shape called a mortise.
- terraced agriculture** Agriculture that uses artificially leveled and stepped hilly or sloped regions, to conserve soil, retain moisture, and make plowing and other aspects of cultivation possible on otherwise marginally productive lands
- terra-cotta** Low-fired clay often used for sculpture, ceramics, and architectural elements.
- testator** A person who has made a legal will.
- theme** An administrative district of the Byzantine Empire.
- theocracy** Rule by priests.
- three-field system** A method of planting fields in rotation, with two fields devoted to growing crops (spring and fall) and the third allowed to lie fallow to improve its fertility.
- tokonoma** A recess in a wall in a Japanese home specially made to display a picture that is often secular.
- tonal** Term describing languages in which the speaker raises or lowers the voice when pronouncing words, thus allowing any word to be pronounced a different way and have a unique meaning.
- tort** A wrongful act that carries with it relief in the form of damages to the victim.
- trabeated pyramid** A building form of successively rising posts and horizontal beams, with the space between posts narrowing with each successively higher level, resembling a side of a pyramid.
- transept** In a cruciform church, the area set crosswise to the nave.
- transhumance** A form of nomadic pastoralism in which herders keep a home base with a permanent water hole and seasonally leave this base to seek new pastures for their livestock, returning to the base as water and pasture grows scarce.
- transmutation** In alchemy, the supposed process of turning one metal into another, as lead into gold.
- transubstantiation** Mystical transformation of the bread and wine of the Eucharist into the body and blood of Christ.
- trebuchet** A siege engine in the form of a large catapult, which could fling heavy stones or other projectiles several hundred yards against the walls and towers of an enemy castle.
- trepanation** The medical procedure of drilling into the skull; one of the oldest forms of surgery, dating far back into prehistory.
- tribute** A payment made by a ruler or a country to another ruler or country as a form of submission or as the price of protection.
- trickster** A recurrent character in indigenous North American mythology who represents the unpredictability of fate and absurdity of life; also a creator divinity and culture hero or heroine.
- triconsonantal** Composed of three consonants.
- trigonometry** The mathematical study of triangles.
- trivium** The three basic subjects in medieval education: grammar, rhetoric, and logic.
- trypanosomiasis** Also known as "sleeping sickness," a disease affecting both animals and humans that is spread by the saliva of the tsetse fly.
- tumulus (pl. tumuli)** A mound of earth and stone built over one or more graves.
- tundra** Land in the arctic whose soil is permafrost, preventing the growth of large plants and usually unsuitable for human habitation.
- tunic** A shirtlike garment that could have short sleeves, long sleeves, or no sleeves; could fall to between the hips and the ankles; and was often belted at the waist.
- tuyere** An opening for supplying air to the interior of a furnace.
- twining** The technique of twisting plant fibers during the process of weaving.
- two-field system** A system of rotating crops between two fields, one of which is allowed to lie fallow in alternating years.
- type** An image or other design stamped onto coins.
- typhoon** A cyclonic storm identical to a hurricane in force and meteorological characteristics but originating over the Pacific Ocean and traveling westward.
- typology** Study, analysis, or classification based on types or categories.
- uji** The Japanese term for the aristocratic clans that participated in government administration and other tasks during the early medieval period.
- umma** The Muslim community as a whole.
- unguent** Cream or lotion applied to the skin to soften or perfume it.
- varna** Any of the four major social classifications of medieval India.
- vassal** Freeman who rendered services to a sovereign, lord, or other superior in return for land.
- vellum** A particular type of parchment made from the skin of a calf or other young animal.
- veranda** Covered porch attached to the outside of a building.
- vernacular** The everyday language or dialect of a particular region or group.

- vigesimal system** A base-20 counting system, using digits of hands and feet to count.
- villa** Large rural estate common in the Roman Empire but that survived into the medieval period as the precursor of the manor system.
- virgin soil epidemics** Contagious diseases that affect a population group, which has had no previous exposure, with catastrophic results.
- visionary experience** Information, often interpreted as religiously significant, that a person receives in a dream, in a trance, or as a result of taking hallucinogenic drugs.
- vizier** An executive officer in Muslim societies.
- votive** Done to fulfill a vow or as an act of devotion.
- wattle and daub** A structure created using a wood lattice-work covered in a mixture of clay, mud, and straw.
- weirs** Dams in waterways designed to divert water or to collect fish.
- wet nurse** A woman who breast-feeds another woman's baby for pay.
- wootz steel** A form of steel manufactured in medieval India that was famed for its toughness and flexibility.
- wrought iron** Form of iron almost entirely free of carbon and having a fibrous structure that is readily forged and welded.
- wrought** Produced by beating into shapes with hammer.
- xenophobic** Afraid of outsiders or foreign elements.
- yin and yang** The two opposing principles in Chinese philosophy—one considered “female” and the other “male”—that also found application in traditional medicine, which sought to keep these principles always in balance within the body to prevent disease; the male principle is hard, bright, and active, while the female principle is soft, dark, and receptive.
- yoga** A spiritual and physical discipline developed in India whereby the practitioner, the yogi, seeks to train his or her own consciousness so as to achieve a sort of divine tranquility.
- yurt** A tentlike dwelling.
- zimbabwe** Term for a stone enclosure among the Shona people of southern Africa.
- zodiac** The 12 constellations circling the celestial sphere of fixed stars along the ecliptic, the path of the sun through the sky.
- zooarchaeology** The study of animal remains at archaeological sites.
- zoomorphic** Taking the form of an animal.

200 – 500

500 – 600
(continues)

AFRICA

ca. 200: The unexplained end of the Nok civilization in northern Nigeria; this culture was the precursor of many of medieval Africa's achievements in art and technology.

ca. 300: Berber tribesmen from North Africa introduce the domestic camel into the trans-Saharan caravan trade.

ca. 330: The kingdom of Axum (modern-day Ethiopia), an economic power in the early Middle Ages because of its control of Indian Ocean trade, converts to Christianity.

ca. 350: The pseudepigraphic book I Enoch is translated into Ethiopic and becomes a central text of the Ethiopian Orthodox Church.

ca. 400: Iron-smelting technology begins to spread throughout sub-Saharan Africa and is adapted by smiths to local conditions.

ca. 450: The foundation of the kingdom of Ghana in the Niger Delta (Sahel) marks the emergence of a rising economy in the area based on control of the trans-Saharan trade.

ca. 500: The Bantu expansion is completed: Bantu-speaking peoples from central Africa spread over much of sub-Saharan Africa, bringing agriculture and metal-working technology with them.

ca. 500: In Egypt, The Emerald Tablet and the *Turba philosophorum*, important alchemical texts influencing Islamic,

THE AMERICAS

ca. 250: The rise of numerous competing Mayan city-states in Mesoamerica.

ca. 450: The Maya develop paper and begin to write their hieroglyphic script (developed about 600 years earlier and used for inscriptions) in manuscripts.

ca. 500: Teotihuacán is founded and flourishes as the first urban center and empire in the Valley of Mexico.

ca. 500: Maize cultivation reaches the Eastern Woodlands of North America, completing its pre-Columbian range.

535: The eruption of Krakatau in Indonesia causes temporary climate change that

Chronology by Region

ASIA AND THE PACIFIC

499: The Indian astronomer Aryabhata publishes the *Aryabhatiya*, which describes moonlight as reflected sunlight, provides a technique of calculating lunar eclipses, and shows some indirect knowledge of Greek heliocentrism.

535: The volcano Krakatau erupts, affecting world climate; a tsunami may have destroyed the capital city of the Tarumanagara Kingdom on Java.

ca. 540: The Indian mathematician Brahmagupta develops a means of writing zero and using it in mathematical operations.

EUROPE

476: Collapse of the Western Roman Empire in the face of invasions by Germanic tribes that found new kingdoms.

499: Completion of the Babylonian Talmud, a text destined to become central to the religious life of European Jewry.

ca. 500: The promulgation of the Salic law by the Frankish monarchy, one of several bodies of German common law put in writing at about this time.

529: Saint Benedict founds the monastery of Monte Cassino near Benevento in Italy and shortly thereafter writes the Benedictine rule, the founding document of Western monasticism.

THE ISLAMIC WORLD

ca. 450: The Arabic script, later used to write the Koran, is developed from the Nabataean alphabet; it becomes one of the most widespread scripts in the Middle Ages.

ca. 570: The birth of Muhammad, the founder of Islam and author of the Koran.

500 – 600
(continued)

600 – 700

AFRICA

European, and eventually even modern science, are composed.

533–34: Byzantine forces under Count Belisarius conquer and annex the Vandal kingdom in North Africa.

535: The eruption of Krakatau in Indonesia may have affected the annual Indian Ocean monsoon and contributed to the outbreak of plague in the Nile Valley that eventually spread throughout Europe (541–42).

ca. 540: Christian missions sent to Nubia (northern Sudan) by the Byzantine government convert the country, divided into several small states modeling themselves after Byzantium, to Christianity.

642: Arab armies occupy Egypt and capture Alexandria after a 14-month siege.

ca. 650: A large-scale slave trade begins to develop between the Indian Ocean coast of Africa and the Islamic world.

665: Arab forces conquer Byzantine North Africa to the west of Egypt (modern-day Libya, Tunisia, Algeria, and Morocco).

THE AMERICAS

results in a severe famine at Teotihuacán and perhaps other areas of the Americas.

562: The Mayan city-state Caracol defeats and supplants the widespread influence of its rival, Tikal.

ca. 600: Expansion of the Tiwanaku state from the Titicaca plateau in the northern Andes and of the Wari state on the Cuzco plain in South America.

ca. 650: The prototype of the Dresden codex is composed, an astrological handbook concerned with predicting the motion of Venus and lunar eclipses.

ca. 650: Teotihuacán in Mexico is destroyed, its temples and palaces burned, and its population of over 100,000 scattered.

683: The sarcophagus lid of King Pakal of the Mayan city of Palenque, showing the dead king's body flying through the air, is created as one of the great masterpieces of Mayan art.

ASIA AND THE PACIFIC

ca. 550: Collapse of the Gupta Empire in India, under the financial drain of defending the North-West Frontier against Hunic invaders.

ca. 550: Final composition of the Bhagavad Gita, an epic poem connecting ancient Indian literature to medieval Hindu religious practices.

589: After a period of political fragmentation, the Sui Dynasty briefly reunifies China until 618.

593: Buddhism is introduced to Japan by the Prince Regent Shotoku; Japanese society begins to absorb Chinese culture.

605: The introduction of the competitive imperial examination system (based on Confucian philosophy) to select civil servants.

610: Initial completion of the Grand Canal linking northern and southern China.

618: The foundation of the Tang Dynasty in China, which moves the capital to Xi'an in western China and reopens the Silk Road, initiating a period of openness in Chinese culture.

624: The promulgation of the Tang Legal Code, foundation of all medieval Chinese law (revised in 737).

635: Nestorian Christian monks introduce Christianity to China, building a church near the capital of Xi'an.

645: The Chinese monk Xuanzang completes a fifteen-year journey to India and back to secure original Sanskrit copies of Buddhist scriptures and writes a geographical treatise about his journey for the emperor.

ca. 650: In China woodblock printing, in which an entire page of text was printed from a hand-carved wooden master, allowed mass-production of texts; paper is invented in China at about the same time.

ca. 650: Sa'ad ibn Abi Waqqas, one of Muhammad's companions, makes an embassy to the emperor Gaozong, introducing Islam to China.

ca. 660: Yan Liben paints *The Scroll of the Thirteen Emperors*, the earliest surviving masterpiece of Chinese painting.

EUROPE

529–33: Promulgation of the Code of Justinian (*Corpus iuris civilis*), final summary of the body of Roman law.

541–42: A pandemic of bubonic plague kills perhaps 40 percent of the population of the Byzantine Empire and devastates the rest of Europe (called the Plague of Justinian after the ruling emperor).

552: The emperor Justinian sends two Nestorian monks as spies to inner Asia; they succeed in bringing back silkworms and the technique of sericulture.

569: Lombard invasion of Italy: the low point of the depredations caused by the Germanic tribes that destroyed urban culture in western Europe.

626: Combined force of Avars and Sassanians besiege Constantinople.

629: Visigoths drive the Byzantines from southern Spain.

663: Byzantine emperor Constans II (630–68) leads an army against the Lombards, but retreats to Sicily.

673: Visigoth king Wamba (r. 672–81) defeats an Arab fleet near the Straits of Gibraltar.

673–78: Arab armies besiege Constantinople by land and sea.

ca. 675: Byzantine defenders of Constantinople deploy a new weapon, Greek fire—a type of flamethrower.

681: Onogur Huns establish the kingdom of Bulgaria.

687: Victory over dynastic rivals at the Battle of Tertry in northern France extends the power of the Frankish king Pepin II (d. 714).

THE ISLAMIC WORLD

622: The Hijra, or flight, of Muhammad to Medina; this event marks the beginning of the Islamic calendar.

632: The death of Muhammad; the beginning of the rule of the caliphs, with Muhammad's companion Abu Bakr as the first caliph.

636–37: The caliph Omar I wins decisive victories against the Byzantine and Sassanian empires, laying the foundation for Islamic conquest of the entire Middle East.

639: A severe draught and famine in southwestern Arabia require massive shipments of food from the newly conquered Near East and the opening of the old Roman Nile-Red Sea canal.

664: A group of Islamic scholars travel to southern India on the annual monsoon merchant fleet and establish the first mosque in India.

666: Islamic forces raid Sicily, the first Islamic attack against western Europe.

680: Hussein, a descendent of Muhammad's cousin Ali and of Muhammad himself, is killed at Karbala during a revolt, leading to the split of Islam into Sunni and Shii sects.

692: The Dome of the Rock on the Temple Mount in Jerusalem is completed, marking the spot where Muhammad was believed to have ascended to heaven.

695: The caliph Abd al-Malik issues the first specifically Islamic coinage; it does not bear the image of the ruler but is decorated only with calligraphy.

697: Christian Coptic peasants in Egypt revolt against the burden of Islamic taxation; more tax revolts occur in 712 and 725–26.

700 – 800

AFRICA

ca. 750: Part of a Jewish community that had lived in Ethiopia since antiquity may have migrated south (at a very uncertain date) and formed new groups that survive today in South Africa.

800 – 900

ca. 800: The lost-wax process of metal casting begins to be used to make sculptures at Igbo Ukwu in the Niger Delta (Sahel) and then spreads throughout western Africa.

ca. 800: The coffee bean is domesticated in Ethiopia; according to legend, this occurred after the goatherd Kaldi noticed its stimulating effects on his flock.

ca. 850: The semi-legendary Queen Gudit sacks Axum, turning Ethiopia inward into a period of isolation from the outside world.

THE AMERICAS

ca. 700: The Mayan city of Tikal becomes a dominant manufacturer and trader of obsidian stone tools and weapons.

711: Renewed military triumph in victory over its rival Calakmul and cultural dominance of the Mayan city-state of Tikal.

727: Ruler 3 ascends the throne of the Mayan city of Dos Pilas; before his death in 741 he conquers several Mayan states, making the largest political unit in Mayan history.

ca. 750: The Mayan city of Chetumal in northern Belize, with its maritime station on Ambergris Caye, dominates maritime trade in the Caribbean.

ca. 790: The artistically important Bonampak murals are painted, depicting the Mayan rituals associated with capturing, torturing, and sacrificing enemy warriors.

ca. 800: The Gate of the Sun (decorated with an early calendar) is erected at Tiwanaku, one of the largest stone monoliths in the world, estimated to weigh 200 tons.

ASIA AND THE PACIFIC

ca. 700: Islamic missionaries, followed shortly by merchants, reach Guangzhou in China, which the Tang opens to international trade.

710: The beginning of the Nara Period in Japan and the transformation of culture based on Chinese models, including the adaptation of Chinese characters (*kanji*).

ca. 750: The Gandhara school of Buddhist religious art flourishes in India, showing heavy influence of Hellenistic (Greek) art.

802: Foundation of the Khmer Empire in Cambodia, a state that endured until 1432.

ca. 850: Gunpowder (probably a recent invention at that time) is first mentioned in a Chinese alchemical text.

EUROPE

782: Charlemagne begins to revive learning in western Europe, bringing the scholar Alcuin to his court and causing surviving texts of ancient books to be copied and distributed.

793: The Vikings make their first great raid on Europe, destroying the monastery on the Northumbrian coast of Britain at Lindisfarne.

800: Pope Leo III crowns Charlemagne as emperor at Rome, restoring the Western Roman Empire in the form of the Holy Roman Empire.

ca. 800: Chess, originally invented in ancient India, is introduced into Europe for the first time and becomes popular among the aristocracy.

835: The “discovery” of relics of Saint James in Spain and the establishment of the pilgrimage center of Santiago de Compostela; the beginning of pilgrimage in medieval Europe.

ca. 800: Modern musical notation is devised as part of the Carolingian Renaissance with its interest in cultural renewal.

842: Charlemagne’s empire collapses in civil war; Charles the Bald and Louis the German swear alliance of France and Germany in the first surviving texts in French and German.

ca. 850: Viking trading and conquest in Russia helps to form the Slav state of Kiev Rus, precursor of the modern-day Russian and Ukrainian states.

855: Saints Cyril and Methodius, Orthodox missionaries to the kingdom of Moravia, devise the Cyrillic alphabet, which would become the standard method of writing for Russian and most Slavic languages.

THE ISLAMIC WORLD

ca. 700: As writing copies of the Koran becomes more important, the Arabic alphabet is reformed by adding vowel points and diacritical marks.

711: Islamic forces make their last major conquests, occupying Spain, the Sind (modern-day Pakistan), and the remainder of inner Asia.

750: Abu al-Abbas as-Saffah founds a new dynasty of caliphs; conversion of the conquered populations to Islam is intensified, and Arabic becomes an official administrative language.

755: Al-Muqqana (the Veiled Prophet) inspired a political uprising and long-lasting heretical sect of Islam in Khorasan (Afghanistan), claiming to be the Mahdi (Islamic redeemer).

762: Baghdad is founded by the Abbasid caliphs as a new capital for the Islamic empire; it becomes one of the most important world centers of learning and culture.

ca. 800: The foundation of Kilwa on an island off Tanzania as a result of increasing trade around the Indian Ocean.

803: Birth of Jabir ibn Hayyan (Geber), an important Islamic alchemist, especially influential in western Europe.

810: Establishment of the House of Wisdom at the caliph’s court in Baghdad as a library and center for scientific and scholarly research.

833: The astronomer al-Farghani (Alfraganus) precisely measures the distance of 1 degree of longitude and hence of the circumference of the earth.

869: The Zanj revolt of African slaves working on plantations in southern Iraq breaks out and is not suppressed until 883.

880: The Islamic alchemist al-Kindi publishes the first description for the distillation of alcohol from wine.

900 – 1000

AFRICA

ca. 900: Arab traders start to compete with Berber merchants in the trans-Saharan slave trade.

ca. 1000: The Yoruba state forms in western Nigeria; descended from the Nok culture, it flourished until ca. 1700.

ca. 1000: The beginning of the Pavement Period or period of mature artistic and architectural styles in Ife in Nigeria, which declined after 1400.

THE AMERICAS

ca. 900: The medieval climate anomaly ushered in a period of warmer than usual temperatures that lasted until ca. 1400; although it was worldwide, it especially fostered the colonization of Greenland.

ca. 900: The Mayan city-states go into decline, and urban centers are abandoned by ca. 1250.

ca. 950: Rise of the Toltec Empire in the Valley of Mexico; its culture spreads to influence the northern Mayan city-states.

1000 – 1100
(continues)

ca. 1000: The rise of the Chimú Empire in the Moche valley of northern Peru, which established many of the administrative and economic structures of the later Incan Empire.

ca. 1000: The Chimú begin to make quipus: detailed bureaucratic records in which patterns on colored strings indicated numbers and words, a practice taken up by the Inca.

ca. 1000: After a long period of colonization from South America, Arawak peoples organized centralized governments on the islands of the Greater Antilles.

ca. 1000: The Inuit people expand from an isolated homeland in Alaska to colonize the whole of Arctic North America, reaching Greenland by 1300.

ca. 1000: The beginning of a maritime trade along the Pacific coast between Central and South America.

ca. 1000: The invention of lacrosse, a sport developed by Native Americans that is still popular today.

1003: The Viking Leif Ericson founds a short-lived colony in North America on the northern tip of Newfoundland, following up sightings of the American coast by other Vikings in 986.

ASIA AND THE PACIFIC

ca. 900: Chinese merchants begin to use checks, paper money, and simple forms of joint-stock companies.

ca. 900: Chinese shipbuilders introduce watertight compartments into ship design, making sinking much less likely in an accident.

960: The foundation of the Song Dynasty, viewed as the golden age of Chinese culture.

960: The Song make flour milling a government monopoly and widely introduce industrial water-powered mills throughout China.

ca. 1000: The expansion of Polynesian peoples in the South Pacific to Hawaii and New Zealand.

ca. 1000: Burmese, Thai, and Laotian peoples are displaced from Tibet and occupy most of Southeast Asia.

ca. 1000: The composition of *The Tale of Genji* by Murasaki Shikibu, the first Asian novel and an important development on the novelistic form.

1102: China's population reaches 100,000,000, doubling in about a century thanks to newly developed techniques of rice cultivation.

1010: India is invaded by the first of several waves of inner Asia Islamic nomad groups, who eventually take over most of the Ganges valley.

1040: The Chinese artisan Bi Sheng invents the first system of moveable type using a ceramic typeset.

1054: Chinese astronomers notice a spectacular supernova on July 5th that remains visible for 23 days.

EUROPE

ca. 975: Gerbert of d'Aurillac (later Pope Sylvester II), after studying in Spain, introduces Arabic numerals into Europe.

ca. 1000: The troubadour poets begin to work in southern France, introducing Arabic forms of literature to Europe and propagating themes of courtly love and of King Arthur.

ca. 1010: The single manuscript preserving the oral saga *Beowulf* (ca. 700) is written; this is the first important literary work in any vernacular language (Old English).

ca. 1050: The growth of international trade fairs, such as that hosted by the Count of Champagne mark a recovering and later an expanding economy.

1075: Pope Gregory VII begins the Investiture Crisis by claiming the right to appoint bishops; it was settled in the Pope's favor in 1122 after a civil war in the Empire.

1087: The Benedictine monk Constantine the African begins to translate an Arabic version of the work of Greek medical writers into Latin, beginning an important movement in Europe to recover the learning of the ancient world from Arabic sources.

1094: The Byzantine emperor Alexius I requests military aid from the pope against the Seljuk Turks, beginning the period of the Crusades.

THE ISLAMIC WORLD

ca. 900: Ptolemy's *Almagest*, the standard ancient Greek handbook on astronomy, is translated into Arabic; it will be translated into Latin in Spain in 1144.

ca. 900: Shadow puppet theater becomes a prominent art form in the Islamic world, beginning in Egypt but probably based on older Persian traditions.

909: The foundation of the Fatamids, a Shia dynasty that at its height controlled all of North Africa, Syria, and most of Arabia.

920: The caliph al-Muqtadir sends an embassy to the Volga Bulgarians; Ibn Fadlan, the secretary attached to the expedition, leaves a detailed geographic and ethnographic description of the journey.

965: Birth of al-Hassan (Alhazen), an Islamic scientist important in the fields of optics, astronomy, and medicine.

ca. 980: Birth of Ibn Sina (Avicenna), a Persian Neoplatonist philosopher and physician, one of the most influential intellectuals in Islamic history and especially influential in western Europe.

1055: The Seljuk Turks, a tribe originally brought into the Islamic world as mercenaries (1038), quickly seize control of most Islamic territories in Asia, which they rule for two centuries.

1000 – 1100
(continued)

1100 – 1200

1200 – 1300
(continues)

AFRICA

ca. 1100: The wooden xylophone, or marimba, is invented in western Africa.

1187: After the recapture of Jerusalem by Islamic forces, the Ethiopian emperor Gebre Lalibela builds a new capital to serve as a New Jerusalem, constructing a dozen monumental rock-cut churches.

ca. 1200: The tradition of Ethiopian royal law enshrined in the *Kebra Nagast* and the *Fetha Negast* begins to be composed.

1235: The Mali Empire dominates the Niger Delta (Sahel) and the trans-Saharan, succeeding Ghana, which had been destroyed by the Almoravid state in North Africa.

ca. 1235: According to legend (the epic of *Sundiata*), the tradition of bardic western

THE AMERICAS

ca. 1050: Beginning of the period of mound building at Cahokia, the largest city of the Mississippian culture; the site was abandoned before 1400.

ca. 1050: The Anasazi culture in the American Southwest constructs its largest town near the Four Corners at a site now known as Chaco Canyon.

ca. 1070: The construction of Serpent Mound in modern-day Ohio, a 1,300-foot-long earthwork in the shape of a serpent probably built by a branch of the Mississippian culture.

ca. 1100: Climate change creates a drier climate in the Great Basin, causing an outmigration of agriculturalists; many become Great Plains nomads, but one group is the ancestor of the Aztec.

ca. 1150: The Toltec capital of Tula is destroyed by nomadic tribes from northern Mexico, probably including the ancestors of the Aztec.

ca. 1250: The replacement of the Anasazi population of the American Southwest by Navajo and Hopi groups.

ASIA AND THE PACIFIC

1162: Birth of Genghis Khan, a military genius who will set in motion the Mongol conquest of most of Eurasia.

ca. 1075: China experiments with land reform and social welfare programs meant to help landless peasants, but they are short-lived owing to opposition from aristocrats.

1086: The first mention in Chinese scientific literature of a compass, a device that seems to have been in use for one or more generations by then.

1192: The beginning of feudalism and the samurai class in Japan as civil disorder escalates and government authority needs more and more soldiers.

ca. 1200: China reaches a new peak of urbanization for any medieval or ancient culture, with five cities of 1,000,000 in population, and 50 cities over 100,000.

ca. 1250: Polynesians colonize Easter Island, the farthest point reached from their homeland in New Guinea.

1209: Genghis Khan attacks China, overwhelming the northern states of Xia and Jin.

EUROPE

ca. 1100: The horizontal loom is introduced from China and is quickly transformed into a mechanized device, allowing weaving to become an industrial process.

ca. 1110: The beginning of miracle, mystery, and morality plays: originally religious dramas, they became increasingly secular and gave rise to modern dramatic traditions, such as that represented by Shakespeare.

1134: Completion of the building of the Abbey of Saint-Denis in Paris, the first building in the Gothic style of architecture.

ca. 1150: Blast furnace developed independently in Europe; together with water-powered mechanical bellows and hammers, this allowed an exponential increase in iron production and laid the foundation for the later Industrial Revolution.

1158: The town of Lübeck is founded on the Baltic coast of Germany; it soon builds a trade network that will become the foundation of the Hanseatic League.

ca. 1175: Europeans used the first counterweight trebuchet during the Crusades; this siege engine was an improvement based on ancient Chinese traction trebuchets.

1209: The foundation of the Franciscan Order, a measure intended to combat popular heresies and which led to important church reforms.

1223: The beginning of the Mongol conquest of Kiev Rus and the period of the so-called Mongol Yoke.

ca. 1250: The magnifying glass and eyeglasses are invented by scholastic

THE ISLAMIC WORLD

1126: Birth of Ibn Rushd (Averröes), an Andalusian Neoplatonist philosopher, physician, and legal scholar especially influential in western Europe.

1165: Birth in modern-day Afghanistan of Abu Bakr, one of the most celebrated calligraphers to produce copies of the Koran.

1206: The Arab scholar and engineer al-Jazari invents the crankshaft to convert continuous circular motion into reciprocating motion, which allowed for a much wider use of milling.

1238: Work begins on the Alhambra Palace in Granada (al-Andalus), one of the finest examples of Islamic architecture in the world.

1200 – 1300
 (continued)

AFRICA

African poets known as griots begins at the same time as the empire of Mali.

ca. 1250: The penetration of Arabs and later the Portuguese (after 1440) into central and southern Africa spreads strains of smallpox to which the local populations have little immunity, causing epidemics.

THE AMERICAS
1300 – 1400

ca. 1300: Nomadic cattle herders from the Sudan (including the Tutsi) migrate south to the great lakes region, sometimes conquering local populations of farmers.

1306: Ethiopia sends a diplomatic mission to Europe that visits Rome, Genoa, and Avignon, in an effort to forge an alliance against the Islamic states in North Africa.

ca. 1375: The southern African kingdom of Great Zimbabwe, builder of the largest stone structures in sub-Saharan Africa, reaches its zenith (and goes into sharp decline after 1450).

ca. 1350: Cities on the Indian coast of Africa begin to build stone flood walls to protect themselves from storm surges caused by cyclones (hurricanes).

ca. 1325: The Aztec begin to build their city of Tenochtitlán on an island in Lake Texcoco in the Valley of Mexico.

ca. 1325: The spread of the Kachina religion among the Hopi and Zuni groups of the American Southwest, probably based on Aztec religious ideas.

ca. 1350: The dramatic date of the *Rabin al Achi*, the only intact surviving drama produced by the Mayan culture; it was composed between that time and the Spanish conquest.

1376: The Aztec Empire is established in the Valley of Mexico under its first elected king, Acamapichtli.

ASIA AND THE PACIFIC

1220: Genghis Khan completes the conquest of inner Asia, having subdued Kara-Kitay and the Khwarezmian Empire.

1234: The Korean scientist Choe Yun-ui invents the first set of metal movable type; the first book printed with them is a set of ritual instructions, *Sangjeong yemun*.

ca. 1250: The Mongols systematically rebuild the infrastructure of the Silk Road, building hundreds of caravansaries along the various routes, in order to promote east-west trade, which they taxed.

1271: Kublai Khan, grandson of Genghis Khan, completes the conquest of China and begins the Yuan Dynasty.

1274: Japan repels a Mongol invasion with the help of the *kamikaze*, the “divine wind” (typhoon) that damaged the invasion fleet; another invasion attempt in 1281 was also prevented by storms.

ca. 1280: Chinese drama flourishes during the Yuan Dynasty (also known as the Mongol Dynasty); this is the golden age of Chinese theater.

ca. 1350: The beginning of Japanese Noh drama, a highly stylized literary form influenced by Buddhism and frequently referring to classical Chinese literature.

1368: Native Chinese officials and military officers overthrow Mongol rule and establish the Ming Dynasty.

EUROPE

philosophers investigating the science of optics.

ca. 1250: The foundation of the modern banking system is laid in the Italian city states, especially Venice.

1267: The alchemist and Scholastic philosopher Roger Bacon is the first European to describe the Chinese invention gunpowder.

1274: Thomas Aquinas’s publication of the *Summa theologiae*, which established the outlines of all later Scholastic philosophy and reconciled Greek philosophical and scientific learning (then being transmitted to Europe through Moorish Spain) with Christian doctrine.

ca. 1275: The ancient Chinese invention of the spinning wheel is introduced into Europe, stimulating the growth of the wool industry and international trade.

ca. 1280: The first mechanical clocks are invented in Europe and installed in churches to keep track of the liturgical hours of the day.

1305: The beginning of the “Babylonian Captivity” of the popes in Avignon, a scandal that eventually led to the election of rival popes and which was not resolved until 1415.

1321: Death of Dante and final publication of his *Divine Comedy*, the first great work of medieval vernacular (Italian) verse.

1324: Gunpowder artillery was first effectively employed at the siege of Metz, rendering all existing fortifications (castles and city walls) obsolete.

1347–50: The great pandemic of bubonic plague known as the Black Death kills as much as half the population of Europe.

1348: Jews, popularly blamed for the Black Death, are massacred in the Rhineland; survivors flee to Poland and lay the foundation for the Ashkenazy communities of Poland and Russia.

ca. 1350: The Merton scholars at Oxford and the French philosopher Nicole Oresme lay the foundation for the graphical representation of mathematical equations.

1356: The Jacquerie (in France) is the first of increasingly serious peasant revolts (rebellion of Wat Tyler in England, 1381; Hussite Wars in Bohemia, 1420–34) occasioned by the grievances of the poor, which looked toward later events such as the Reformation and French Revolution.

THE ISLAMIC WORLD

1250: The Mamluks, slave soldiers who had served the caliphate since the eighth century, rebel and establish an independent government in Egypt.

1258: Mongol invaders destroy the city of Baghdad, massacring the entire population and destroying the royal library (House of Wisdom), thus ending the golden age of Islamic culture.

1270: The Chinese invention of gunpowder is first described by an Arabic alchemist, Hassan al-Rammah.

1282: First mention of the use of the compass in Arabic texts, in the *Treasure Book of Merchants in Travels*.

1299: Osman I begins a series of conquests that would eventually bring the entire Middle East and Balkans under the rule of the Ottoman Turks.

1324: King Mansa Musa of Mali, founder of the Sankoré madrasa in Timbuktu, makes a celebrated pilgrimage to Mecca.

1347–50: The great pandemic of bubonic plague kills as much as half the population of the Mediterranean region of the Islamic world.

1365: The Ottoman Empire establishes the Janissary corps as an elite imperial bodyguard, composed of Christian slaves from the Balkans.

1400 – 1600

AFRICA

ca. 1400: In central Africa the rulers of Mpemba Kasi and the Mbata Kingdom enter a federation that creates the kingdom of Kongo.

1441: Representatives of the Ethiopian Orthodox Church attend the Council of Florence held by the Roman Catholic Church.

1444: The Portuguese begin the Atlantic slave trade on the western African coast; the slaves were originally used at sugarcane plantations on São Tomé, an island in the Gulf of Guinea.

1468: The Songhai Empire captures Timbuktu and replaces Mali as the dominant power in the Niger Delta and Sahel regions.

ca. 1470: The city of Benin, founded around 1180, becomes the main imperial power on the western African coast.

1485: After beginning diplomatic relations with the Portuguese, who were trading and exploring in western Africa, Nzinga a Nkuwu, the king of Kongo, converts to Christianity.

1486: Oba Esige, the king of Benin, sends his son to Portugal as an ambassador after several years of trade contacts with the Portuguese.

THE AMERICAS

ca. 1400: Carib colonists from South America displace earlier Arawak populations from the islands of the Lesser Antilles.

ca. 1400: The Aztec make vellum (animal skin) manuscripts written in a pictographic script (practices that may well have begun much earlier).

1431: Nezahuacoyotl is crowned king of Texcoco, the second most important Aztec city, and establishes important legal and artistic traditions.

1438: The foundation of the Inca Empire, which quickly expands to encompass almost all of the Pacific coast of South America and the inland Andes.

1492: Columbus reaches America, ultimately resulting in the complete colonization of North and South America.

1492–1560: Contact with Europeans introduces smallpox and other diseases against which Native Americans have no immunity, causing plagues that wipe out as much as 90 percent of the population.

1502: Creation of the Calendar Stone, a compilation in relief sculpture of Aztec history, mythology, and ideology.

1521: Spanish conquest of the Aztec Empire under Hernán Cortés.

1532: Spanish conquest of the Inca Empire under Francisco Pizarro.

1550: The *Popol Vuh*, a Mayan mythological epic, is written down in the modern Mayan language from now-lost Mayan texts of the Classic Period (before the 10th century).

ASIA AND THE PACIFIC

1402: The foundation of the Sultanate of Malacca on both sides of the straits between Malaysia and Java, a state that would control the increasingly important spice trade.

1405: The emperors of China dispatch treasure fleets of up to 500 immense ships to explore and dominate the Indian Ocean; the voyages are stopped after 1433 because of fears of foreign ideas.

1443: Phonetic alphabet is developed in Korea.

1498: Portuguese explorer Vasco da Gama reaches the port of Calicut, India.

EUROPE

1434: Under King Henry the Navigator of Portugal, explorers begin to sail down the African coast, eventually reaching the Indian Ocean and breaking the Islamic control of trade with India (1497).

1435: Leonbattista Alberti publishes *De pictura*, describing the first geometrically correct system of perspective in painting.

1455: Johannes Gutenberg produces in Mainz the first printed Bible with his invention of the printing press and movable type.

1492: Ferdinand and Isabella complete the Reconquista in Spain by capturing Granada and expel Jews from Spain; Columbus makes contact with the Americas on their commission.

THE ISLAMIC WORLD

1453: The Ottoman Turks capture and destroy the city of Constantinople, bringing the Byzantine Empire to an end and destroying much of the legacy of Greek literature.

1497: The Arab geographer Ahmad bin Majid serves as the Indian Ocean navigator for the Portuguese explorer Vasco da Gama on the first European voyage to round the Cape of Good Hope.

General Bibliography

GENERAL

- Jordan, William C. *Dictionary of the Middle Ages, Supplement 1*. New York: Charles Scribner's Sons, 2004.
- McKitterick, Rosamond. *Atlas of the Medieval World*. New York: Oxford University Press, 2004.
- Strayer, William R. *Dictionary of the Middle Ages*. New York: Charles Scribner's Sons, 1982–1989.

AFRICA

- Brooks, George E. *Landlords and Strangers: Ecology, Society, and Trade in Western Africa, 1000–1630*. Boulder, Colo.: Westview Press, 1993.
- Connah, Graham. *African Civilizations: An Archaeological Perspective*, 2nd ed. New York: Cambridge University Press, 2001.
- Hall, Martin. *Farmers, Kings, and Traders: The People of Southern Africa, 200–1800*. Chicago: University of Chicago Press, 1990.
- Davis, Jr., R. Hunt. *Encyclopedia of African History and Culture*, 5 vols. New York: Facts On File, 2005.
- Kusimba, Chapurukha. *The Rise and Fall of Swahili States*. Walnut Creek, Calif.: AltaMira, 1999.
- Levtzion, Nehemia. *Ancient Ghana and Mali*. New York: Holmes and Meyer, 1980.
- McIntosh, Roderick. *Ancient Middle Niger: Urbanism and the Self-Organizing Landscape*. New York: Cambridge University Press, 2005.
- Oliver, Roland, and Anthony Atmore. *Medieval Africa, 1250–1800*. New York: Cambridge University Press, 2001.
- Oliver, Roland, and Brian Fagan. *Africa in the Iron Age, c. 500 B.C.–A.D. 1400*. New York: Cambridge University Press, 1975.
- Tamrat, Tadesse. *Church and State in Ethiopia, 1270–1527*. Oxford, U.K.: Oxford University Press, 1972.
- Vansina, Jan. *Kingdoms of the Savanna*. Madison, Wis.: University of Wisconsin Press, 1966.
- Vansina, Jan. *Paths in the Rainforests: Toward a History of Political Tradition in Equatorial Africa*. Madison, WI: University of Wisconsin Press, 1990.
- Vansina, Jan. *How Societies Are Born: Governance in West Central Africa before 1600*. Charlottesville: University of Virginia Press, 2004.

THE AMERICAS

- Ames, Kenneth M., and Herbert D. G. Maschner. *Peoples of the Northwest Coast: Their Archaeology and Prehistory*. London: Thames and Hudson, 2000.
- D'Altroy, Terence N. *The Incas*. Malden, Mass.: Blackwell, 2002.
- Evans, Susan Toby. *Ancient Mexico and Central America: Archaeology and Culture History*. New York: Thames and Hudson, 2004.
- Fagan, Brian M. *Ancient North America: The Archaeology of a Continent*, 4th ed. New York: Thames and Hudson, 2005.
- Mann, Charles C. *1491: New Revelations of the Americas before Columbus*. New York: Knopf, 2005.
- Moseley, Michael E. *The Incas and Their Ancestors*, 2nd ed. New York: Thames and Hudson, 2001.
- Pauketat, Timothy R. *Ancient Cahokia and the Mississippians*. New York: Cambridge University Press, 2004.
- Sharer, Robert J., with Loa P. Traxler. *The Ancient Maya*, 6th ed. Stanford, Calif.: Stanford University Press, 2006.
- Smith, Michael E. *The Aztecs*. Malden, Mass.: Blackwell, 2003.
- Smith, Bruce D. *The Mississippian Emergence*, 2nd ed. Tuscaloosa: University of Alabama Press, 2007.
- Wilson, Samuel M, ed. *The Indigenous People of the Caribbean*. Gainesville: University Press of Florida, 1997.

ASIA AND THE PACIFIC

- Andaya, Barbara W. *The Flaming Womb: Repositioning Women in Early Modern Southeast Asia*. Honolulu: University of Hawaii Press, 2006.
- Andaya, Leonard Y. *The World of Maluku: Eastern Indonesia in the Early Modern Period*. Honolulu: University of Hawaii Press, 1993.
- Asher, Catherine B., and Cynthia Talbot. *India before Europe*. New York: Cambridge University Press, 2006.
- Embrey, Patricia Buckley. *The Cambridge Illustrated History of China*. Cambridge, U.K.: Cambridge University Press, 1999.
- Fischer, Steven Roger. *A History of the Pacific Islands*. New York: Palgrave Macmillan, 2002.
- Hall, Kenneth R. *Maritime Trade and State Development in Early Southeast Asia*. Honolulu: University of Hawaii Press, 1985.

- Higham, Charles. *The Archaeology of Mainland Southeast Asia: From 10,000 B.C. to the Fall of Angkor*. New York: Cambridge University Press, 1989.
- Higham, Charles. *The Civilization of Angkor*. Berkeley: University of California Press, 2004.
- Higham, Charles F. W. *Encyclopedia of Ancient Asian Civilizations*. New York: Facts On File, 2004.
- Kirch, Patrick Vinton. *On the Road of the Winds: An Archaeological History of the Pacific Islands before European Contact*. Berkeley: University of California Press, 2000.
- Reid, Anthony. *Southeast Asia in the Age of Commerce, 1450–1680*. New Haven, Conn.: Yale University Press, 1993.
- Thapar, Romila. *Early India: From the Origins to A.D. 1300*. Berkeley: University of California Press, 2003.

EUROPE

- Bartlett, Robert. *The Making of Europe: Colonization, and Cultural Change, 950–1350*. Princeton, N.J.: Princeton University Press, 1993.
- Bennett, Judith, and C. Warren Hollister. *Medieval Europe: A Short History*, 10th ed. New York: McGraw-Hill, 2006.
- Cantor, Norman. *The Civilization of the Middle Ages*. New York: HarperCollins, 1994.
- Crabtree, Pam J. *Medieval Archaeology: An Encyclopedia*. New York: Garland, 2001.
- Curta, Florin. *East Central Europe and Eastern Europe in the Early Middle Ages*. Ann Arbor: University of Michigan Press, 2005.
- Davis, R. H. C. *A History of Medieval Europe: From Constantine to Saint Louis*, 3rd ed. New York: Longman, 2005.
- Fitzhugh, William W., and Elisabeth I. Ward, eds. *Vikings: The North Atlantic Saga*. Washington, D.C.: Smithsonian Institution Press, 2000.
- Hodges, Richard. *Dark Age Economics: The Origins of Towns and Trade, A.D. 600–1000*, 2nd ed. London: Duckworth, 2004.
- Holmes, George, ed. *The Oxford Illustrated History of Medieval Europe*. New York: Oxford University Press, 2001.
- Huizinga, Johan. *The Waning of the Middle Ages*. New York: Dover, 1999.
- Jordan, William Chester. *Europe in the High Middle Ages*. New York: Viking, 2003.
- Keen, Maurice. *The Pelican History of Medieval Europe*. New York: Penguin, 1969.
- Le Goff, Jacques. *Medieval Civilization, 400–1500*, trans. Julia Barrow. Oxford: Blackwell, 1988.
- McCormick, Michael. *Origins of the European Economy: Communications and Commerce, A.D. 300–900*. New York: Cambridge University Press, 2002.
- Pirenne, Henri. *Medieval Cities: Their Origins and the Revival of Trade*. Princeton, N.J.: Princeton University Press, 1969.
- Pirenne, Henri. *Mohammed and Charlemagne*. London: Routledge, 2007.
- Rosenwein, Barbara. *A Short History of the Middle Ages*, 2nd ed. Orchard Park, N.Y.: Broadview Press, 2004.
- Waldman, Carl and Catherine Mason. *Encyclopedia of European Peoples*, 2 vols. New York: Facts On File, 2006.
- Wickham, Chris. *Framing the Early Middle Ages: Europe and the Mediterranean, 400–800*. New York: Oxford University Press, 2007.

THE ISLAMIC WORLD

- Arnold, Sir Thomas, and Alfred Guillaume, eds. *The Legacy of Islam*. Oxford. U.K.: Clarendon Press, 1931.
- Berkeley, Jonathan P. *The Formation of Islam: Religion and Society in the Near East, 600–1800*. New York: Cambridge University Press, 2003.
- Bulliet, Richard. *The Case for Islamo-Christian Civilization*. New York: Columbia University Press, 2004.
- Campo, Juan E. *Encyclopedia of Islam*. New York: Facts On File Publishing, 2008.
- Daniel, Norman. *The Cultural Barrier: Problems in the Exchange of Ideas between Historical Islam and the West*. Edinburgh: Edinburgh University Press, 1975.
- Daniel, Norman. *Islam and the West: The Making of an Image*. Edinburgh: Edinburgh University Press, 1960.
- Frasseto, Michael and David Blanks, eds. *Western Views of Islam in Medieval and Early Modern Europe: Perception of Other*. New York: St. Martin's Press, 1999.
- Ghazanfar, S. M. *Medieval Islamic Economic Thought: Filling the "Great Gap" in European Economics*. London: RutledgeCurzon, 2003.
- Ghazanfar, S.M. *Islamic Civilization: History, Contributions, and Influence—A Compendium of Literature*. Lanham, Md.: Scarecrow Press, 2006.
- Hill, Fred J., and Nicholas Awde. *A History of the Islamic World*. New York: Hippocrene Books, 2003.
- Hodgson, Marshall G. S. *The Venture of Islam: Conscience and History in a World Civilization*, 3 vols. Chicago: University of Chicago Press, 1974.
- Lapidus, Ira. *A History of Islamic Societies*, 2nd ed. New York: Cambridge University Press, 2002.
- Lowney, Chris. *A Vanished World: Muslims, Jews, and Christians in Medieval Spain*. New York: Oxford University Press, 2006.
- Menocal, Maria Rosa. *The Ornament of the World: How Muslims, Jews, and Christians Created a Culture of Tolerance in Medieval Spain*. Boston: Little, Brown, 2002.
- Morgan, Michael H. *The Enduring Legacy of Muslim Scientists, Thinkers, and Artists*. Washington, D.C.: National Geographic Society, 2007.
- Reeves, Minou. *Muhammed in Europe: A Thousand Years of Myth-making*. New York: New York University Press, 2001.
- Schacht, Joseph. *The Legacy of Islam*, 2nd ed. Oxford. U.K.: Clarendon Press, 1975.
- Southern, Sir Richard. *Western Views of Islam in the Middle Ages*. Cambridge, Mass.: Harvard University Press, 1962.
- Wallace-Murphy, Tim. *What Islam Did for Us: Understanding Islam's Contributions to Western Civilization*. London: Watkins Publishing, 2006.
- Watt, W. Montgomery. *The Influence of Islam on Medieval Europe*. Edinburgh: Edinburgh University Press, 1994.

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